DTP4700 – Next Generation Software Defined Radio Platform

Spectra DTP4700 is a wideband, high-performance baseband and RF Software Defined Radio (SDR) development and test platform. Spectra DTP4700 supports the implementation and deployment of the next-generation of complex Software Communications Architecture (SCA) compliant networking waveforms required for military, homeland security and commercial SDRs. Spectra DTP4700 is an optimized small form-factor platform with low power consumption that enables the development, testing and deployment of waveforms.

Spectra DTP4700 comes pre-integrated and packaged with:

- AM/DM37x OMAP based digital baseband processing system, providing GPP, DSP and FPGA processor resources.
- Linux OS and device drivers.
- Full duplex RF Transceiver, providing wide operating range: 400 MHz to 4 GHz or 30 MHz to 1.6 GHz.
- RF Front-End to the RF Transceiver to create a high performance fully-fieldable radio system.
- Housed in a rugged 1U enclosure with removable cover for access to the hardware.
- PrismTech's benchmark-setting SCA 2.2.2 compliant Core Framework, together with SCA Devices and ORB/COS.
- Demonstration SCA Waveform Applications (FM audio and data carrying examples with source code).
- User documentation.
- All available off-the-shelf with simple licensing and support contracts.

Spectra DTP4700 Package is Expandable by Optionally Adding:

- Spectra CX tool for SCA component modeling, code generation and compliance validation.
- Spectra Probe Toolbox real-time debugging tool.
- Spectra SCA Radio Services and Devices package provides implementations of the Joint Tactical Networking Center (JTNC) standard SCA Radio Services and Devices APIs. In addition to the Audio Port Device that is bundled with the base Spectra DTP4700 system this includes an Ethernet Device, Serial Port Device, GPS Device, Frequency Reference Device, Time Service and a Vocoder Service.

Spectra DTP4700 Benefits

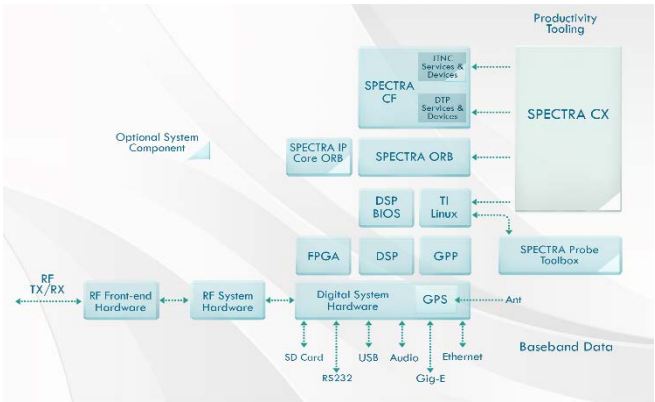
- Capable of hosting high data rate waveforms.
- Wide RF operating range.
- Frequency range can support a broad range of commercial, public safety and military requirements.
- SCA development for the OMAP ARM GPP and C64x DSP processors.
- Ideal for low power consumption handheld applications.
- Efficient Linux based development environment.
- High performance, cost effective SCA development and test platform.



Spectra DTP4700 is an Ideal Platform for:

- Waveform and application development / test teams in major radio OEMs and their end customers.
- Enabling both in-house and third-party development of SCA waveforms and applications for later deployment on target production radio platforms.
- Advanced wireless communications (government and defence) laboratories conducting research in fields such as cognitive radio, electronic warfare, and secure SDR waveforms.
- Internal research and development (IR&D) and collaborative research projects in advanced wireless communications.
- Academic and laboratory use.
- Independent waveform and application developers creating software IP for the SDR market.

Software Stack

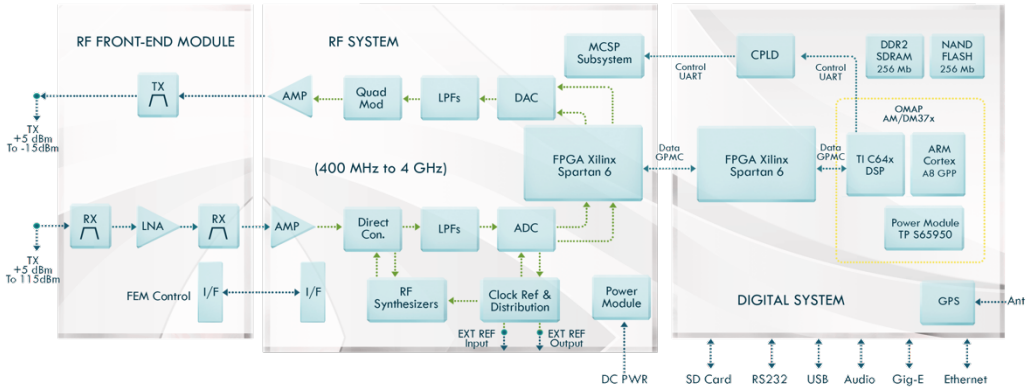


Digital System

- Consolidated GPP, DSP and FPGA digital baseband processing hardware platform.
- Based on Texas Instruments' AM/DM37x OMAP multimedia applications processor and Xilinx FPGA technologies.
- Features a 1 GHz advanced Superscalar ARM© Cortex™ A8 RISC core.
- Also features a 800 MHz C64x DSP core and SGX subsystem for 2D and 3D graphics acceleration.
- Xilinx Spartan 6 FPGA ultra low power; low cost FPGA family.
- Multiple digital (Ethernet, Gig-E, USB, SD, RS232) data and audio interfaces.
- Integrated GPS receiver with accurate 1-PPS output.

ADLINK
Leading EDGE COMPUTING

Hardware Components



SCA Operating Environment (OE)

- The first complete Commercial Off-The-Shelf (COTS) OE available from a single vendor.
- Includes the SCA 2.2.2 compliant Spectra Core Framework (CF) and the CORBA-compliant Spectra ORB middleware, which supports both C and C++ waveform development.
- Includes a POSIX compliant Linux OS (TI DVSDK 4.02—2.6.32 Arago Linux kernel).
- Includes DTP4700 SCA platform Devices.

RF System and Front-End Module

- Low cost and high performance.
- Full duplex transceiver (FDD, TDD) architecture with programmable signal bandwidths from 40 KHz to 40 MHz.
- Available in either 30MHz to 1.6 GHz (DTP4700L) or 400 MHz to 4 GHz (DTP4700H) Tx/Rx frequency range configurations.
- Direct conversion architecture providing continuous RF coverage across the full operating range.
- Dual-channel ADCs: 12-bits at 100 Msps.
    - Dual-channel DACs: 16-bits at 800 Msps.
    - TX: Quadrature modulator; RX: direct conversion
    - Xilinx Spartan-6 FPGA technology

Spectra CX Radio Development Tool (Optional)

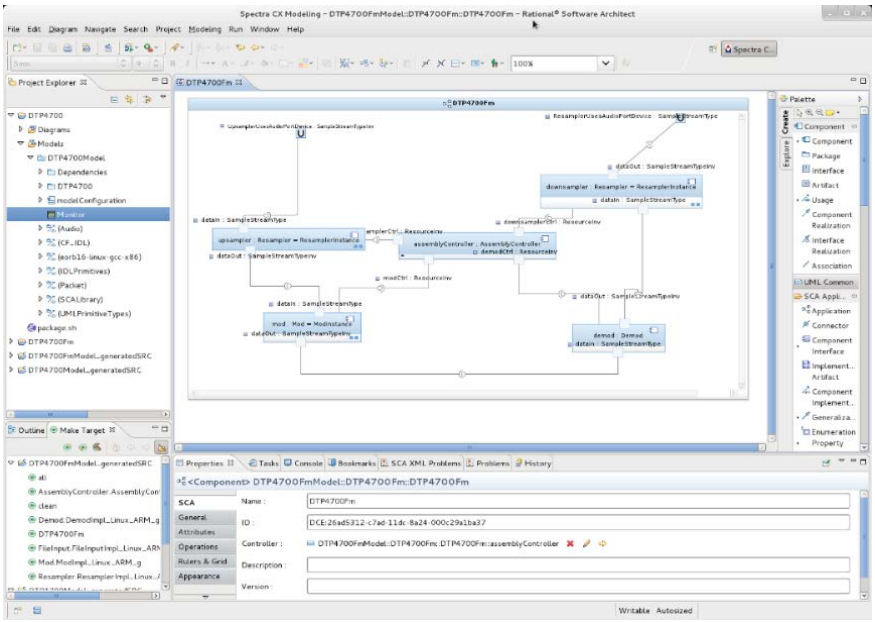
Spectra CX is a model-driven development tool that simplifies, accelerates, and validates a significant proportion of the SCA development process.

In addition, it validates SCA compliance at the architectural and unit test level.

- Generates SCA component source code in C & C++ that is correct by construction.
- Modeling, generation and deployment of SCA compliant waveform components on both GPP and DSP processors.
- Roadmap to FPGA modeling and VHDL code generation.
- Generates SCA compliant artifacts such as: XML descriptor files, compliance test reports and validation documentation.
- Spectra CX enables SCA and non-SCA software aspects to be developed together, integrated early and thoroughly tested.
- Single integration model reduces development risk.
- Results in a faster time-to-market, lower costs, better software quality and superior compliance for all SCA waveform and platform code developed using Spectra.

ADLINK
Leading EDGE COMPUTING

- SCA Radio Monitoring tool:
    - Providing a uniform platform and waveform control mechanism.
    - SCA based control of any waveform launched on the radio.
    - Support for remotely installing and uninstalling waveforms in the radio.
    - Support for switching between multiple waveforms without having to reboot the radio.



For More Information

For further information regarding the Spectra CX please e-mail: ist_info@adlinktech.com or visit: ist.adlinktech.com

SPECTRA

GENERAL SYSTEM FEATURES

Modelling Tool Support	SPECTRA CX
Core Framework Support	SPECTRA CF
ORB/COS	SPECTRA ORB (C & C++ Editions)
DTP Radio Services & Devices	GPP Device, DSP Device, Waveform FPGA Device, RF Control Device, Packet Service
JTNC Radio Services & Devices	Audio Port Device, Ethernet Device, Serial Port Device, GPS Device, Frequency Reference Device, Timing Service, Vocoder Service
SCA Support	SCA 2.2.2
Operating System	TI DVSDK 4.02 (2.6.32 Arago Linux Kernel)
Rack Mounted	1U Rugged Enclosure with Removable Cover
GPP Processing	1 GHz ARM Cortex A8
DSP Processing	800 MHz TI C64x
FPGA Processing	Dual Xilinx Spartan 6 (1 FPGA for the Digital System, 1 FPGA for the RF System)

RF SYSTEM SPECIFICATION

	DTP4700H	DTP4700L
Receive Frequency Range	400 - 4000 MHz	30 - 1600 MHz
Transmit Frequency Range	400 - 4000 MHz	30 - 1600 MHz
Programmable Signal Bandwith	40 KHz - 40 MHz	40 KHz - 40 MHz
ADC / DAC Resolution	12 / 16 Bits	12 / 16 Bits
Max ADC / DAC Sample Rate (DAC can be up-sampled by up to x8)	100 / 100 Msps	100 / 100 Msps
Frequency Stability	+/- 2.5 ppm	+/- 2.5 ppm
Full Duplex Symbol Rate	up to 20 Msym/s	up to 20 Msym/s
Tx Power Output	-10 to +5 dBm	-10 to +5 dBm
Tx Output Impedance	50 ohms	50 ohms
Tx Output Return Loss	10dB	10dB
Tx Frequency Resolution	< 10 Hz	1 Hz
Tx P1dB (FEM dependent)	+5dBm	+15dBm
Tx IP3	+25 dBm	+34 dBm
Tx Phase Noise	Offset from Fcenter = 1GHz	Offset from Fcenter = 400 MHz
	-90 dBc/Hz @ 100Hz	-95 dBc/Hz @ 100Hz
	96 dBc/Hz @ 1 KHz	-110 dBc/Hz @ 1 KHz
	-105 dBc/Hz @ 10KHz	-121 dBc/Hz @ 10KHz
	-105 dBc/Hz @ 100KHz	-121 dBc/Hz @ 100KHz
	-140 dBc/Hz @ 1 MHz	-115 dBc/Hz @ 1 MHz
	-150 dBc/Hz @ 100Hz	-135 dBc/Hz @ 10Hz
Tx Carrier Feed-through	-55 dBc	-65 dBc
Tx Sideband Suppression	-42 dBc	-55 dBc
Rx Input Impedance	50 ohms	50 ohms
Rx Input Return Loss	10 dB	10 dB
Noise Figure	< 10dBm (FEM dependent)	< 10dBm (FEM dependent)
Rx Frequency Resolution	10 Hz	0 Hz
Rx Max Composite Input Power	+5 dBm	+5 dBm
Rx Input IP3	-20 dBm	-20 dBm
RxPhase Noise	+20 dBm	+16 dBm
	Offset from Fcenter = 1GHz	Offset from Fcenter = 400 MHz
	-90 dBc/Hz @ 100Hz	-92 dBc/Hz @ 100Hz
	96 dBc/Hz @ 1 KHz	-105 dBc/Hz @ 1 KHz
	-105 dBc/Hz @ 10 Khz	-115 dBc/Hz @ 10 Khz
	-105 dBc/Hz @ 100 KHz	-115 dBc/Hz @ 100 KHz
	-140 dBc/Hz @ 1 MHz	-145 dBc/Hz @ 1 MHz
	-150 dBc/Hz @ 10 MHz	-155 dBc/Hz @ 10 MHz
Rx Baseband Gain	+40 dB	+40 dB
Rx Sensitivity (25 KHz)	-110 dBm	-110 dBm
Channel Selectivity	-30 dBc +/- 3 BW from FCenter	-30 dBc +/- 3 BW from FCenter
	-50 dBc +/- 5 BW from FCenter	-50 dBc +/- 5 BW from FCenter

MECHANICAL

Size	33.5cm x 20.32cm x 4.45cm
Weight	< 1.8 Kg
Power Consumption (+9v in)	< 20 watts

ENVIRONMENTAL

Operating Temperature Range	0 to 50 ˚C
Storage Temperature Range	-40 to +85 ˚C

ADLINK

Leading EDGE COMPUTING

All products and company name listed are trademarks or trade names of their respective companies.
Updated Nov. 6, 2017 ©2017 ADLINK Technology, Inc. All Rights Reserved. All specifications are subject to change without further notice.