



SVCScan

Android Data Acquisition Software

USER MANUAL

Version 1.2

29 Firemens Way, Poughkeepsie, New York 12603 USA
Voice: (845) 471-7007, Fax: (845) 471-7020, E-mail: svcinfo@spectravista.com
Copyright © 2021 Spectra Vista Corporation

Table of Contents

INTRODUCTION.....	1
SUPPORTED ANDROID OPERATING SYSTEMS / PLATFORMS	1
SUPPORTED ANDROID LOCALIZATIONS / LANGUAGES	1
SUPPORTED INSTRUMENTS	1
DOWNLOADING / INSTALLING SVCSCAN FROM GOOGLE PLAY.....	1
INSTALLATION ISSUE – “SCREEN OVERLAY DETECTED”	2
PAIRING SVCSCAN WITH AN I-SERIES INSTRUMENT	4
<i>TIP – FIXING PAIRING ISSUES</i>	5
ANDROID OS PERMISSIONS.....	5
SVCSCAN MENU AND SCREENS.....	6
HOME SCREEN.....	7
WEATHER SCREEN	11
FILES SCREEN	12
SPECTROMETER SCREEN	13
APP SETTINGS SCREEN	14
DEVICES SCREEN	16
PRIVACY POLICY SCREEN	17
USING SVCSCAN WITH THE WEDI	18
MOVING ACQUIRED DATA TO A PC.....	20
SIG FILE PC WINDOWS PROCESSING.....	23
SIG FILE OVERLAP / MATCHING TOOL	23
SIG FILE MERGE TOOL	23

Table of Figures

Figure 1 Initial Pairing With an i-Series Instrument.....	4
Figure 2 Entering the Bluetooth PIN During Pairing	4
Figure 3 SVCSan Menu	6
Figure 4 SVCSan Home Screen (Portrait Orientation).....	7
Figure 5 SVCSan Home Screen (Landscape Orientation).....	8
Figure 6 Three Display Modes: Radiance (Reference/Target), Reflectance, and Photo.....	9
Figure 7 Pinch-to-Zoom Graph Data (Landscape Only).....	10
Figure 8 Weather Information Entry Screen	11
Figure 9 SIG File Handling - Top Level (Empty), Folder View -> File View	12
Figure 10 Spectrometer Control Screen – Scan Time Mode (Left), Coadds Mode (Right).....	13
Figure 11 App Setting Screen.....	14
Figure 12 Android Platform Roll and Pitch Displayed In Real-time.....	14
Figure 13 Device Selection Screen	16
Figure 14 Downwelling Irradiance Within Range (Left) and Out Of Range (Right), with Acceptable Deviation = 10%.....	18
Figure 15 Correct Android USB Usage Settings.....	20
Figure 16 Windows PC Explorer Folder View - SVCSan Top Folder	21
Figure 17 Windows PC Explorer Folder View - SVCSan Folder Contents	22

Introduction

SVCSan is an Android app that is used to control Spectra Vista Corporation (SVC) i-Series field-portable spectroradiometers. The app may be used to:

- Acquire new spectral data scans from i-Series instrument, and store the new data to files.
- Graphically view spectral data that has previously been acquired from the instrument.

SVCSan presents the spectroradiometer operator with a graphical user interface (GUI). This GUI may be used to trigger scans, and is also able to control all scan settings within the connected instrument.

For convenience, the GUI may be operated while the Android device is orientated in either portrait or landscape mode.

SVCSan communicates wirelessly via a Bluetooth connection between the Android platform and the instrument – no cables are required for operation.

Supported Android Operating Systems / Platforms

SVCSan has been tested with several models of Android phones and Android tablets. The app requires a Bluetooth interface in order to communicate with the i-Series spectroradiometer.

The app works with all versions of Android at OS version 4.1 or newer.

Supported Android Localizations / Languages

SVCSan supports the following Android Languages

- English
- Chinese (Simplified)

Supported Instruments

SVCSan is compatible with the following Spectra Vista instrument models:

- XHR-1024i
- HR-1024i
- HR-768i
- HR-768si
- HR-640i
- HR-512i

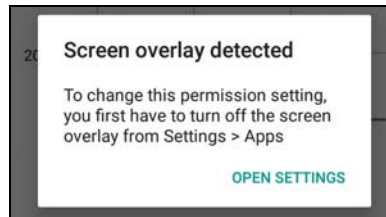
Downloading / Installing SVCSan From Google Play

SVCSan may be downloaded and installed directly from the Google Play Store, located at <https://play.google.com/store>. On that web site, search for “SVCSan” from Spectra Vista Corporation, and then select the app for download and installation.

If you do not have access to the internet from your Android device, please contact Spectra Vista to request a standalone APK installation file that does not require direct internet access for installation.

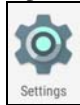
Installation Issue – “Screen overlay detected”

After initially installing SVCScan on some versions of Android, you may encounter the following screen when running SVCScan for the first time:



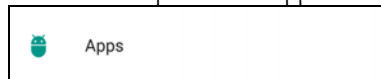
If you do see this screen, then the Android OS is encountering an issue when trying to set app permissions directly from a running app. Take the following steps to correct the problem:

- Exit SVCScan immediately by pressing the Android “Running Apps” button (usually marked with a square symbol) and pressing the “x” in the upper-right corner of the SVCScan entry.
- Open the Android OS “Setting” app, usually marked by a “gear” icon.



- We'll use the Android Settings app to manually set SVCScan's permissions, as follows:

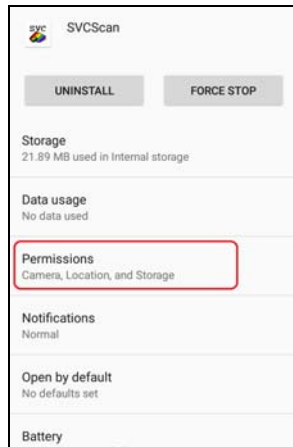
- Find and press the “Apps” or “Applications” menu entry.



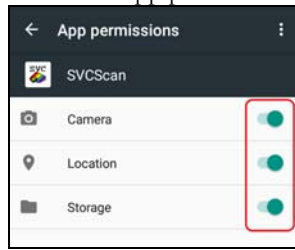
- Find and press the “SVCScan” menu entry.



- Press the SVCScan “Permissions” menu entry.



- Set all app permission to “On”.



- Exit the Settings app, and re-start SVCScan.

Pairing SVCSan With An i-Series Instrument

Pairing is the process of creating an initial Bluetooth connection between the Android device and the i-Series instrument. This pairing process only needs to take place once; after the initial app installation and pairing, SVCSan retains the Bluetooth connection parameters and will automatically re-connect with the last paired instrument at app startup.

After SVCSan is installed and running on a new device, the app initially displays the following screen:

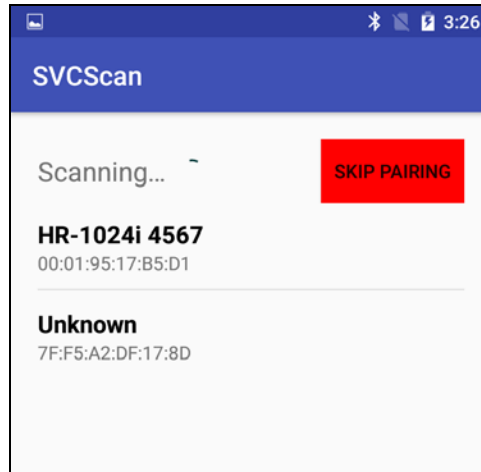


Figure 1 Initial Pairing With an i-Series Instrument

In this initial pairing mode, SVCSan displays all of the Bluetooth sources that are currently within range of the Android device.

Note that the “SKIP PAIRING” button may be pressed at any time to bypass the pairing/connection process and proceed directly to the app’s main screen. This is useful if the operator just wants to review existing scans, without connecting to the i-Series instrument.

To pair with the instrument, tap the correct list entry - “HR-1024i 4567” in the example above. This takes you to the dialog shown below, where the instrument’s Bluetooth PIN must be entered:

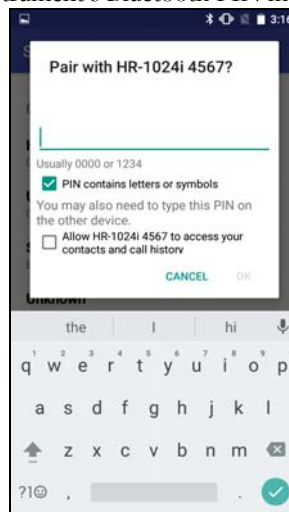


Figure 2 Entering the Bluetooth PIN During Pairing

Be sure to check “PIN contains letters or symbols” in the above dialog, in order to enter the required non-numeric PIN characters.

Now enter the PIN using the on-screen keyboard. The PIN string varies with instrument model according to the table below:

Instrument Model	Bluetooth PIN
XHR-1024i	xhr1024i
HR-1024i	hr1024i
HR-768i	hr768i
HR-768si	hr768si
HR-640i	hr640i
HR-512i	hr512i

After entering the PIN, press the OK button to complete the pairing process.

TIP – FIXING PAIRING ISSUES


1. Ensure that the i-Series instrument is powered up, is within range, and that there are no cables plugged in to the instrument's USB or AUX ports.
2. If a pairing attempt repeatedly fails, try re-booting both the Android device and the i-Series instrument.
3. In the "Initial Pairing" or "Devices" screen elsewhere in this document, it is common for the name "**Unknown**" to be initially displayed in the list of detected Bluetooth devices. It may take 60-90 seconds for the familiar names to be displayed. Be patient.
4. Some Android platforms do not support application pairing with external devices very well – for example, they do not allow an application operator enough time to complete typing the Bluetooth PIN. If this seems to happen, or repeated attempt to pair through SVCScan fail, then try using the Android OS to achieve the pairing instead. This is typically found under the OS's Settings->Bluetooth menu.

Android OS Permissions

SVCScan requires the following runtime permissions from the Android OS:

Permissions	Reason Permission Is Required
Camera Access	SVCScan has the ability to acquire target photos directly using the Android camera on platforms that include a camera. See the "App Settings" section below for additional details.
Location	SVCScan uses location and time information in order to calculate and store sun angle information as auxiliary data within output files. It also accesses platform orientation (roll, pitch), and optionally stores this information in output files as well. Finally, SVCScan will optionally use location information to automatically retrieve local weather information from a weather server and store this weather information in output files. See the "App Settings" section below for additional details.
Storage	SVCScan stores scan data and acquired target photos in the Android platform's on-board storage in a folder called: "\SVCScan" (prior to version 1.6.0) or "\Download\SVCScan" (Version 1.6.0 and later).

SVCSan Menu and Screens

Pressing the menu  button located in the upper-left portion of the screen displays the SVCSan main menu:

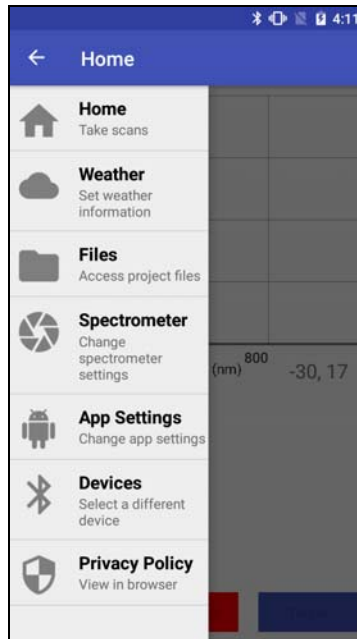


Figure 3 SVCSan Menu

Tap any of the menu entries to transition to one of SVCSan's control/setup screens. Each of these screens is described in a section below.

Home Screen

The home screen contains controls that are used to acquire and display new scans from the attached instrument. In addition, it may also be used to display previously acquired scans via the “Files” screen. The portrait mode home screen is shown below:

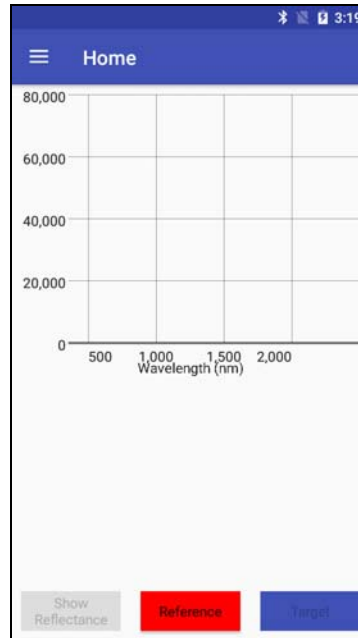


Figure 4 SVCSan Home Screen (Portrait Orientation)

The portrait orientation home screen consists of three areas:

The topmost area displays the current radiance graph, reflectance graph, or target photo. In this orientation, the graphical information is static and cannot be panned or zoomed. In the example above, a blank radiance graph is initially shown.

The middle area displays the current graph’s header (auxiliary) information in text format. This is the date, time, scan settings, etc. that are associated with the displayed graph. In the example above, this area is blank.

The bottom area contains 3 buttons with the following functions:

- **Show Radiance/Show Reflectance/Show Photo – Gray Button** - this changes the type of information displayed in the topmost area of the screen to the indicated type. This button toggles among the three display modes with each button press.
- **Reference – Red Button** - this button causes reference scan acquisition to occur on the connected instrument. The results of the reference scan are displayed in the graph area.
- **Target – Blue Button** - this button causes a target scan acquisition to occur on the connected instrument. Depending on the current “Show” mode, the resulting graph is displayed, and a new SIG data file is written to storage.

Similarly, the landscape orientation home screen is shown below:

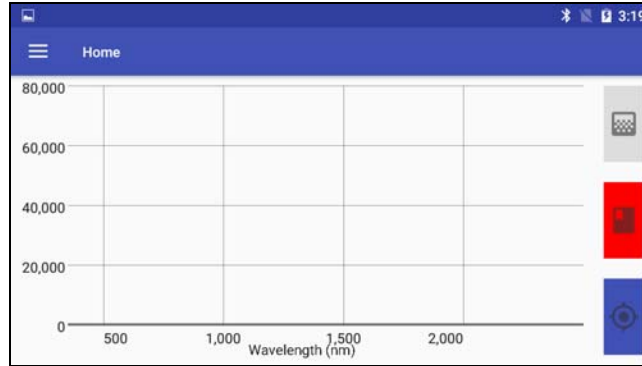


Figure 5 SVCSan Home Screen (Landscape Orientation)

The landscape orientation home screen differs slightly from portrait orientation in the following ways:

- The current graph's header (auxiliary) text information is not displayed; this makes more room for the graph itself.
- The text on the 3 buttons has been replaced by an iconic representation.
- The graph area may now be panned and zoomed by using 2-finger pinch/drag operations. This allows the operator to focus in on small features in the displayed graph.

The figure below illustrates, side-by-side, the effect of repeatedly pressing the “Show ...” button to change the type of information displayed in the upper portion of the portrait orientation display:

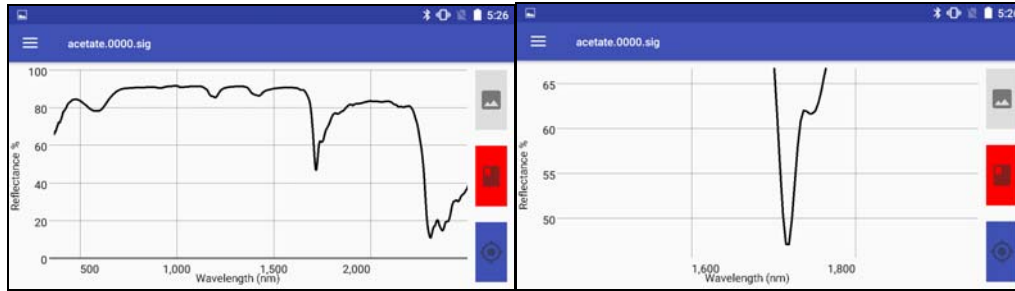


Figure 7 Pinch-to-Zoom Graph Data (Landscape Only)

In this example, the operator has focused in on the trough located near 1715 nm using zoom and pan operations.

Weather Screen

The Weather Screen allows the operator to enter weather-related information into the app. Once entered, the weather is stored as header information within each spectral data output file.

Weather information may be entered in one of two ways:

- Manually, by selecting and typing information in any desired field.
- Automatically, by pressing the AUTOFILL button. In order to use this button, the Android platform must have previously determined its location, and an internet connection must be available. Under these conditions, the app requests local weather information from an internet weather server (OpenWeatherMap.org) and fills in the weather fields automatically.

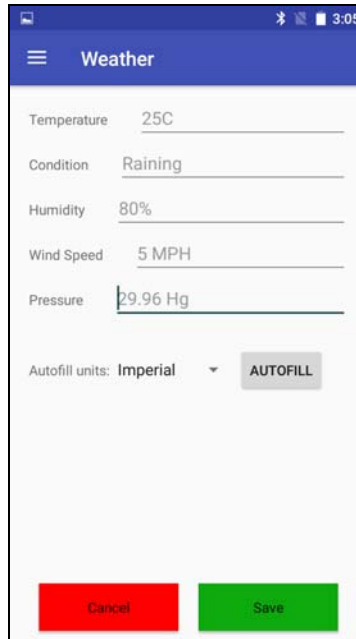


Figure 8 Weather Information Entry Screen

The “**Autofill units**” control determines the units on weather information that is retrieved from the internet weather server. The options for this control are **Standard**, **Metric**, and **Imperial**.

Note that, once entered, it is the operator’s responsibility to ensure that this screen contains accurate weather information over the period of time that new scans are acquired from the spectrometer.

Files Screen

The Files Screen serves two purposes:

- Set a new output file Basename – a “basename” is the beginning portion of file names that the app uses to write new SIG files to storage. The operator may enter a new base name by editing the “Current Basename” field. The default Basename at app startup consists of the string “HR.mmDDyy”, where mm=month, DD=day, yy=year.
- Open an existing file – the operator may select an existing SIG file. The SIG file’s contents are then displayed in the Home Screen.

The figures below show:

- On the left: Empty storage with no stored SIG files and a current base name of HR.010819. This is how the File Screen appears prior to acquiring any spectral scans.
- In the middle: Folder view, showing just 1 sequence of SIG files currently stored, all with the basename “HR.010819”.
- On the right: After tapping on the “HR.010819” folder, 3 SIG files that all have a base name of “HR.010819” are shown. The three individual files are named HR.010819.0000.sig, HR.010819.0001, and HR.010819.0002.sig. Pressing any one of these three sequence numbers will cause that file to be loaded and graphed in the Home Screen.

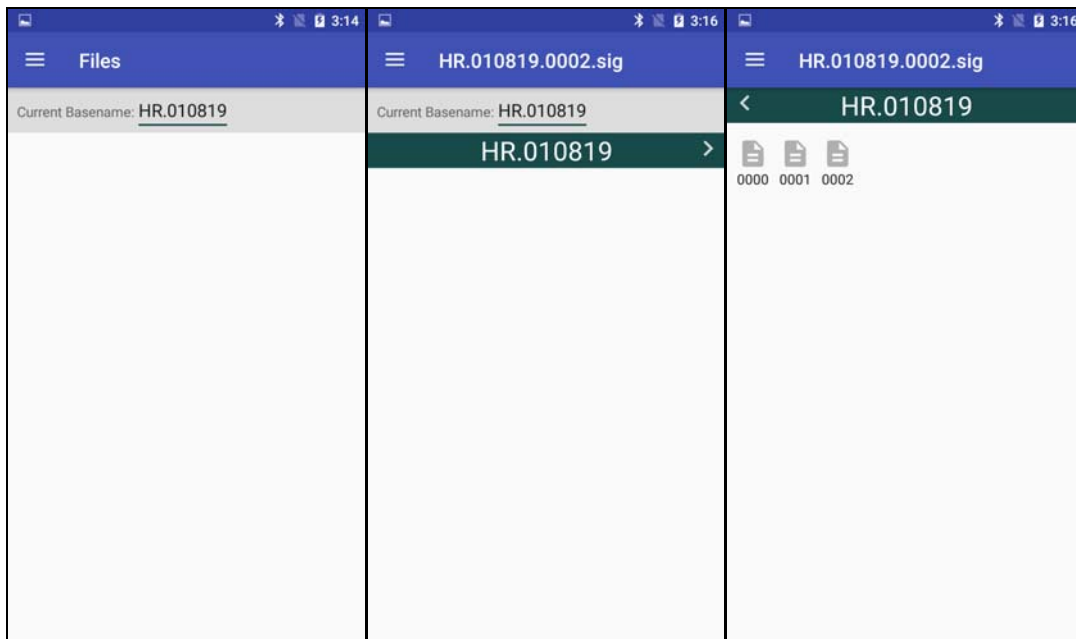


Figure 9 SIG File Handling - Top Level (Empty), Folder View -> File View

When writing SIG files, the app automatically appends a four-digit incrementing value to the basename as each subsequent SIG file is created.

So for example, if the operator specifies the basename “pond”, the first SIG file created from a target scan will have the file name “pond.0000.sig”, the second “pond.0001.sig”, the third “pond.0002.sig”, etc.

Spectrometer Screen

The Spectrometer Screen allows the operator to change setting within the connected i-Series instrument. Two views of the Spectrometer Screen are shown below:

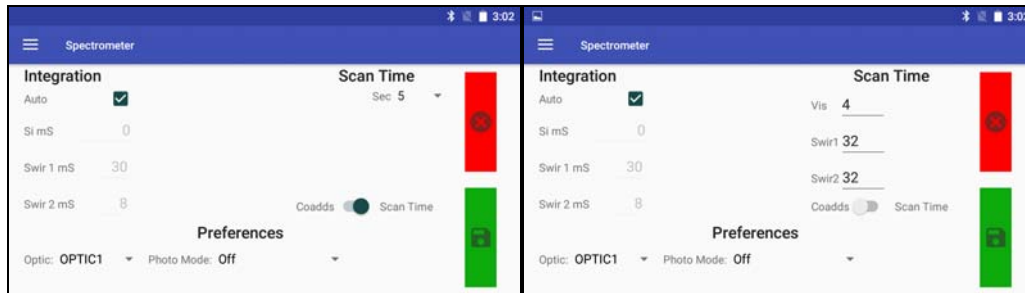


Figure 10 Spectrometer Control Screen – Scan Time Mode (Left), Coadds Mode (Right)

The spectrometer controls on this screen are:

- **Integration** – when **Auto** is checked, the connected instrument chooses the best integration time settings under the current lighting conditions; when **Auto** un-checked, the operator may manually select individual detector integration times in milliseconds for the **Si** (350-1050 nm), **Swir 1** (950-1850 nm), and **Swir 2** (1850-2500 nm) detectors.
- **Scan Time** – when in **Scan Time** mode, the operator selects the number of seconds allocated to each reference and target scan. When in **Coadds** mode, the operator selects the number of coadds (sub-scans) that each detector contributes to each reference and target scan. Note that the number of Coadds selected in this menu represents pairs of **Coadds**; so for example if “4” is selected, the resulting scan will actually contain 8 **Coadds** averaged together.
- **Optic** – select which one of up to eight fore-optics is currently installed on the instrument. This determines which radiometric calibration table is used to produce calibrated radiance/irradiance spectral data in the output SIG files.
- **Photo Mode** – determine the type of photo acquired by the connected instrument’s internal JPEG camera:
 - **Off** – no photo will be acquired.
 - **Low Resolution** – a low resolution target photo is acquired with each target.
 - **High Resolution** – a high resolution target photo is acquired with each target.

Note that the instrument Photo Mode control may be over-ridden and disabled if the operator chooses to use the Android camera instead of the instrument’s camera. See the **App Settings Screen** for more details.

When the controls are set as desired, the operator presses the **green Save button** to send the new spectrometer settings to the connected instrument.

Pressing the **red Cancel button** will discard any new settings, leaving the actual instrument settings unchanged.

App Settings Screen

The App Settings Screen lets the operator control SVCSan internal settings.

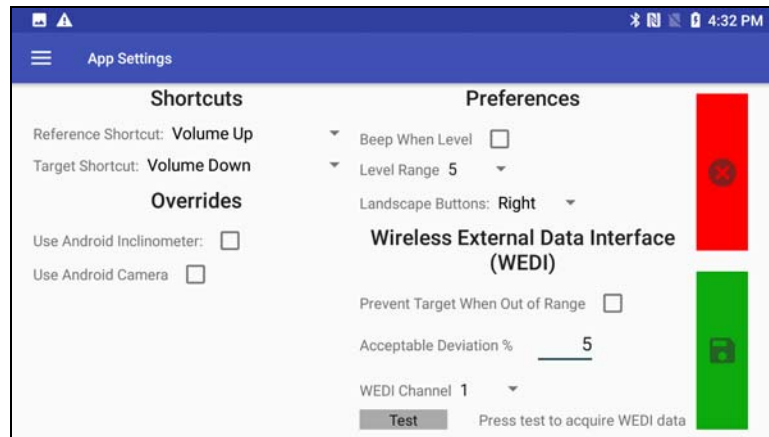


Figure 11 App Setting Screen

The app controls on this screen are:

Shortcuts:

- **Reference / Target Shortcut** - Reference and Target scans may optionally be acquired by pressing the Android volume up/down buttons. These are the physical buttons generally located on the side of the Android device. When enabled, these shortcuts may be used instead of tapping the red/green soft buttons displayed within the Home Screen. The supported methods of activation of the volume buttons for each action (Take a Reference scan, Take a Target scan) are:
 - **None** – no shortcut; the volume buttons do not cause scan acquisition to occur.
 - **Volume Up** – single-click on up volume.
 - **Volume Down** – single-click on down volume.
 - **Any Single Click** – single-click on up **or** down volume.
 - **Double Click Volume Up** – double-click on up volume.
 - **Double Click Volume Down** – double-click on down volume.
 - **Any Double Click** – double-click on up **or** down volume.

Overrides:

- **Use Android Inclinometer** – when checked, the Android platform's internal inclinometer is used to determine the Roll and Pitch angle values in effect whenever a Reference or Target scan is acquired. Normally, the inclinometer within the connected instrument supplies the Roll and Pitch values that are stored in each SIG file header. When enabled, the Android device's current roll and pitch values are displayed in the lower-right hand side of the Home Screen:

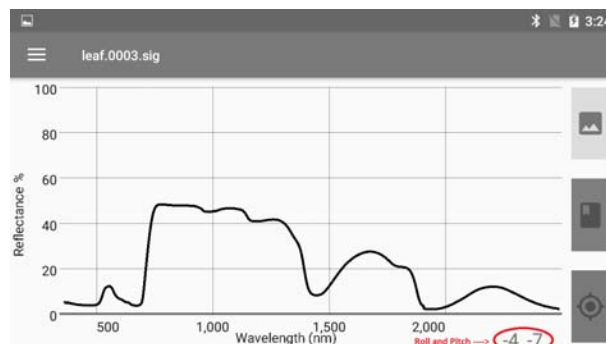


Figure 12 Android Platform Roll and Pitch Displayed In Real-time

- **Use Android Camera** – when checked, the Android platform’s internal camera is used to acquire Target scan photos. Normally, the instrument’s own internal JPEG camera acquires Target scan photos. Using the Android camera over-rides the Photo Mode setting within the Spectrometer Screen.

Preferences:

- **Beep When Level** – It may be desirable to know when the Android device is being held level with the ground. The app will emit a beeping sound if this preference is checked and the device is held level, to the degree determined by the next preference.
- **Level Range** – This setting determines the range, in \pm degrees, that is considered to be level.
- **Landscape Buttons** – When the Android device is held in landscape mode, this setting determines whether the 3 Home Screen buttons (Reference/Target/Mode) appear on the left- or right-hand-side of the display

Wireless External Data Interface (WEDI):

Note: These control items only apply to systems that include a WEDI-4 or WEDI-16 device; if your spectrometer system does not include a WEDI, disable this function by un-checking the “Prevent Target When Out Of Range” checkbox.

- **Prevent Target When Out of Range** – When checked, if the downwelling irradiance is currently outside the “Acceptable Deviation %” setting, the operator will be warned before a Target is acquired. If un-checked, the WEDI-reported downwelling irradiance does not play any role in Target acquisition.
- **Acceptable Deviation %** – This is the +/- percentage deviation allowed in the downwelling irradiance before the operator is warned that the last Reference scan may no longer be valid for the current downwelling irradiance.
- **WEDI Channel** – Selects which WEDI channel (1 – 16) is the source of downwelling irradiance data. This source is typically the PAR sensor input. The channel depends on the WEDI model in use.
 - **WEDI-4** – Use channel 1, the PAR Sensor input.
 - **WEDI-16** – Use channel 13 or 14, depending on which connector your PAR Sensor is plugged into.

Note that while the PAR (Photosynthetically Active Radiation) sensor is used throughout this manual as the source of downwelling irradiance, it may be possible to use other appropriate WEDI-connected sensors for this purpose as well.
- **TEST** – Press the TEST button in order to display the current data value from the selected **WEDI channel**. This button may be used to test the downwelling irradiance function values during setup.

For more information on how to use SVCScan’s real-time downwelling irradiance monitoring capability, see the section “Using SVCScan With The WEDI” within this manual.

When the App Settings values are set as desired, the operator presses the **green Save button** to permanently save the app settings.

Pressing the **red Cancel button** will discard any new settings, leaving the prior settings unchanged.

Devices Screen

Selecting the Devices Screen returns the app to pairing mode:

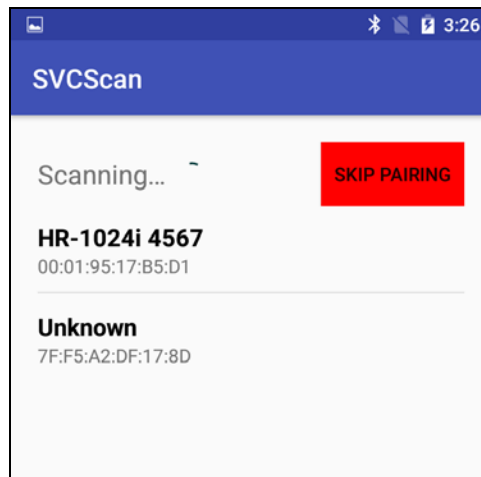


Figure 13 Device Selection Screen

See the section **Pairing SVCSan With An i-Series Instrument** for details on this screen.

Privacy Policy Screen

Selecting this menu item will open an internet browser and display Spectra Vista's app privacy policy to the operator. An internet connection is required.

Using SVCScan With The WEDI

SVCScan has the capability to monitor real-time downwelling solar irradiance via a WEDI-4 or WEDI-16 and warn the user whenever downwelling Target irradiance changes with respect to Reference irradiance. This capability can significantly reduce the number of “bad” target scans dramatically and therefore increase the efficiency of any field campaign.

In order to do this:

- The WEDI must be powered-on and connected via Bluetooth to the iSeries instrument. This allows the SVCScan software to access the WEDI’s PAR (Photosynthetically Active Radiation) sensor data via its own Bluetooth connection to the iSeries instrument.
- The SVCScan software must be configured via its App Settings menu to enable its real-time WEDI monitoring function; see the section “**App Settings Screen**” for related settings.

When enabled in this way, SVCScan polls the WEDI’s PAR sensor and updates related information on the SVCScan main screen in two places, as shown below:

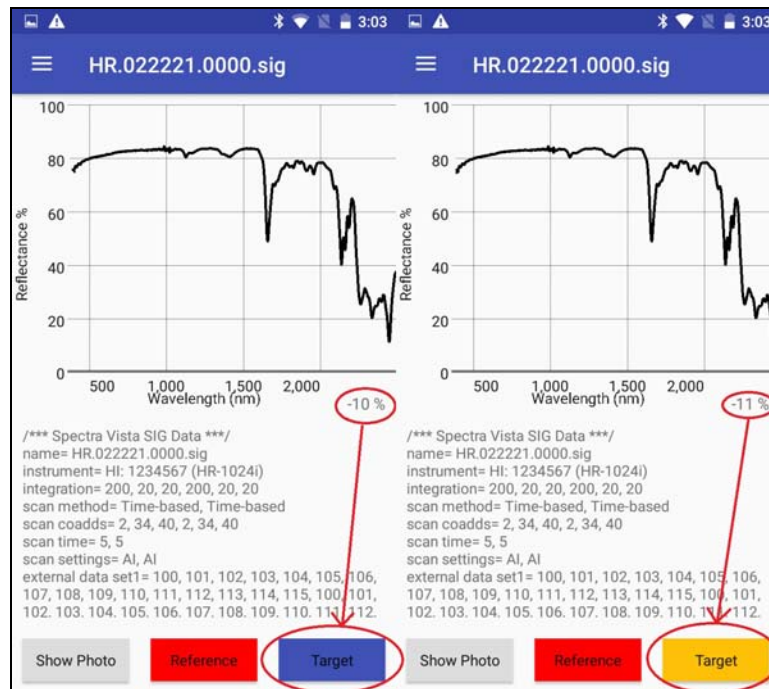


Figure 14 Downwelling Irradiance Within Range (Left) and Out Of Range (Right), with Acceptable Deviation = 10%

In the example above, the SVCScan App Setting Screen has the following values set:

- **Prevent Target When Out of Range** is **checked**; this enables the real-time monitor.
- **Acceptable Deviation %** value is set to **10%**; this sets +/- irradiance change limits.

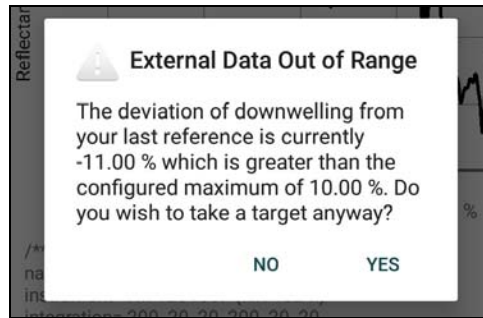
In addition, a prior Reference scan has already been acquired, effectively setting the baseline downwelling irradiance level at reference time.

In the left screen (above), the circled value tells the operator that the downwelling irradiance is currently down by 10% when compared to the irradiance when the Reference scan was acquired. Since the current downwelling is less-than/equal-to the acceptable deviation, the Target button is its normal blue color, and a successful target can now be acquired normally.

But in the right screen (above), the downwelling irradiance is now down by 11% when compared to the Reference scan. Since the current downwelling is now greater than the acceptable deviation, the Target button has changed to yellow, warning the operator about current conditions. The operator can wait a few moments, perhaps for a cloud to clear from the sun. Or the operator can choose to acquire a new Reference scan, if appropriate.

Note that, even when the Target button is yellow, the operator may still press it and acquire a new target scan.

However, if a yellow Target button is pressed, the operator is warned with the message shown below:



Moving Acquired Data To A PC

SVCScan stores all acquired spectral data and ancillary information into data files with a “.sig” file extension. Likewise, any target photos are stored in JPEG format into files with a “.jpg” file extension. These files may be found within the Android device in a folder named “SVCScan”.

The SVCScan files may be typically and most easily moved from Android device storage to a Windows PC via a USB cable connection.

Once connected, Android storage will appear as a folder in Windows Explorer. Files may then be selected, dragged and dropped from Android to Windows.

Note however that some versions of Android may require additional steps in order to successfully transfer files:

- The Android device should always be re-booted after acquiring spectral data and before connecting the USB cable. Failure to reboot may result in some SIG or JPG files to appear to be missing from the SVCScan folder under Windows Explorer.
- For security purposes, some versions of Android require the operator to explicitly change the reason for connecting the USB cable to the Windows PC. A typical menu for doing this is shown in the example below. Each time the USB cable is connected, the connection type defaults to “Charging” only, preventing file transfers. This setting must be changed to “File Transfers” every time the USB cable is connected before files may be successfully dragged/drop between the two devices.

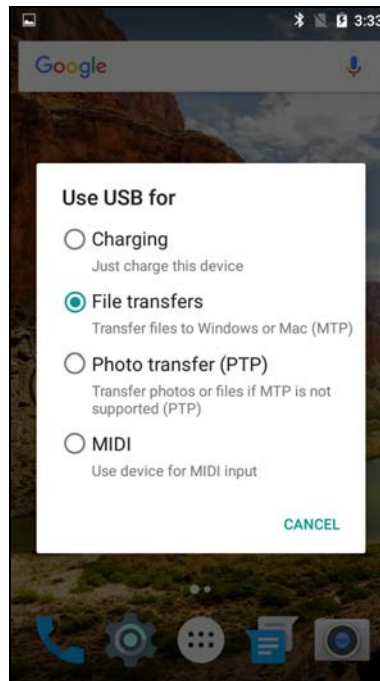


Figure 15 Correct Android USB Usage Settings

The menu in the example above appears when the operator swipes-down from the top of the screen just after the USB cable is connected. The exact method to specify the purpose of the USB connection may vary among various Android versions.

Once successfully connected via USB, use Windows Explorer on the PC to locate the Android internal storage folder.

IMPORTANT NOTE: The SVCScan data folder can be found in one of two locations, depending on the version of SVCScan that you are using:

- Versions prior to 1.6.0: The SVCScan data folder is located in the Android “Internal Storage/SVCScan/” folder.
- Version 1.6.0 and later: The SVCScan data folder is located in the Android “Internal Storage/Download/SVCScan/” folder.

After upgrading to Version 1.6.0 or later from a prior version, SVCScan automatically moves all existing spectral SIG and target JPG files from the top-level folder into the “Download” folder the first time that it is run. When it does this, it displays the following reminder/warning message:



A typical Windows Explorer view of the top-level “Internal Storage” folder is shown below:

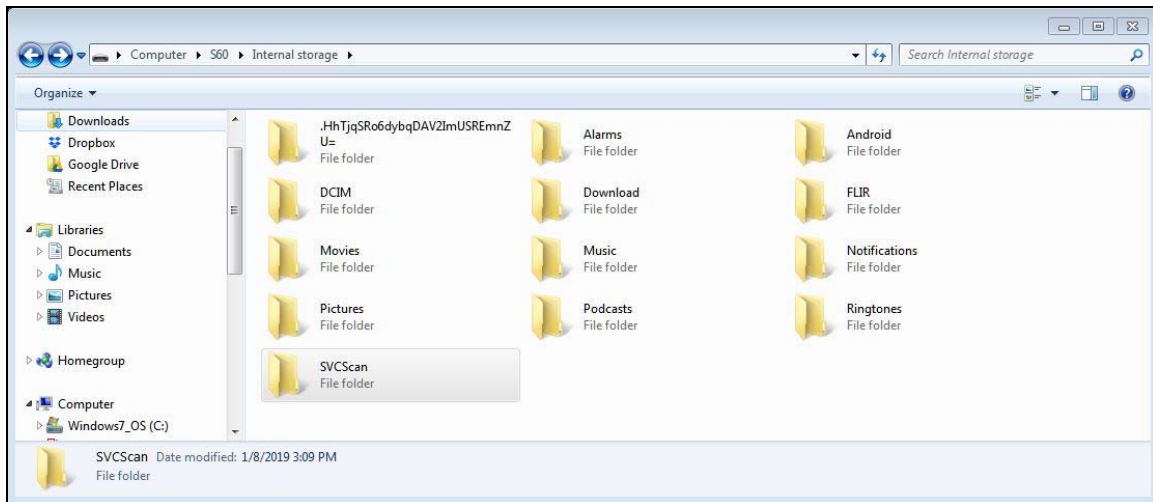


Figure 16 Windows PC Explorer Folder View - SVCScan Top Folder

Click on the “SVCScan” folder (which may be located within the “Download” folder) in order to display its contents:

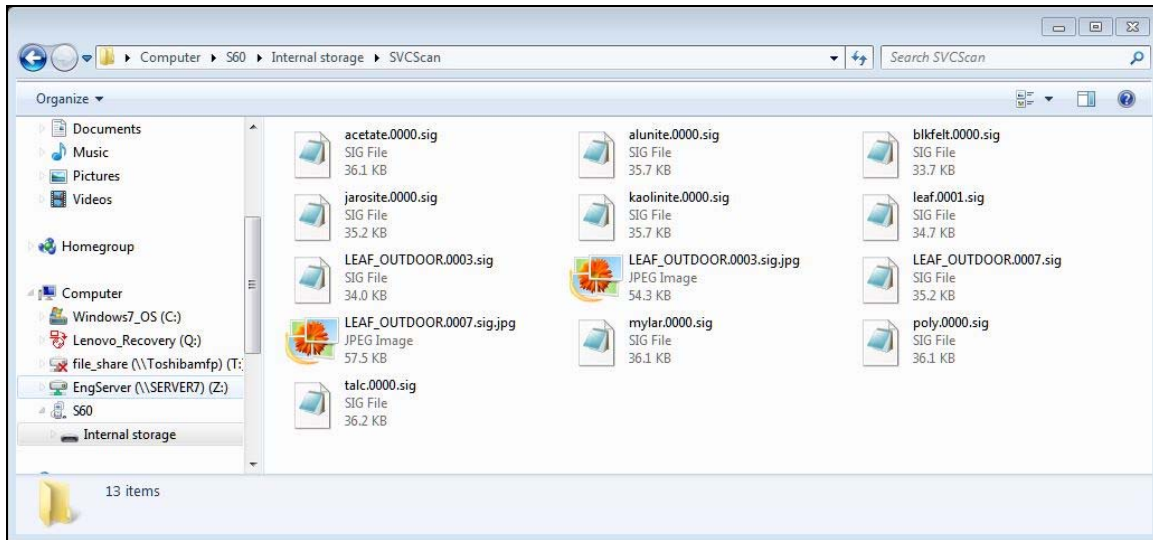


Figure 17 Windows PC Explorer Folder View - SVCScan Folder Contents

From here, the SIG and .JPG files may be dragged and dropped into the Windows PC file system.

SIG File PC Windows Processing

This section contains instructions for additional optional processing of SVCScan-acquired SIG data files, once the files have been transferred to a Windows PC computer.

These optional processing tools allow the operator to improve the data by applying algorithms that, among other things, enhance the spectral data, change its formatting, or combine individual files into single files for more convenient analysis. Each tool acts on batches of SIG files simultaneously, so many SIG files may be processed in a short period of time.

The processing tools are bundled together into Spectra Vista's "PC Data Acquisition Software" product. Spectra Vista supplies a copy of this Windows software with each i-Series instrument that it sells. Please contact Spectra Vista to obtain an installer for the latest version.

Refer to the "Tools" menu within the "PC Data Acquisition Software" for a complete list of all the SIG file manipulation tools that are available. Each tool describes what the tool does, how to use it, and what output files are produced. In addition, the User Manual for the PC Data Acquisition Software fully describes all tools and their usage.

The following Windows PC tools described here are of most value to SVCScan users:

SIG File Overlap / Matching Tool

This tool provides two distinct functions:

Overlap Removal

The full-range i-Series instruments produce SIG files that contain "overlap regions". These are regions of the spectrum that occur at the transitions from one spectrometer to the next that contain data from both the lower-wavelength and upper-wavelength spectrometers. This tool removes this overlapping data.

Matching

Again on full-range i-Series instruments, the un-cooled VIS array (350-1050nm) may drift a bit in radiance at the upper wavelength end. This slight drift in radiance is caused by temperature changes in the un-cooled VIS array. The net effect is to see a small step in radiance between the un-cooled VIS array and the temperature-controlled SWIR1 array (950-1800nm).

While this step effect is mitigated through instrument warm-up, and has no effect on reflectance calculations, the step effect on radiance can be eliminated entirely by "matching" the VIS array radiance to the SWIR1 array (950-1800nm) radiance.

This tool provides the means to both remove the overlap region while matching the VIS and SWIR1 radiance curves.

SIG File Merge Tool

This tool combines multiple SIG files and produces one of the following output files:

- A single Excel spreadsheet containing all input SIG file spectral and header data side by side in columns.
- A single SIG output file that contains the averaged radiance/reflectance values of all input SIG files.

The SIG File Merge Tool is useful for cross-target spectral analysis, and for averaging multiple target scans.

