

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 / Application.
- ▶ User documentation.
- ▶ All available off-the-shelf with simple licensing and support contracts.

Spectra DTP4700 package is expandable by optionally adding:

PrismTech's Spectra CX tool for SCA component modeling, code generation and compliance validation.

Spectra DTP4700 benefits:

- ▶ Capable of hosting high data rate waveforms.
- ▶ Wide RF operating range.

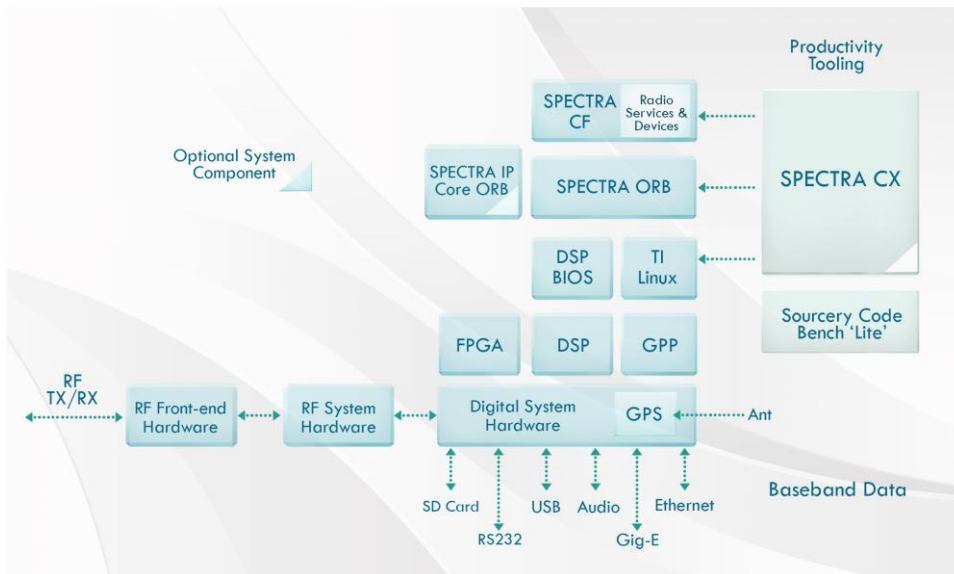
- ▶ Frequency range can support a broad range of commercial, public safety and military requirements.
- ▶ SCA development for the OMAP ARM GPP and C64x DSP processors.
- ▶ Ideal for low power consumption handheld applications.
- ▶ Efficient Linux based development environment.
- ▶ High performance, cost 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 defense) 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

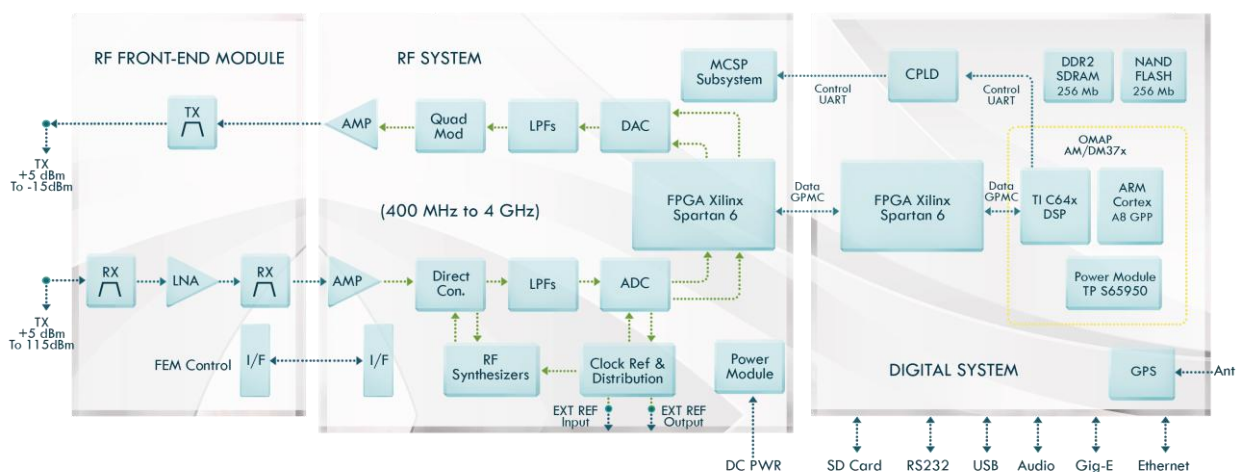


Digital System

- ▶ 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.

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.

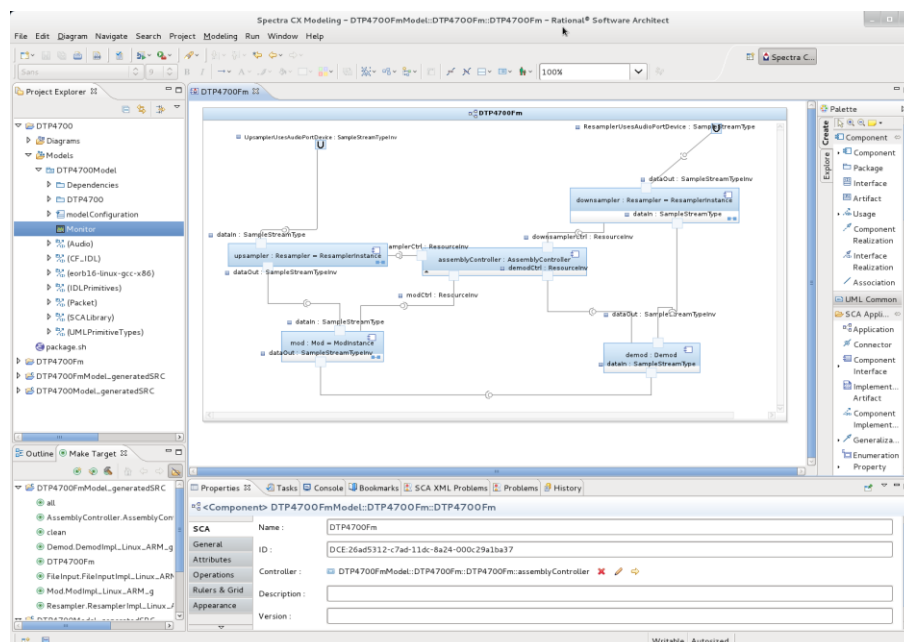
RF System and Front-end Module

- ▶ 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. 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.
- ▶ 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.





SPECTRA

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GENERAL SYSTEM FEATURES

Modelling Tool Support
Core Framework Support
ORB/COS
SCA Platform Devices
SCA Support
Operating System
Rack Mounted
GPP Processing
DSP Processing
FPGA Processing

SPECTRA CX
SPECTRA CF
SPECTRA ORB (C & C++ Editions)
GPP Device, DSP Device, Waveform FPGA Device, RF Control Device, Audio Port Device
SCA 2.2.2
TI DVSDK 4.02 (2.6.32 Arago Linux Kernel)
1U Rugged Enclosure with Removable Cover
1 GHz ARM Cortex A8
800 MHz TI C64x
Dual Xilinx Spartan 6 (1 FPGA for the Digital System, 1 FPGA for the RF System)

RF SYSTEM SPECIFICATION

Receive Frequency Range
Transmit Frequency Range
Programmable Signal Bandwidth
ADC / DAC Resolution
Max ADC / DAC Sample Rate (DAC can be up-sampled by up to x8)
Frequency Stability
Full Duplex Symbol Rate
Tx Power Output
Tx Output Impedance
Tx Output Return Loss
Tx Frequency Resolution
Tx P1dB (FEM dependent)
Tx IP3
Tx Phase Noise

DTP4700H

400 - 4000 MHz
400 - 4000 MHz
40 KHz - 40 MHz
12 / 16 Bits
100 / 100 Msps
+/- 2.5 ppm
up to 20 Msym/s
-10 to +5 dBm
50 ohms
10dB
< 10 Hz
+5dBm
+25 dBm
Offset from Fcenter = 1GHz
-90 dBc/Hz @ 100Hz
96 dBc/Hz @ 1 KHz
-105 dBc/Hz @ 10KHz
-105 dBc/Hz @ 100KHz
-140 dBc/Hz @ 1 MHz
-150 dBc/Hz @ 100Hz

DTP4700L

30 - 1600 MHz
30 - 1600 MHz
40 KHz - 40 MHz
12 / 16 Bits
100 / 100 Msps
+/- 2.5 ppm
up to 20 Msym/s
-10 to +5 dBm
50 ohms
10dB
1 Hz
+15dBm
+34 dBm
Offset from Fcenter = 400 MHz
-95 dBc/Hz @ 100Hz
-110 dBc/Hz @ 1 KHz
-121 dBc/Hz @ 10KHz
-121 dBc/Hz @ 100KHz
-115 dBc/Hz @ 1 MHz
-135 dBc/Hz @ 10Hz

Tx Carrier Feed-through
Tx Sideband Suppression
Rx Input Impedance
Rx Input Return Loss
Noise Figure
Rx Frequency Resolution
Rx Max Composite Input Power
Rx Input IP3
RxPhase Noise

-55 dBc
-42 dBc
50 ohms
10 dB
< 10dBm (FEM dependent)
10 Hz
+5 dBm
-20 dBm
+20 dBm
Offset from Fcenter = 1GHz
-90 dBc/Hz @ 100Hz
96 dBc/Hz @ 1 KHz
-105 dBc/Hz @ 10 KHz
-105 dBc/Hz @ 100 KHz
-140 dBc/Hz @ 1 MHz
-150 dBc/Hz @ 10 MHz

-65 dBc
-55 dBc
50 ohms
10 dB
< 10dBm (FEM dependent)
0 Hz
+5 dBm
-20 dBm
+16 dBm
Offset from Fcenter = 400 MHz
-92 dBc/Hz @ 100Hz
-105 dBc/Hz @ 1 KHz
-115 dBc/Hz @ 10 KHz
-115 dBc/Hz @ 100 KHz
-145 dBc/Hz @ 1 MHz
-155 dBc/Hz @ 10 MHz

Rx Baseband Gain
Rx Sensitivity (25 KHz)
Channel Selectivity

+40 dB
-110 dBm
-30 dBc +/- 3 BW from FCenter
-50 dBc +/- 5 BW from FCenter
+40 dB
-110 dBm
-30 dBc +/- 3 BW from FCenter
-50 dBc +/- 5 BW from FCenter

MECHANICAL

Size
Weight
Power Consumption (+9v in)

33.5cm x 20.32cm x 4.45cm
< 1.8 Kg
< 20 watts

ENVIRONMENTAL

Operating Temperature Range
Storage Temperature Range

0 to 50 °C
-40 to +85 °C

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