

**VIAVI**

VIAVI Solutions



Brochure

# VIAVI Raptor

The All-in-One Integrated Development  
and Test Solution for Your Software  
Defined Systems

It is not where you start that counts, it is where you finish and how fast you get there. We can help with that.

Simplify and speed up the development of your wireless Software Defined System (SDS) by using RAPTOR, the All-In-One integrated solution.

Following open standards, the Raptor will take you from the R&D stages all the way to the test and performance measurement of your final product.

Based on the Software Communications Architecture (SCA), an international open standard for the development of portable SDS software, you can start the development of your applications on the RAPTOR's modular platform using ready-made SCA-compliant signal processing blocks and migrate the code to your own SCA radio or other SDS with minimum modifications. You can easily replace or add any signal processing block on your own from the graphical component-based development tool.

Test the performance of your system, in real time, by monitoring the signal at the antenna port or by probing inside the waveform at the signal processing block level. Generate signals on your own or record from real environment and inject them into your signal processing chain to test its performance.

## At A Glance

### Modular Platform

- 2 or 5 slots AXIe chassis daisy chainable to 256 chassis
- 32 GB/s slot-to-slot data throughput
- Quad-core 2.4 GHz i7 processor (option for two i7)
- Intel Arria 10 or Xilinx Zynq User FPGAs with partial reconfiguration capability
- 100 kHz to 6 GHz transceiver (option to 30 GHz receiver)
- 200 MHz instantaneous bandwidth
- 250 MS/s, 16 bit ADC / DAC
- Display, 4 USGB 3.0, Gigabit Ethernet and audio ports

### Software Communications Architecture (SCA)

#### Development Suite from NORDIAsoft

- SCA v4.1 Core Framework following the JTNC / WInnF open standard
- SCA Architect: a graphical and component based software tool for the development of SCA waveforms and applications
- SCA Inspector: an introspection tool for run-time monitoring / debugging of SCA applications. Use the unique probing capability to monitor the signal produced by each software components
- SCA DSP Toolbox: a library of signal processing algorithms already packaged as SCA components to get you started quickly
- SCA Devices: hardware abstraction modules based on JTNC and WInnF standards

### Signal WorkShop™

- Highly sophisticated signal analysis tool: Probe your signal processing chain to visually monitor the performance of your SDS unit.
- Live signal monitoring: displays waveform characteristics, such as spectrum, spectrogram, time plot, constellation, SNR, power levels
- Extensive post-capture analysis capabilities: includes Pulse, PSK, QAM, AM, FM, PM, and more
- Generate your own signals or record real spectrum environment and playback to test your radio implementation

## Design – Develop – Emulate – Test

The RAPTOR is the perfect companion for the complete R&D cycle of your radio product, all the way to production and field tests phases making it a complete lifecycle solution. An All-in-One integrated environment to develop, emulate and test your Software Defined Radio / System product. Built on the NordiaSoft SCA Development Suite, the ideal tool chain to speed up the software development for your SCA-based systems.

### DESIGN

The NordiaSoft SCA tools make it easy to design your applications and define a deployment strategy for your platform to optimize overall system performance. Graphically assemble signal processing blocks and let the NordiaSoft SCA core framework 1) deploy them into their respective platform processing element (FPGA, DSP, and GPP cores), and 2) interconnect them with each other and with external peripherals such as RF Transceiver, GPS, Audio, Ethernet, etc. Its intuitive graphical model-based design, with hundreds of validation rules, will significantly speed up your development.



### DEVELOP

No need to be an SCA expert. Go right into the development of your application's signal processing algorithms and let the NordiaSoft SCA tool automatically generate the SCA code so that your algorithm implementation (code) can be deployed as part of an SCA waveform. Speed up your development further by dragging and dropping SCA-compliant signal processing blocks such as modulators, error correction codes, and filters. Insert the Bit Error Rate (BER) meter and channel emulator blocks to test your waveform under different channel conditions (Gaussian noise, multi-path, phase delays, etc.). Add your own signal processing blocks or modify those provided to suit your own needs.



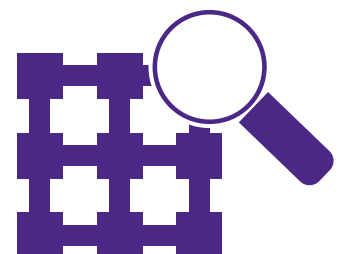
### EMULATE

Use the RAPTOR as the surrogate platform to run and test your applications in real time. Install, configure, start and stop your applications from an intuitive user interface. Modify in real-time your software deployment strategy to optimize your application performance. Emulate channel characteristics using signal processing blocks from the provided DSP Toolbox. The RAPTOR's instrument grade, high performance capabilities will undoubtedly satisfy all your radio requirements. Its configurable and modular design safe-guards your investment for future projects. Integrated following the SCA, the RAPTOR offers standard interfaces to ensure minimum modifications to your developed applications when you need to port it into your own platform.



### TEST

Connect directly at the antenna port or insert software probes within the signal processing chain and to analyze the performance of your system. View the signal characteristics in the time or frequency, or modulation domains, or look at the phase constellation. With the high-resolution visualization tools, analyze the signal to noise ratio, adjacent channel interference, filter performance, synchronization robustness and much more. Analyze performance in simulated or real interference environment by creating your own test signals or recording live signals and play it back into your processing chain, including combining real and synthetic signals.



## Modular Platform

The VIAVI modular platform underpins the RAPTOR and is the most flexible, open standards-based modular development platform for radio, radar, electronic warfare, signal intelligence and robotics embedded system applications.

Don't wait for your final hardware product to be fully developed before starting to design and implement your software applications. The RAPTOR modular platform can emulate the signal processing environment of most wireless platforms. With its Quad i7 general purpose processors, its user-FPGA (Intel or Xilinx), its instrument grade RF front end, and extremely fast AXIe data backplane, the CMP provides the ultimate level of flexibility for accelerating the development process from concept to market-ready product.

With its high-performance, ultra-wide aggregated chassis bandwidth (up to an impressive 1.5 Tbps), the platform is a unique development environment. It incorporates an instrument grade RF front end for prototyping and development that provides RF characteristics traditionally only available to test instruments. The RAPTOR platform offers a 100 kHz to 6 GHz RF transceiver with an optional receiver configuration to 30 GHz. Its 200 MHz bandwidth, supported by 250 MS/s 16 bits ADC and DAC will satisfy most of the wireless systems.

Coupled with the NordiaSoft SCA Development Suite and the VIAVI Signal WorkShop, it makes the perfect system to develop and test your own product.



# Software Communications Architecture Development Environment

The NordiaSoft eCo Suite is a comprehensive SCA-based Integrated Development Environment (IDE) for heterogeneous embedded distributed systems. Used by system developers and integrators, it provides an extensive environment for the development of platform and application software compliant with the SCA standard.

Embracing the concepts of Component-Based Development (CBD) and Model-Driven Engineering (MDE), the Suite allows developers to model, create, deploy and test software components that run in real-time on a wide range of operating environments. It simplifies architectural design, reduces development costs and time to market, optimizes software performance, and improves overall system quality.

The eCo Suite follows the Software Communications Architecture (SCA), an international open standard developed by the US Department of Defense in collaboration with the Wireless Innovation Forum, an international organization of industry, academia, and government labs. It has been used as the Reference Implementation for the development of national SCA certification labs and deployed on thousands of fielded military equipment.

The NordiaSoft eCo Suite is composed of:

## Core Framework

NordiaSoft eCo Hub is the run-time engine that deploys, configures, and controls software applications on embedded systems platforms. It implements the full profile of the SCA Version 4.1 standard.

## Modeling Tool

NordiaSoft eCo Architect is a visual modeling development tool to create, validate, and debug SCA software components and applications. Express all SCA concepts graphically and automatically generate the SCA infrastructure code.

## SCA-Compliant Signal Processing Components

NordiaSoft eCo Toolbox is a library of SCA-compliant signal processing algorithms for wireless systems is available to speed up development. The library includes modems, error correction codes, filters, channel emulators, and many more components to choose from and drag-n-drop into your design.

## Monitor / Debug Tool

NordiaSoft eCo Inspector is a run-time monitoring / debugging tool to install and control applications, as well as to visualize the structure of the running software. Insert probes, in real-time, in your signal processing chain and analyze the signal characteristics when combined with Signal WorkShop.



# Signal Analysis and Test

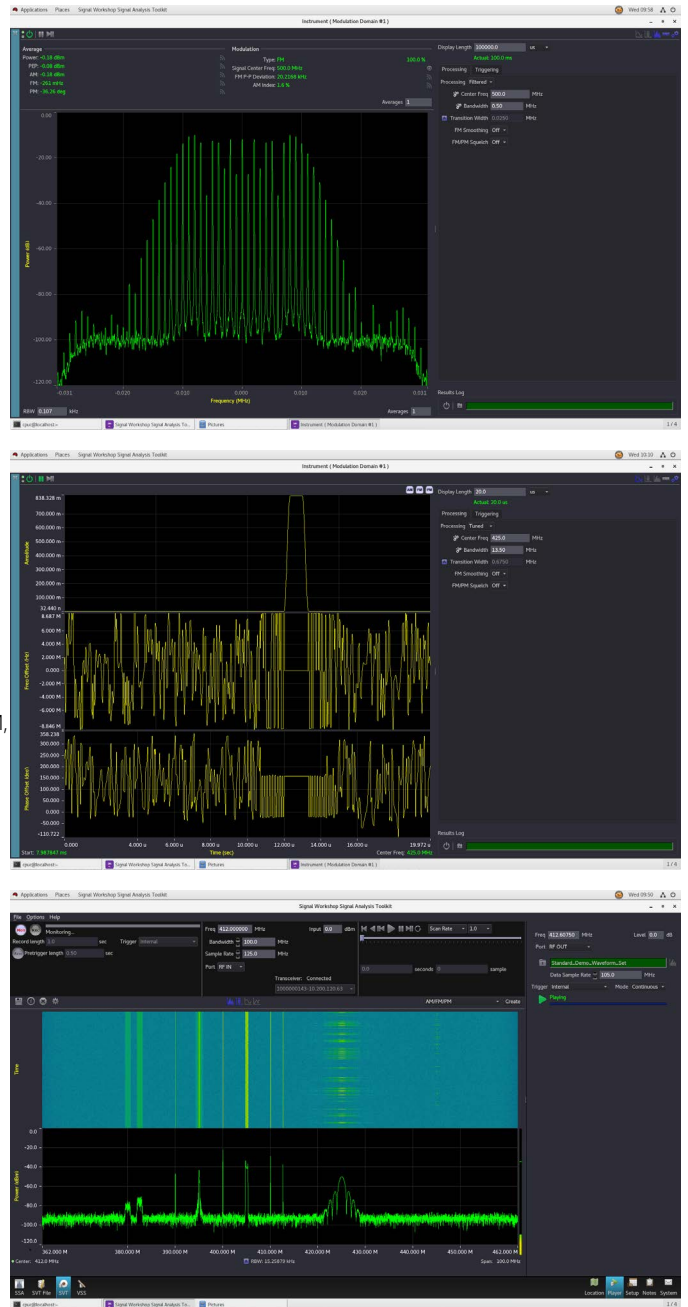
Signal WorkShop is a fully integrated signal analysis tool designed to assist in finding and / or solving the toughest RF communications signal quality, spectral monitoring, interference, and environmental RF issues.

Used in combination with the VIAVI Solutions modular platform AXIe-based system components it becomes a full-featured, general purpose RF analysis tool that combines live and off-line signal simulation and analysis functionality, capable of capturing and / or reconstructing entire RF environments. Combined into the RAPTOR with the NordiaSoft eCo Suite, the tool can also inject signals or analyze signal characteristics, within the signal processing chain using software probes.

Signal WorkShop consists of four primary components: the Vector Signal Simulator (VSS), the arbitrary RF waveform player, Vector Signal Player (VSP), and the RF analysis feature set Signal View Toolkit (VST) for live monitoring / capture and SVT File for providing post-capture analysis. VSS is capable of creating a single waveform or reproducing entire spectral environments, with its capacity to combine multi-carrier and multi-standard waveforms.

The Signal WorkShop feature set includes:

- Unified, comprehensive focus on observing, analyzing, documenting, and even recreating electromagnetic environments
- Live monitoring and post-capture signal display, analysis and processing
- Interactive spectrum / spectrogram / time plots
- Results strip charting and data logging
- Modulation domain analysis function for basic modulation classification (AM, FM, CW, pulse, other)
- Precision GPS latitude, longitude, time stamp
- Bandwidth resampling engine and time-trim tools to assist in capture file-size management
- AM/ FM / PM analysis
- ASK / FSK / PSK / QAM analysis
- ASK Burst / FSK Burst / PSK Burst analysis
- Pulse analysis
- Signal notepad for recording plots and data
- Channel Power and Adjacent Channel Power Ratio (ACPR) analysis functions
- Spectrum Allocation Table
- Environmental Signal Parameterization identifies and measures parameters for signals in the environment
- Remote API control



## Use Cases

The RAPTOR is an extremely versatile platform that can be used in every stage of your R&D cycle. Here are a few use cases where the RAPTOR can make a huge difference for your system.

### **Waveform and Radio Development and Characterization**

The configurable and instrument grade platform can emulate most of any Software Defined Systems that you may dream on. Design and implement complex signal processing applications for distributed platform using the NordiaSoft eCo Suite, the acclaimed COTS environment for SCA development, and test them on the high performance multi-processor platform.

Create test points in your waveforms and use Signal WorkShop to analyze in real-time, the performance of the signal processing components or inject signals (one that you create or that you recorded over the air) into your applications to measure performance.

### **Software Defined Radio Lab**

Create an SDR Lab for the development and test of waveforms. Use it to develop your applications on an SCAv4.1 compliant platform and port them to your own SCA platform when ready or to a third party platform. Connect the RAPTOR to real radios, daisy chain them together, inject real-life signal and analyze the performance of the most complex networks.

### **SCAv4.1 Certification Lab**

Use the RAPTOR as a test environment for SCAv4.1 compliancy. Build your own applications or test third party compliancy with the specification. National programs are using the NordiaSoft SCA eCo Suite as reference implementation to develop SCA certification tools.

### **Production Test**

Use the RAPTOR during both the R&D and production phases and keep the same test suite between both phases. Use Signal WorkShop and the probing and signal injection capabilities of eCo Suite to run all your development test matrix and isolate any problem that may occur.

### **Depot and Field Test**

Provide your customers with the test matrix so they can use them to diagnose any issues with the radios in the field.



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