RF System Solutions Overview

Spectrum Analysis with Real-Time Signal Recording & Playback

ABOUT US

Delivering PC-based signal technology solutions since 1988, Signatec provides a complete solution that combines performance features of oscilloscopes, spectrum analyzers and signal generators with high-speed signal recording systems featuring embedded programmable DSP and arbitrary waveform generation and playback capabilities. Signatec is a product brand of Vitrek, LLC, a USA ISO 9001:2015 Certified Company

APPLICATIONS

Wideband Signal Spectrum Analysis

Wideband Stimulus / Response Test

Satellite Communications Testing

RADAR Design and Test

Electronic Warfare (EW) Test

Signals Intelligence (SIGINT)

Spectrum Monitoring

LIDAR Systems

FEATURES

- Open Architecture, COTS Based Modular System
  - RF Input & RF Output Frequencies up to 40 GHz
  - Instantaneous Bandwidths from 1 MHz up to 1 GHz
  - Synchronized Multi-Channel Operations
  - A/D Sampling: 16-Bit up to 1 GS/s, 12-Bit up to 6 GS/s
  - D/A Sampling: 16-Bit up to 5 GS/s
- Real-Time Signal Recording, Playback & Monitoring with Windows Software
  - Actively Monitor Live Recording & Playback
  - Real-Time Sustained Gap-Free Streaming up to 6 GB/s
  - Stream Real-Time Data to Powerful GPU for Digital Signal Processing
  - System Data Recording Storage Capacities up to 192 TB
- Multiple Analysis Displays with Scope Cursor Tracking Measurements
  - IQ Time Domain
  - Frequency Domain
  - I Spectrum
  - IQ Power Spectrum
  - Constellation
  - Spectrogram
  - Persistence
  - Histogram

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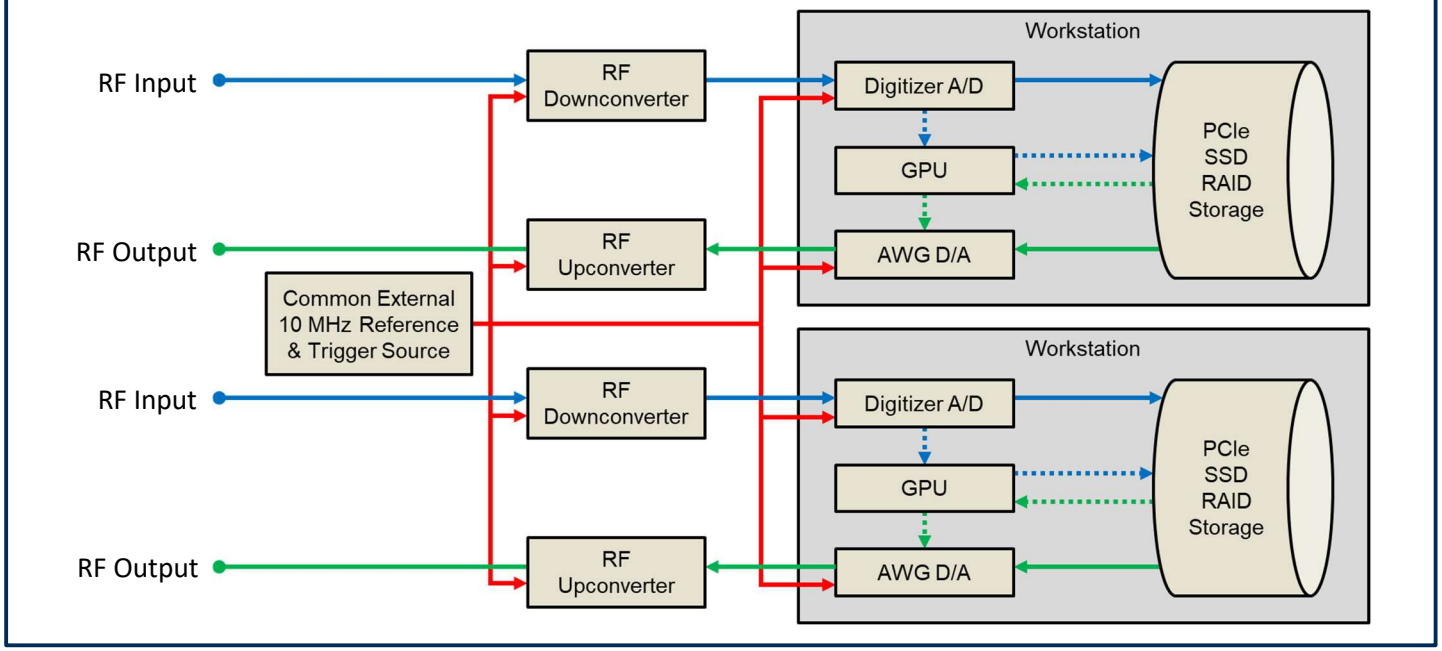
Multi-Channel RF System Solutions – General Block Diagram



System Overview

Signatec offers a selection of RF Downconverter and RF Upconverter models that can cover narrowband frequencies starting at 9 kHz to wideband frequencies up to 40 GHz, with instantaneous bandwidths (IBW) that range from 10 MHz up to 1 GHz.

Multi-channel RF systems are constructed by distributing a common external 10 MHz reference clock source to the instruments, as well as a common supplied external trigger source, for synchronized operations.

The outputs of the RF Downconverters are connected to the channel inputs of high-speed PCIe Digitizers with suitable input bandwidth and A/D sampling rates for the targeted application. A selection of PCIe Digitizer models feature A/D resolution and sampling rates of:

- 16-bit up to 1 GS/s and up to 700 MHz BW
- 14-bit up to 400 MS/s and up to 240 MHz BW
- 12-bit up to 3 GS/s and up to 1.75 GHz BW
- 8-bit up to 6 GS/s and up to 1.75 GHz BW

All Digitizer models support PCIe Data Streaming Mode that allows for the capability to simultaneously acquire and stream data to targeted host CPUs or GPUs for further signal processing analysis and/or to high-speed PCIe-based storage for real-time sustained gap-free signal recording operations.

For RF playback operations, signal data recording files are streamed from the high-speed storage to PCIe Arbitrary Waveform Generators (AWG) with suitable output bandwidth and D/A sampling rates for the targeted application. A selection of PCIe AWG models feature D/A resolution and sampling rates of:

- 16-bit up to 5 GS/s and up to 2.5 GHz BW
- 14-bit up to 1.2 GS/s and up to 590 MHz BW
- 8-bit up to 1.2 GS/s and up to 590 MHz BW

Signal data files can be optionally streamed to targeted host CPUs or GPUs for signal processing operations prior to sending to AWGs for playback. The outputs of the AWGs are connected to the inputs of the RF Upconverters that then handles the final upconversion back to the targeted RF frequency range for the application.

Customizable high-performance PC workstations provide up to 96 PCIe Gen3 dedicated bandwidth lanes to maximize operational performance of multiple instrument cards and storage with capacities up to 192 TB.

Windows GUI-based software provides integrated operational control of both the RF Downconverter receiver and the Digitizer for signal capture, analysis, and recordings. Likewise, Windows GUI-based software provides integrated operational control of both the AWG and RF Upconverter for playback operations.

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RF Downconverter / RF Upconverter Series

Signatec currently features the following selection of RF Downconverter and RF Upconverter model series. Please contact us for further detailed specifications and/or to discuss possible options for working with existing RF equipment or other possible 3rd party equipment.

	A-Series	B-Series	C-Series	D-Series
				
RF Input:	9 kHz – 8, 18, 27 GHz	100 kHz – 6 GHz	500 MHz – 26.5 GHz	100 MHz – 40 GHz
RF Output:	Not Applicable	100 kHz – 6 GHz	Not Applicable	100 MHz – 40 GHz
Software Selectable Bandwidths:	10 MHz @ IF 35 MHz 40 MHz @ IF 35 MHz 100 MHz @ IF 0 Hz OR 10 MHz @ IF 35 MHz 80 MHz @ IF 55 MHz 160 MHz @ IF 0 Hz	80 MHz @ IF 100 – 500 MHz * 160 MHz @ IF 240 – 500 MHz * 320 MHz @ IF 1.25 GHz * Tunable in 5 MHz Steps	1 MHz @ IF 70 MHz 5 MHz @ IF 70 MHz 10 MHz @ IF 70 MHz 20 MHz @ IF 70 MHz 30 MHz @ IF 70 MHz 40 MHz @ IF 70 MHz 80 MHz @ IF 160 MHz 500 MHz @ IF 1 GHz	50 MHz @ IF 50 MHz – 1 GHz * 100 MHz @ IF 70 MHz – 1 GHz * 200 MHz @ IF 120 MHz – 1 GHz * 500 MHz @ IF 270 MHz – 1 GHz * 1 GHz @ IF 520 MHz – 1 GHz * * Tunable in 10 kHz Steps
Digitizer A/D Support: (* = Limited)	Razor * / PX14400 / RazorMax / EON	PX14400 * / RazorMax * / EON	Razor * / PX14400 * / RazorMax * / EON	Razor * / PX14400 * / RazorMax * / EON
AWG D/A Support: (* = Limited)	Not Applicable	PXDAC4800 * / PX16DAC5G2	Not Applicable	PXDAC4800 * / PX16DAC5G2

Digitizer Series

Signatec currently features the following selection of high-speed PCIe Digitizers for RF capture. Please contact us for further detailed specifications and/or to discuss possible options for working with existing RF equipment or other possible 3rd party equipment.

	Razor Express	PX14400D2	RazorMax Express	EON Express
				
# of A/D Input CHs:	2 – 4	2	2 – 4	1 – 2
A/D Resolution:	12-bit / 14-bit / 16-bit	14-bit	16-bit	8-bit / 12-bit
A/D Sampling Rates:	1 kS/s – 200 MS/s	625 kS/s – 400 MS/s	1 kS/s – 1 GS/s	1 kS/s – 6 GS/s
A/D Input Bandwidth:	DC – 125 MHz	DC – 248 MHz	DC – 700 MHz	DC – 1.75 GHz

Arbitrary Waveform Generator Series

Signatec currently features the following selection of high-speed PCIe Arbitrary Waveform Generators for RF playback. Please contact us for further detailed specifications and/or to discuss possible options for working with existing RF equipment or other possible 3rd party equipment.

	PXDAC4800D-DP	PX16DAC5G2
		
# of D/A Input CHs:	2 – 4	2
D/A Resolution:	8-bit / 14-bit	16-bit
D/A Sampling Rates:	4.688 MS/s – 1.2 GS/s	50 MS/s – 5 GS/s
D/A Output Bandwidth:	DC – 590 MHz	100 MHz – 2.5 GHz

Sig-Station Series

Sig-Stations are custom high-performance PC workstations designed specifically for integrating multiple GaGe / Signatec advanced instruments and maximizing their operational performance. As COTS-based open architecture systems, component items are also future upgradeable and compatible with other 3rd party items and software.

Sig-Stations come with all instruments, features, and software fully tested and installed so that the user can be up and running with their system solution right out of the box; thus saving time and minimizing risks of self-integrated systems.

These workstations incorporate the latest in PC-based technology featuring:

- Form Factors: Portable / Desktop / 1U, 2U, 4U Rackmount
- Up to 96 PCIe Gen3 Dedicated Bandwidth Lanes
- Intel Xeon CPUs up to 56 Cores Total
- 6-Channel System RAM up to 768 GB Total
- PCIe Based SSDs up to 8 TB Capacity per Drive
- PCIe SSD RAID Volume Capacity up to 192 TB
- Single PCIe RAID Volume Write Rates up to 12 GB/s
- Simultaneous 3 x PCIe RAID Volume Aggregate Write Rates up to 24 GB/s (up to 8 GB/s per Volume)

Contact us to configure a custom system tailored for your application requirements.

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SpectraScopeRT / SpectraViewRT

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.

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

Analysis displays include IQ Time Domain, Frequency Domain, I Spectrum, IQ Power Spectrum, Constellation Plot, Spectrogram Plot, Persistence Plot, and Histogram Plot. 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

The SpectraViewRT application allows an operator to open/view and conduct playback of previous signal recordings to the display monitor for analysis.

DsWaveGen

DsWaveGen is a Windows based application that requires no programming and allows for integrated operational control of both the Arbitrary Waveform Generator (AWG) and the Upconverter for RF playback operations.

This application eases the process of playing back pre-recorded signal data files from a variety of sources, including SpectraScopeRT streaming recordings. Other collected streaming recordings are also supported given the specific sample rate, number of active channels and sample format.

Once the application has been started, the user selects the header/binary file combination for playback and the targeted playback AWG. The header file describes details of the recording and automatically configures the DsWaveGen playback parameters to prevent playback setup mismatches. The user can also optionally choose to manually select playback settings, with the software providing warning notices if selected settings are mismatched compared to the data source file characteristics.

After the playback parameters have been selected the operation may be armed by selecting the Play operation. The playback may be triggered immediately on start through a software trigger on the User Interface or by an applied external trigger on the AWG device instrument.

DsWaveGen also includes the ability to control an Upconverter device that is fed by the output of the AWG. This provides an integrated solution to control/monitor the AWG streaming playback as well as an attached Upconverter.

Customized Solutions

Contact us to discuss possible customized system solutions. As an open architecture based provider, Signatec can work and partner with other 3rd party organizations to tailor a system solution for your specific targeted application requirements.

Signatec Volume Embedded OEM Program

Signatec values our embedded OEM customers and understands their needs to complete projects on time and within budget. With our reliable, high-quality products and support, our OEM customers gain valuable time-to-market and save tens of thousands of development dollars. Our knowledgeable support staff assists OEM customers through all product lifecycle stages from development to production. This OEM-friendly philosophy is why we have so many satisfied OEM customers around the world.

The Signatec OEM Program consists of two tier levels: Gold and Platinum

- **Gold Tier Level**

  All established and identified Signatec OEMs enter the program at the Gold Tier Level where Signatec can help the OEM "focus on their added value" while we provide our expertise of integrating our instrumentation products into customized PC solutions, including hardware, software and firmware. The Gold Tier Level includes the following feature benefits:

  - No charge supplied product evaluation unit(s) and Software Development Kits (SDKs) for qualification and initial development.
  - No charge telephone support through the evaluation.
  - Negotiated factory and/or on-site technical support including custom hardware/software development.

- **Platinum Tier Level**

  Once the OEM has specified a product ready for full production integration and release, they then move to the Platinum Tier Level that includes the following feature benefits:

  - Volume discount pricing is established.
  - OEM specification is established and corresponding product is given a unique part number to ensure quality tracking and Engineering Change Order (ECO) control.
  - All software tools are provided on a site-license basis.
  - A Smart Spares Pool (safety stock) program is established if the OEM application requires one. This ensures that a specified quantity of product is always kept on stock on a ready-to-ship basis.

We encourage you to contact Signatec and discuss your potential volume embedded OEM application in more detail with our engineering team.

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WARRANTY

Standard two years parts and labor.

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

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