SpectraScopeRT is your control panel to tune frequency, select bandwidth, and record signals – While viewing in real-time!

KEY SPECIFICATIONS – RANGE OF SYSTEMS

- RF Input Frequency Coverage Range from 9 kHz to 40 GHz
- IF Analog Instantaneous Bandwidth Range Selection from 100 kHz to 1 GHz
- A/D Sampling Rate Selection: 16-Bit up to 1 GS/s, 12-Bit up to 6 GS/s
- Real-Time Sustained Gap-Free Streaming Rate up to 5 GB/s per Channel
- Up to 192 TB Storage Capacity for Hours/Days of Signal Recording Time
- Open Architecture, COTS Based Platforms – Portable, Desktop, Rackmount

FEATURES

- Windows Spectrum Analyzer with Real-Time Signal Recording & Monitoring
- Integrated Operational Control of Both Downconverter Receiver & Digitizer
- Analysis Displays Include: Time Domain, Frequency Spectrum, Power Spectrum, Constellation, Spectrogram, Persistence, and Histogram
- Actively Monitor Displayed Snapshots During Real-Time Live Recordings
- Control and Monitor Multiple Systems Remotely with Server/Client Options
- Flexible Signal Recording Output Filename Management Parameters
- File Span Recording Splits Long Recordings into Multiple Size-Specified Files
- Signal Recording Duration by File Size, Elapsed Time, or Both
- Easy Import of Recording Files into 3rd Party Apps with Raw Binary Data
- Save/Load Setup Configurations & Create/Run Script Execution Operations
- Supports GaGe High-Speed Digitizer Model Instruments
- Programming-Free GUI Operation; No Programming Skills Required

ABOUT US

Since 1987, GaGe is a worldwide industry leader in high-speed data acquisition solutions featuring a portfolio of the highest performance Digitizers, PC oscilloscope software, powerful SDKs for custom application development, and turnkey integrated PC-based measurement systems.

GaGe is a product brand of Vitrek, a USA fully accredited ISO 9001:2015 quality certified and ISO 17025 calibration certified company.

APPLICATIONS

Wideband Signal Spectrum Analysis

Wideband Stimulus / Response Test

Satellite Communications Test

Radar Design and Test

Electronic Warfare (EW) Test

Signals Intelligence (SIGINT)

Spectrum Monitoring

Ultrasound Imaging

Non-Destructive Testing (NDT)

Mass Spectroscopy

Time of Flight (ToF)

Light Detection and Ranging (LiDAR)

Life Sciences

Particle Physics

SpectraScopeRT Overview

SpectraScopeRT is a Windows based spectrum analyzer application that requires no programming and allows for integrated operational control of both the downconverter receiver and the digitizer for signal capture, analysis, recordings. Any tuner, downconverter, or receiver with an IF output or a virtual receiver is supported.

SpectraScopeRT provides the ability to save established settings to a configuration file that can be opened and applied, thus saving time from manually re-applying settings for repetitive configurations.

Analysis displays include Time Domain, Frequency Spectrum, Power Spectrum, Constellation, Spectrogram, Persistence, and Histogram. Multiple display type windows can be opened and shown simultaneously with auto tile and cascade options or manually sized and placed as desired.

Display windows include support for scope cursors to navigate through the display and obtain measurements. Cursor Track Mode can be enabled to lock the position of the two placed cursors. When locked, the spacing between cursors remains constant as they are moved through the display of data.

The primary advantage of SpectraScopeRT is the ability to conduct real-time streaming signal recordings to drive storage with provided monitoring capability to ensure the recording process is operating with expected signal data and without errors.

The non-proprietary file format of the raw binary data file allows for other 3rd party software applications to import and utilize the data easily, with associated separate XML-based header files that contain the context information on the data file.

Multiple systems running the SpectraScopeRT Server option can be accessed and operated as remote nodes with a single user interface over an Ethernet network with the Remote Client option. This is beneficial in cases where multiple systems, that may be dispersed in different locations, need to have acquisition and/or recording operations controlled without physical attendance at each system. A script editor can also be used in conjunction with script execute actions to design an automation sequence for targeted operations.

SpectraViewRT Overview
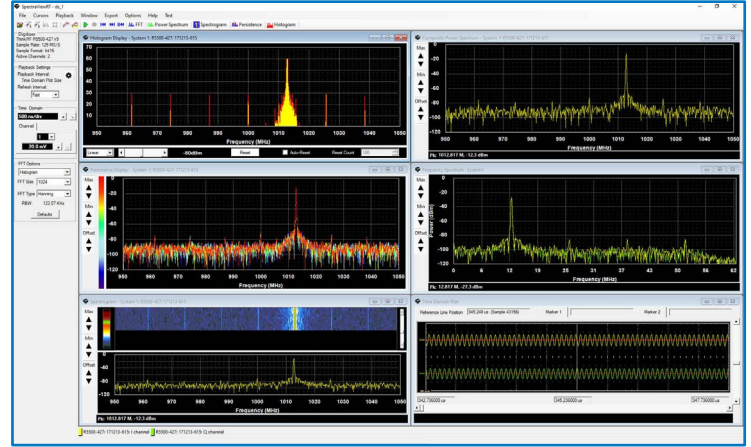
SpectraViewRT is a Windows based application that allows an operator to open/view and conduct playback of previous signal recordings to the display monitor for analysis.

Viewing file details will display the details of the opened signal recording present in the header file associated with the recording data file for review. It includes basic information about the recording, applied digitizer model information, applied receiver model information, and settings utilized for the recording with total elapsed time duration of the recording file.

The various display types for Time Domain, Frequency Domain, Spectrogram, Persistence, and Histogram can all be effectively utilized for playback operations.

Playback operations utilize familiar navigation toolbar buttons for starting playback, stopping playback, stepping backwards and forwards, and moving back to start, and for playback looping when the time domain data will loop from the end of the file back to the beginning when the end of file is reached.

SpectraViewRT provides an Export Split File feature to facilitate taking a large signal recording file and splitting it into smaller sized files for ease of manipulation and management. This feature is especially useful for transferring smaller data file sizes that contain only the data of particular interest for review, rather than the entire original large signal recording file size.

The main recording file can be split into smaller files based on file size, recording duration, samples, or number of split files. Each segmented/split file contains a binary recording file as well as a corresponding header file that defines the content of the split file.

SpectraScopeRT GUI

To start in SpectraScopeRT, the System menu is used to select and configure the targeted digitizer(s) and downconverter receiver(s) to be considered part of the defined RF system.

Multiple digitizer and receiver models are supported; including a virtual receiver option for simulating a non-existent receiver or to interface with a 3rd party receiver that is not natively supported by SpectraScopeRT by using the 3rd party supplied receiver control application and matching its specific settings with the virtual receiver setup in SpectraScopeRT.

Multiple RF Systems can be defined and added for operations.
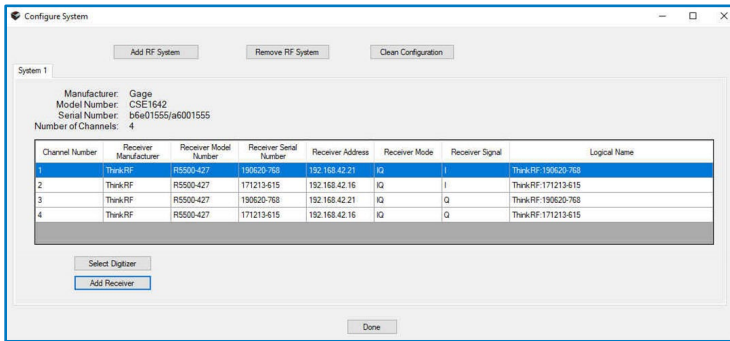
The main SpectraScopeRT GUI consists of Menu Bar, Tool Bar, Scope Display Views Area, and the Control Interface:
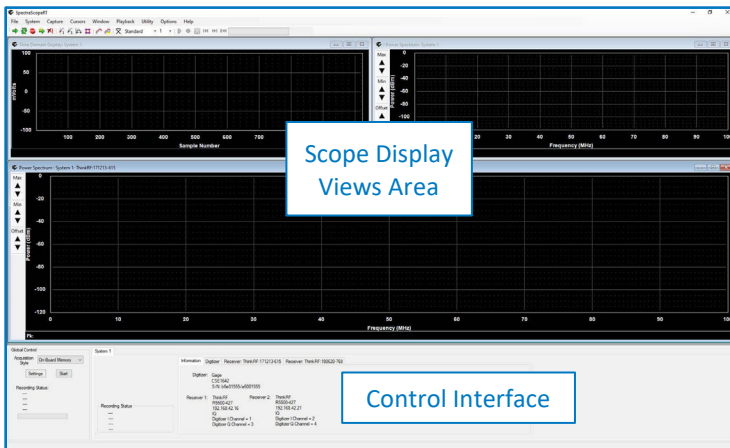
The Control Interface section provides access to the global control for acquisition, RF system, digitizer, and receiver control settings. A System tab is presented for each established RF system that includes related Information, Digitizer and Receiver tabs.

The Information tab contains a summary of the RF system with basic digitizer and receiver information presented.

The Digitizer tab contains the manufacturer of the digitizer, the model number, the serial number, and digitizer related settings.

The Receiver tab contains the receiver manufacturer, model, the interface identification, and receiver related settings.

Specific digitizer settings vary by model, but generally include:

- A/D Sampling Rate with Internal/External Source Clock
- Data Packing Modes for Streaming Operations if Supported
- Number of Active A/D Input Channels
- A/D Input Channel Voltage Ranges, Coupling, Impedance
- Trigger Source, Level, Polarity, and Timeout
- Data Plotting Parameters for Time Domain & FFT Data
- Transfer Stats for Streaming Mode Operations

Specific receiver settings vary by model, but generally include:

- Output Bandwidth & Reference Level Adjustments
- Center Frequency & Adjustments
- Attenuator, Gain Control & Filter Options
- Reference Clock Source

The Scope Display Views Area section is utilized for various analysis display windows that are described further in the following sections. Multiple display type windows can be opened and shown simultaneously with auto tile horizontally/vertically and cascade options or manually sized and placed as desired.

The Global Control section is utilized to select the acquisition style, the recording session settings and the start/stop of acquisition recording. This section is also continually updated during live recording operations to indicate recording duration, data bytes stored, etc.

Acquisition Styles & Capture Modes

There are two acquisition styles supported:

1.) On-Board Memory Mode

This mode takes snapshots of data during execution, but not all the real-time data is collected. The rate at which the snapshots are taken depends on the number of active display plots, the number of acquisition samples for each snapshot, the performance of the computer graphics subsystem and the processing power of the local CPU. Typical update rates are from 10 to 30 captures per second.

On-Board Memory mode can be used first to verify the acquisition setup prior to performing a streaming recording. This mode allows setup parameter adjustments while the acquisition is in progress so one does not have to start and stop operations before altering a parameter.

2.) Streaming Mode

In this mode, once the operation setup is complete the acquisition is armed and ready to be triggered. It is important to note that during Streaming modes of operation that the computer and storage subsystem must be configured and selected to sustain the required real-time data rates.

Streaming mode requires that the setup does not change during the acquisition process since there is no convenient mechanism to handle setup transitions during the streaming of data in real-time.

Acquisition captures are taken via One Shot or Continuous modes.

A One Shot acquisition acquires just one scan of data and displays the results in the available displays. After the One Shot operation is invoked the application awaits a trigger event. The trigger event is controlled through the Trigger selection on the Digitizer control tab. If a trigger event is not detected one may use the Force Trigger selection to force an acquisition and display update. The Stop or Abort selections can be used to return the acquisition to the idle state. The One Shot mode is only available when in the On-Board Memory mode of acquisition.

A Continuous operation runs until the user instructs the acquisition to cease through use of the Stop or the Abort controls. After the Continuous operation is invoked, the application awaits a trigger event. The trigger event is controlled through the Trigger selection on the Digitizer control tab. In On-Board Memory mode each acquisition awaits a trigger event before retrieving the digitizer data and displaying the results. For Streaming mode, the acquisition awaits a single trigger event before continually acquiring data.

Under Sampling and Virtual Receiver

SpectraScopeRT supports any tuner, downconverter, or receiver with an IF output by manually entering the key parameters in the virtual receiver setup panel. This includes analog IF outputs from Spectrum Analyzers, Radar monitor panels, etc.

The virtual receiver mode allows for input of Center Frequency, Bandwidth, IF Frequency, and whether frequency inversion is used. Amplitude levels are calibrated using the "Reference Level Adjust" input. These features allow IF signals to be viewed at the correct center frequency and level.

With digitizer support for external sample clock, this mode also allows support for IF direct-to-digital conversion, or under sampling. This technique requires an analog bandpass filter before the digitizer input, instead of a tuner or downconverter. Under sampling advantages include:

- Capturing IF signals higher than ½ the digitizer sample rate (Fs)
- More efficient recording by reducing the stream rates to reflect the needed IF bandwidth

The combination of external sample and support for a virtual receiver allows broad support for recording any IF signal within the analog bandwidth of the selected digitizer.

The example below shows a 200 MS/s digitizer setup to analyze off-the-air signals from 80 to 120 MHz via under sampling:
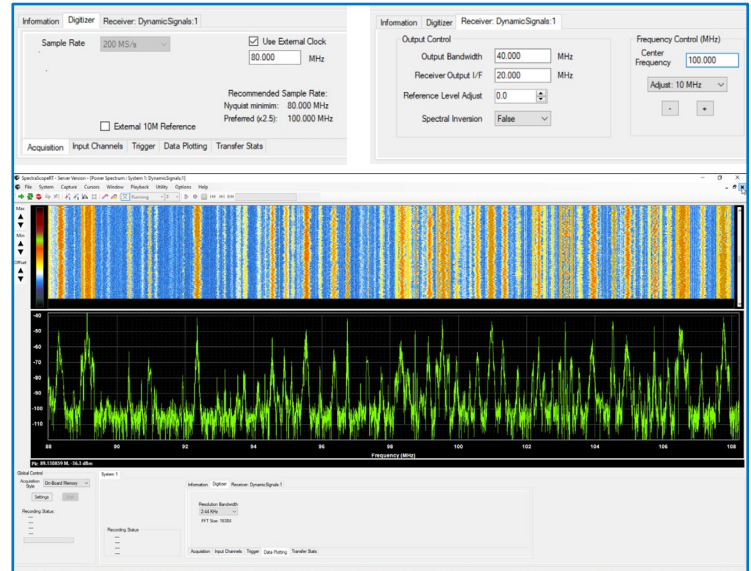

Scope Cursors, Maximum Hold, and Averaging

Display windows allow the user to enable up to 2 cursors to navigate through the display and obtain measurements. Cursor control is available for Time Domain, Frequency Spectrum, Power Spectrum, and Spectrogram displays.

A bottom display plot information indicator strip identifies the values associated with placed Cursor 1 (C1), Cursor 2 (C2), and the value differences between the two cursors (C2-C1). Cursor Track Mode can be enabled to lock the position of the two placed cursors. When locked, the spacing between cursors remains constant as they are moved through the display of data.

During the course of zooming and panning in on a display window, it is possible for the cursor(s) to be placed outside of the visible area. An issued reset cursor position automatically resets the cursor positions to a default 1/3 and 2/3 locations relative to the current extent of the active display region.

In addition to scope cursors, a Maximum Hold plot can be selected to be shown on a display as shown:
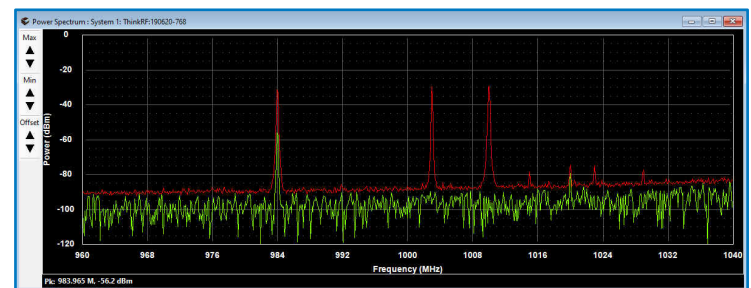
When enabled an additional waveform plot in red is shown on the graph to display the greatest value in magnitude since the Maximum Hold was enabled or reset. This feature is useful in capturing peak values in a waveform.

When selecting a reset of the Max Hold, the first plot update of the data forms the baseline data for the maximum hold values. Each additional plot value is compared against the last and the plot value of the greatest magnitude is retained.

An Averaging control enables or disables averaging a display before it is plotted. Not all displays support signal averaging. Those that support the feature will show the Averaging control button on the application menu bar enabled when the display window is selected.

Two Averaging mode options are available:

1.) Standard Averaging

User selects the number of scans of data that are to be averaged before display. The number of averages range from 1 to 64 in a power of 2 arrangement.

2.) Running Average

User selects the last number of scans of data to be averaged together for display. The last number of scans can be in the range from 1 to 64. As this is a running average, only the last indicated number of scans are kept and averaged. The averaging does not wait until an entire new set of number of scans are received, it merely uses the last number of scans obtained.

Time Domain Display
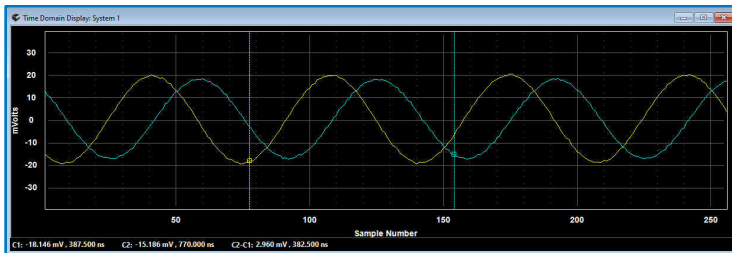
The Time Domain Display shows the time domain signals presented to the digitizer. The maximum number of points that are plotted for a time domain signal are 4096. If the requested resolution bandwidth selection requires less than 4096 points, then only the required number of points are plotted. The 4096 data point plotting limit is to ensure that the time domain plotting does not take unnecessary processing time from other more important display windows.

Time Domain Display supports 2 cursors. A bottom plot indicator information strip identifies the position and voltage of the placed cursors, and the value differences between 2 placed cursor positions for measurements.

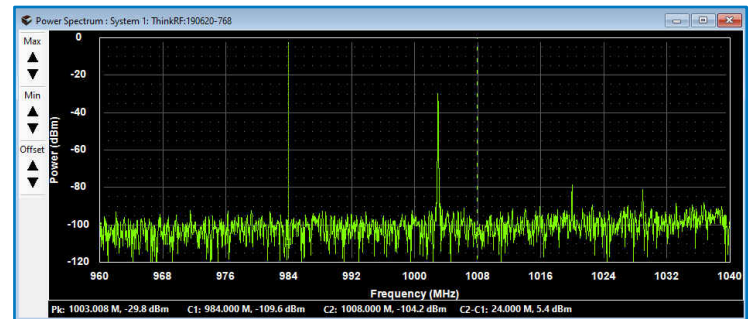## Frequency Spectrum Display
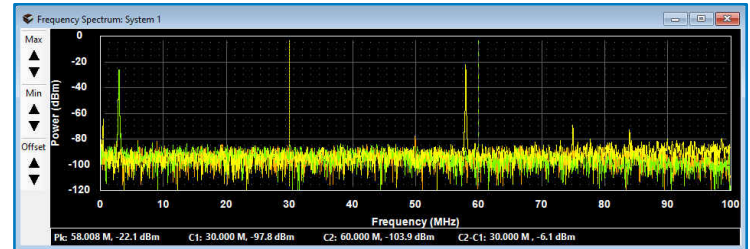
The Frequency Spectrum display shows the output of the FFT of the digitizer signals. The number of bins in the FFT is derived by the digitizer Resolution Bandwidth setting on the Data Plotting tab for the selected digitizer. The lower the frequency of the resolution bandwidth setting, the greater the number of points that are plotted in the FFT.

A default window is applied to the time domain signal before the FFT is executed. The current default window is a Hanning window. Note that the Intermediate Frequency (IF) depends on the Instantaneous Bandwidth (IBW) selected.

The display indicates the FFT with regards to the input as seen by the digitizer. There are no calculations at this point to show how this signal relates to the RF input of the receiver. One must refer to the Power Spectrum display for this level of combined information.

Frequency Spectrum Display supports 2 cursors. A bottom plot indicator information strip identifies the position and values of the placed cursors, and the value differences between 2 placed cursor positions for measurements.

Power Spectrum Display

The Power Spectrum display shows the output of the FFT of the composite I and Q signal from the receiver. The number of bins in the FFT is derived by the Display Resolution Bandwidth setting. The lower the frequency of the resolution bandwidth setting, the greater number of points that are plotted in the FFT.

A default window is applied to the time domain signal before the FFT is executed. The current default window is a Hanning window. Depending on the Instantaneous Bandwidth (IBW) selection, the power spectrum displayed may only use the I signal and not the Q.

This display shows the RF signal components as seen by the RF input of the receiver. This FFT considers the tuned frequency of the receiver as well as the application of any spectral inversion.

Frequency Spectrum Display supports 2 cursors. A bottom plot indicator information strip identifies the position and values of the placed cursors, and the value differences between 2 placed cursor positions for measurements.

Constellation Display

The Constellation Plot display shows the I and Q data from the receiver. This is a plot of the obtained time domain data of I against the time domain data of Q.

Since I and Q are required to generate a constellation plot, it is only available in Instantaneous Bandwidth modes that generate both I and Q.

The Constellation Display supports zoom and panning operations but does not support cursor controls.
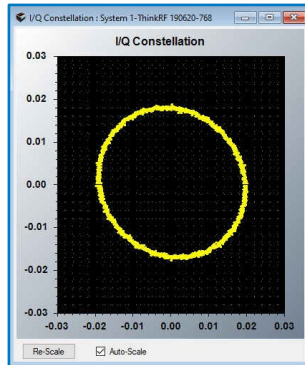
Spectrogram Display
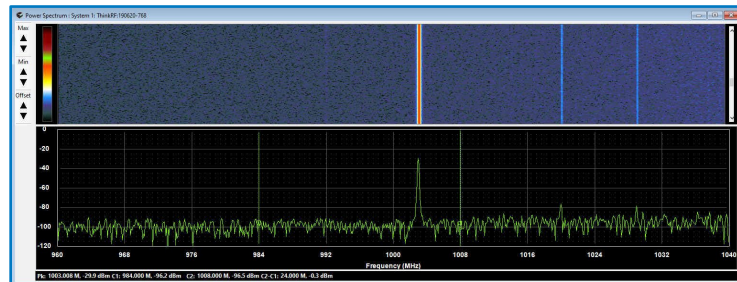
The Spectrogram plot is a dual-display window. In the top section of the display is a bitmap drawn to represent the magnitude of the power rendered as a color. The color gradient can be selected by the user to customize the rendering of the power magnitude. The lower section of the display shows the composite power spectrum. This is essentially a copy of the Power Spectrum display window type.

FFT Display data can be zoomed in and out and panned through via mouse control mechanisms. When zooming in on the FFT portion of the display the spectrogram maintains the full bandwidth of the display and the color bitmap follows the zoomed range as well.

In SpectraViewRT, one may pause the display playback when they see a peak of interest in the displayed color bitmap. By double-clicking on the color bitmap one can have the time-domain display automatically repositioned to the data that caused the peak in the spectrogram. This is a useful feature when searching for pulsed signals.

Persistence Display
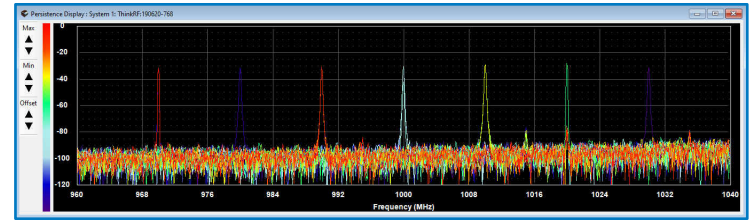
The Persistence display adds a short historical view of the composite power spectrum. The persistence display shows the last 20 composite power spectra overlaid on one another. Each plot of the spectrum on the display is represented in a difference color based on the signal acquisition age. The newest data is represented by the color shown at the top of the gradient display color bar and the oldest data by the color at the bottom of the color bar.

Histogram Display
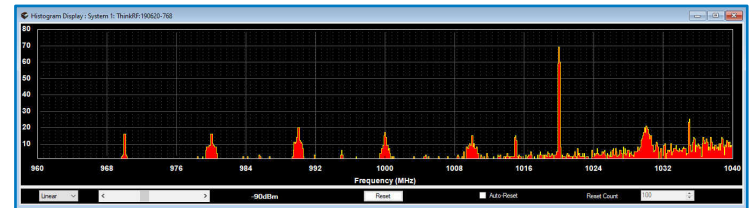
The Histogram Plot displays cumulative historical information related to the composite spectrum. In the histogram, each bin corresponds to a bin in the composite power spectrum FFT. After each composite FFT is calculated, each histogram bin is incremented by 1 if the bin value exceeds the user selected threshold. This provides a simple mechanism for filtering out frequency components that are not of interest and to verify the consistency of frequency components above a threshold.

The Linear/Log display selector controls the Y-axis display scale. The Log scale allows small bin count numbers to be effectively displayed in conjunction with large bin count numbers.

A Histogram Threshold Selection is used to control the minimum power level detected in a bin before its histogram count is incremented.

A reset button sets all bin counters back to their initial value of zero. One may also force the bin counters to zero upon a specific number of acquisitions by enabling the Auto-Reset feature. The terminal count before a reset is applied in through the Reset Count numeric control.

Some fine grain selections for the Resolution Bandwidth may make the Histogram display difficult to discern due to the number of available pixels to display the histogram. One may either increase the width of the histogram display window or decrease the resolution bandwidth so that each bin is wider.

Signal Recordings

Several parameters must be set prior to initiating a signal recording. The setup configuration is accessed through the Settings button in the Global Control section. The following table identifies typical settings that can be established.

Setting	Description
Recording Duration	The targeted duration of a recording operation can be specified by either total data file size or by elapsed time (hours, minutes, seconds) or a combination of both total file size and time. Signal recordings can also be manually controlled via the Start/Stop recording button selections.
User Text Field	A general use text box that the user can enter up to 256 characters to describe the data acquisition conditions. This entry is stored in the header file for the signal recordings for later reference.
Output Directory	The base directory used to store recording files on the targeted storage drive.
File Prefix	This field can either specify the exact filename to which recorded data is stored, or it can be used to specify the starting characters for a filename that has additional information appended to it.
Include In Filename	This option allows the user to select additional filename characters that can make the filename unique. If the None selection is made, the filename contains only the characters shown in the Filename Prefix field, specifying the exact filename for recorded data. The Date and Time selection forces the current date and time to be appended to the recorded filename. The prefix for the filename is contained in the File Prefix field. The Incrementing Number selection appends the next available integer numeric value to the File Prefix.
Overwrite File	This option allows a file to be continually overwritten without the user question prompt of overwriting a file.
File Span Recording	This option allows splitting the recorded file into multiple files. A File Size setting determines the approximate target size of each of the individual files. The filenames for the individual files have the characters "_partx" appended before the file suffix. The "x"starts at 0 and increments by 1 for each subsequent file.

Conducted signal recording operations will produce two files per recording session with the following file name extensions:

.stmrcd = Raw binary data file of the signal recording

.stmrcd.hdr = Header file for the signal recording

The raw binary data files (.stmrcd) contain only sample data values of the recorded signal; there is no file header or additional information contained in the raw binary data file. The non-proprietary file format of the raw binary data file allows for other 3rd party software applications to import and utilize the data easily.

The binary file format of the raw data file is ultimately dependent on the selected digitizer model instrument utilized and can contain 8-bit, 12-bit, or 16-bit based data. For multi-channel digitizer model instruments, active channel data is sample-interleaved within the raw binary data file; for example, a 4-Channel digitizer will produce a sample-interleaved file in this sequenced format:

CH-1, CH-2, CH-3, CH-4, CH-1, CH-2, CH-3, CH-4, CH-1, etc.

Since the raw binary files do not store any context information about the details of the data in the file, the second header file (.stmrcd.hdr) is also created with the raw binary file.

By default, header files are auto generated with the same file name of the recorded binary data file but with the added identified stmrcd.hdr file extension ending and resides in the same targeted directory location path of the recorded data file.

The header file is a small size generated XML-based formatted file that contains information about the associated recorded data file that includes items such as digitizer model, channel count, input voltage range, sampling rate, user text field notes, and more. The header files are easily read by any XML-aware software or text-based editor software application.

External Clock Source Option

Digitizers that are part of the RF system can be clocked from an external frequency source. The external clock is used when a required sample rate is not a part of the native sample rate selections for the digitizer or to synchronously clock multiple digitizers.

SpectraScopeRT provides a means through the user interface to specify the external sample rate provided so that the application can perform the requisite calculations for display. In addition, SpectraScopeRT supports certain 3rd party signal generator sources for integrated operational control.

Configuration Support

Selecting the Auto-Load Configuration Setup menu item displays the various options for configuration restoration. The configuration to be restored when the application is started can be the Last User Saved Configuration, the Last Auto Saved Configuration or no restore.

Before the application is terminated the current configuration is saved to storage. Once a setup configuration has been saved it can be automatically loaded on program restart if the Last User Saved Configuration is selected.

Each time the program is restarted with an enabled auto-load option, the digitizer selection and receiver selection are made when the program starts and is checked against the digitizer manufacturer/model and receiver manufacturer/model in the configuration setup file. If there is a mismatch in either device, a warning message is displayed, and the configuration is not restored.

In addition to hardware configurations, the various display plot configuration layouts with color schemes can also be saved and auto restored when the application is launched saving time from having to re-configure display windows.

Server/Client Options

Multiple systems running the SpectraScopeRT Server Edition can be accessed and operated as remote nodes with a single user interface over an Ethernet network with the Remote Client Edition. This is beneficial in cases where multiple systems, that may be dispersed in different locations, need to have acquisition and/or recording operations controlled without physical attendance at each system.

For network access to the remote nodes, all participating computers must be on the same subnet. Prior to configuring the remote client, all participating remote nodes must be powered up and accessible on the network.

In the remote client software, the Global Operations section contains the controls that operate on all participating remote nodes. The SpectraScopeRT Nodes is a list of participating remote nodes along with their status. Access to the individual remote nodes is selected using the Network Node Tab. The hostname for the remote node is displayed on the label for the tab.
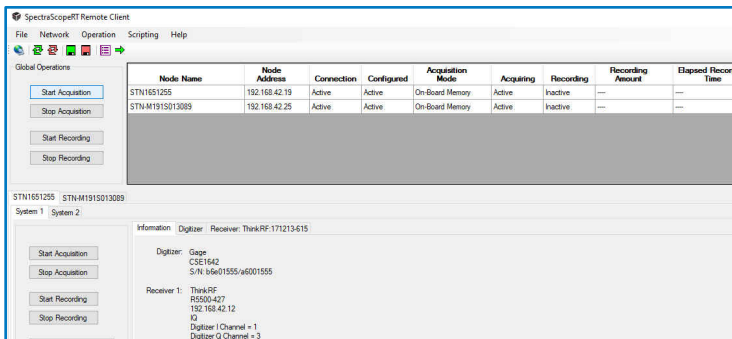
The remote client software includes a scripting tools editor allowing for automated control and operation of SpectraScopeRT remote notes for easily repeating acquisition/recording sequences.

The script editor Server Information section displays the currently available remote nodes that can be included in the script operations. The remote node servers that are used in the script are also displayed to provide a cross reference to ensure that the desired remote node servers have been included in the script.

The Script Iteration Count specifies the number of complete iterations (loops) that the script will execute. This value can range from 1 to 1000.
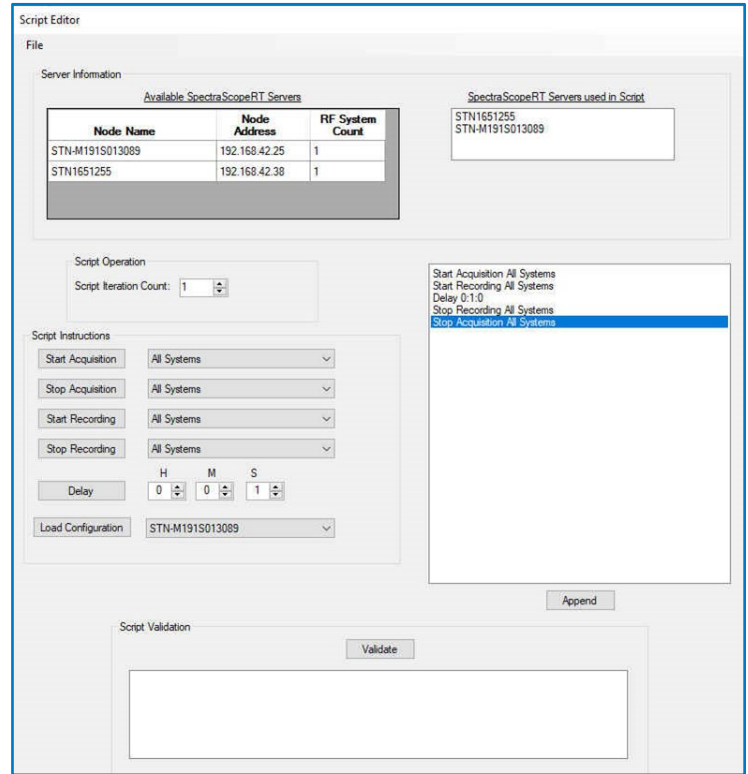

The Script Instructions section is used to generate the script to be executed. Script instructions are added by clicking on the button corresponding to the instruction to be added. The associated instruction list section displays the order of script instruction execution.

As instructions are added to the list they are normally appended onto the last instruction in the list. As shown above, the instructions are appended since the Append mode is selection. Hitting this button toggles between Append and Insert modes. When in the Insert mode the new instruction is added before the highlighted list instruction.

The Load Configuration is used to select the targeted remote node specific configuration setup to be included in the script. The configuration setup must already exist on the remote node for it to be included in the script, and all available configuration files will be listed for possible selection.
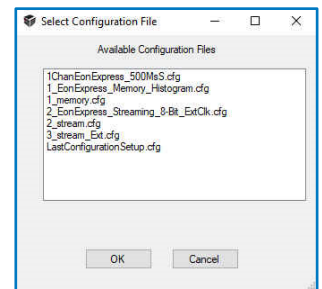
A script validator tool performs a quick logical test on the script sequence to check for any inconsistencies.
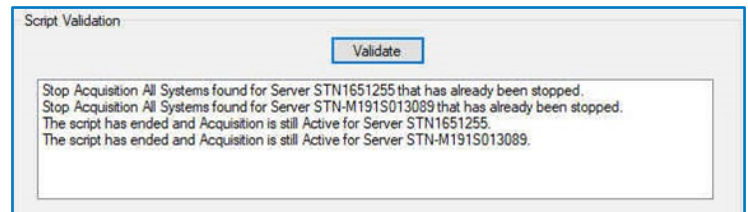
SpectraViewRT GUI

While On-Board memory captures can be viewed and played back from directly within the SpectraScopeRT application, Streaming mode-based signal recordings require the companion product SpectraViewRT application to open/view and conduct playback of previous signal recordings to the display monitor for analysis.

When opening previous streaming signal recording files, the matching raw binary data file (.stmrcd) and header file (.stmrcd.hdr) pair must exist to properly evaluate the recorded data.

SpectraViewRT has a control interface panel on the left-hand side of the application with the primary scope view (for multiple displays) occupying the main right-hand side.

The Control Interface Panel includes digitizer and receiver information and settings for Playback to display with Time Domain, Frequency Domain, and Spectrogram controls.

The digitizer information reflects data about the digitizer utilized for the conducted signal recording file as contained in the matching header file.

The receiver information reflects data about the receiver utilized for the conducted signal recording file as contained in the matching header file.

The Playback settings group controls the rate at which the application plays back the time domain data as well as the speed at which the displays are updated.

The Time Domain, FFT Units, Frequency Domain, and Spectrogram groups control settings all have similar functionality as previously described SpectraScopeRT Time Domain, Frequency Domain, and Spectrogram displays all with similar scope cursor controls, zoom in/out, and panning capabilities.

Export of Signal Data

SpectraViewRT provides an Export Split File feature to facilitate taking a large signal recording file and splitting it into smaller sized files for ease of manipulation and management.

This feature is also useful for the purposes of transferring smaller data file sizes that contain only the data of particular interest for review, rather than the entire original large signal recording file size.

The main recording file can be split into smaller files based on file size, recording duration, samples, or number of split files. Each segmented/split file contains a binary recording file as well as a corresponding header file that defines the content of the split file.

The original recording filename is used as the basis for determining the split filenames, but one may select an appropriate suffix to be appended to the main filename.

The generated split files can be located within the same directory as the main recorded file or located under a directory generated by the split file utility.

Once all the selections have been determined in the File Split Options section, selecting the Start button initiates the operation with a progress bar shown for indicating processing progress.

Signal Playback

The primary advantage of SpectraViewRT is the ability to conduct playback of previous large streaming signal recordings to the display monitor for analysis.

Viewing File Details will display the details of the opened signal recording present in the header file associated with the recording data file for review. It includes basic information about the recording, applied digitizer model information, applied receiver model information, and settings utilized for the recording with total elapsed time duration of the recording file.

The various display types for Time Domain, Frequency Domain, Spectrogram, Persistence, and Histogram can all be effectively utilized for playback operations.

Playback operations utilize familiar navigation toolbar buttons for starting playback, stopping playback, stepping backwards and forwards, and moving back to start.

Selecting Start will initiate the playback through the entire signal recording data file to the active displays on the monitor. The playback operation can be manually stopped at any time by selecting Stop.

Selecting Step Backward causes the time domain display to step one interval backward, while selecting Step Forward causes the time domain display to step one interval forward. The amount of interval movement is dependent on the setting in the Playback Interval setting in the Playback Settings group. The step backward and step forward can either be by number of samples, time, or time domain plot size.

Selecting Move to Start rewinds the playback to the start of the recording. If the playback is not actively running when this selection is made, the file pointer is reset to the beginning of the file, but the display is not updated. You must continue playback or perform a step operation for a display update.

When the Enable Playback Looping option is enabled, the time domain data will loop from the end of the file back to the beginning when the end of file is reached. If the option is disabled, the playback ceases once the end of the file has been reached.

SpectraScopeRT & SpectraViewRT

Spectrum Analyzer Recording & Playback Viewer Software

MAIN SPECIFICATIONS

Time Domain Displays

Channel Indicator	Displayed I & Q (if applicable) channels.
Zero Voltage Indicator	Displayed reference line.
Max. # of Points Plotted	SpectraScopeRT: 4096 points SpectraViewRT: Up to 65536 points
Timebase Indicator	Displayed value based on current time domain scaling.
Timebase Scaling	Vertical scale by voltage per division control. Horizontal scale by sample number per division control.
2 Position Cursors	Assignable cursors with track mode used to navigate and obtain measurements between positions in display.

Frequency Spectrum Displays

FFT of Signals	Displayed FFT output of digitizer signal channels.
FFT # of Bins	Derived by the Display Resolution Bandwidth setting. The lower the frequency of the resolution bandwidth setting, the greater the number of points that are plotted in the FFT.
FFT Window Type	Default Hanning window is applied to time domain signal before the FFT is executed.
FFT Unit Type	1 milliwatt (dBm).
FFT Scale Controls	Adjust Max., Min., & Offset for display by 5 dBm units.
FFT Zoom/Pan	Mouse controls for zooming in/out & panning of data.
FFT Max Hold	Display a maximum hold waveform for the maximum power exhibited during FFT plotting.
2 Position Cursors	Assignable cursors with track mode used to navigate and obtain measurements between positions in display.

Power Spectrum Displays

FFT	Output of the FFT of the composite I & Q signal from the receiver. Depending on receiver bandwidth selection, power spectrum displayed may only use the I signal and not the Q signal. Display shows the RF signal components as seen by the RF input of the receiver. This FFT considers the tuned frequency of the receiver as well as the application of any spectral inversion.
FFT # of Bins	Derived by the Display Resolution Bandwidth setting. The lower the frequency of the resolution bandwidth setting, the greater the number of points that are plotted in the FFT.
FFT Window Type	Default Hanning window is applied to time domain signal before the FFT is executed.
FFT Unit Type	1 milliwatt (dBm).
FFT Scale Controls	Adjust Max., Min., & Offset for display by 5 dBm units.
FFT Zoom/Pan	Mouse controls for zooming in/out & panning of data.
FFT Max Hold	Display a maximum hold waveform for the maximum power exhibited during FFT plotting.
2 Position Cursors	Assignable cursors with track mode used to navigate and obtain measurements between positions in display.

Constellation Displays

Constellation Plots	Shows the I and Q data from receiver. This is a plot of the obtained time domain data of I against the time domain data of Q. Only available for receivers with instantaneous bandwidth modes that generate both I and Q.
Zoom/Pan	Mouse controls for zooming in/out & panning of data.
Scale Controls	Auto-Scale: Maintain full-scale view of plot Re-Scale: Force aspect ratio recalculation

Spectrogram Displays

Spectrogram Plots	A plot displaying the FFT output referenced to the RF input to the receiver and a waterfall color bitmap representing the magnitude of the power over time.
FFT Display	Utilizes all the same specified settings as detailed in the Power Spectrum Displays specifications.
Color Gradients	The range of colors is selectable with a color gradient selection window or with a greyscale gradient option.
Automatic Reposition	In SpectraViewRT, one may pause the display playback when they see a peak of interest in the displayed color bitmap. By double-clicking on the color bitmap one can have the time-domain display automatically repositioned to the data that caused the peak in the spectrogram. This is a useful feature when searching for pulsed signals.

Persistence Displays

Persistence Plots	Plot displaying a brief historical view of the last 20 composite power spectra overlaid on one another with a color mapped area representing the age of the spectral acquisition in color.
Color Gradients	The range of colors is selectable with a color gradient selection window or with a greyscale gradient option.
Scale Controls	Adjust Max., Min., & Offset for display by 5 dBm units.

Histogram Displays

Histogram Plots	Displays cumulative historical information related to the composite power spectrum FFT with each plot displaying the tracked count of FFT bin occurrences over time.
Display Scale	Linear or Log.
Threshold Selection	Control the minimum power level detected in a bin before its histogram count is incremented.
Reset Count	Controls to set all bin counters back to initial value of zero with option to auto reset after a specified number of acquisitions.

GaGe Sales

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To find your local sales representative or distributor visit:

https://vitrek.com/sales-network

GaGe is a product brand of Vitrek, a USA fully accredited ISO 9001:2015 quality certified and ISO 17025 calibration certified company.

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Warranty

Standard two years parts and labor.

Unless otherwise specified, all dynamic performance specifications have been qualified on engineering samples. All specifications are subject to change without notice.

Datasheet Revision 2 – 03/17/2023

ORDERING INFORMATION

Part Order #	Part Name	Part Description
DSD-SRT-A00	SpectraScopeRT Standard Edition	Real-Time Spectrum Analyzer & Signal Recording Software Single Local Host Operation
DSD-SRT-B00	SpectraScopeRT Server Edition	Real-Time Spectrum Analyzer & Signal Recording Software Single Server Host Operation Can be remotely connected to with Remote Client Edition.
DSD-SRT-C00	SpectraScopeRT Remote Client Edition	Real-Time Spectrum Analyzer & Signal Recording Software Single Remote Client Host Operation Can remotely connect to multiple Server Edition Hosts.
DSD-SVT-000	SpectraViewRT	Spectrum Analyzer & Playback Viewer Application Single Local Host Operation Conduct playback of previous streaming mode signal recording files to the display monitor for analysis.

Software Requirements

- Operating System : Windows
- Receiver : None (can use virtual receiver interface)
- Digitizer : See Digitizer Supported Listing Below

Receivers Supported

The following receivers have integrated support in SpectraScopeRT. Other third-party receivers or non-existent receiver are supported via the virtual receiver interface in SpectraScopeRT. Contact us for inquiries on adding built-in integrated support for other specific targeted receivers.

- A-27-Series RF Downconverters | Up to 8 GHz, 18 GHz, or 27 GHz RF
- B-Series RF Downconverters | Up to 6 GHz RF

Digitizers Supported

The following digitizers have integrated support in SpectraScopeRT. Contact us for inquiries on adding built-in integrated support for other specific targeted digitizers.

- GaGe RazorMax CSE161G2 | 16-Bit, 2-CH, 1 GS/s, 700 MHz BW
- GaGe Razor CSE1642 | 16-Bit, 4-CH, 200 MS/s, 125 MHz BW
- GaGe Razor CSE1622 | 16-Bit, 2-CH, 200 MS/s, 125 MHz BW
- GaGe EON CSE161G2 | 12-Bit, 1-CH, 6 GS/s, 1.75 GHz BW
- GaGe EON CSE123G2 | 12-Bit, 2-CH, 3 GS/s, 1.75 GHz BW

External Clock Sources Supported

The following optional external clock sources have integrated support in SpectraScopeRT for use when a required sample rate is not a part of the native sample rate selections for the digitizer or to synchronously clock multiple digitizers. Contact us for inquiries on adding built-in integrated support for other specific targeted external clock sources.

- DSG-B00-06G | USB Signal Generator, 60 MHz to 6.8 GHz