

## SpectraTronix C700

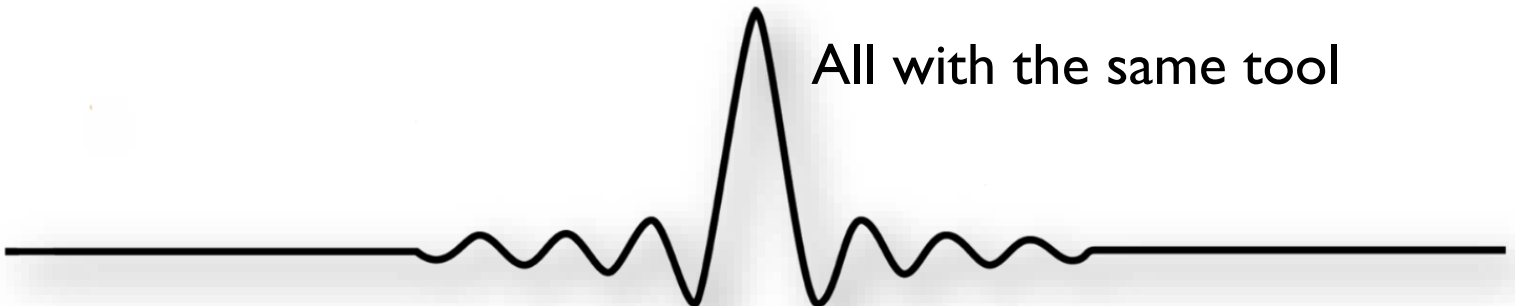
### Modular Test & Development Platform



Ideal Solution for Cognitive Radio, DSP, Wireless Communications & Massive MIMO Applications

Design, Test, Verify & Prototype...

All with the same tool



- Ideal for education for RF and wireless.
  - Readymade educational laboratories with theoretical materials and guided lab sheets.
  - Affordable prices make it possible to get large quantities for every student.
  - More cost saving due to reusability of same components in different setups and experiments.
- Direct FPGA access - Custom User Code
- Supports **Altera**<sup>®i</sup> FPGAs & tools
- Coherent Multi Channel & MIMO Ready
- Superior Phase Noise & SFDR performance

- Integrates with your design environment of choice: **MATLAB**<sup>®ii</sup>, **LabVIEW**<sup>®iii</sup>, **.NET** & more...
- Professional Design & Prototyping Services Accelerate your Time-to-Market
- Frequency range: 400 MHz to 6 GHz
- Wide IQ Bandwidth up to 40 MHz
- Digital I & Q with 16-bit resolution
- Analog, Digital & Arbitrary modulation
- Phase Noise -107 dBc/Hz @ 10 KHz
- Switching time < 10 μs
- Cutting-edge RF Waveform generation with Modular architecture to meet various applications

The C700 is a Modular Development & Verification platform designed specifically to bring about speed and flexibility to FPGA & System Designers. Allowing you to test your RF design without draining your time & resources integrating and troubleshooting RF boards.

Focus on your design code while the C700 Platform takes care of Synchronization, LO Control, data communication and all other ancillary functions.

Works out of the box. No time wasted on Setup Integration, testbed creation or code re-design

Use C700 Modules to build your system with ready-made modules for Signal Generation and Vector Modulation, Signal Reception & Vector Demodulation, LO Generation and distribution, Onboard DSP (ARM & x86), Baseband Signal Processing FPGA and more.

Modules are all Plug & Play and communicate together on the C700 data bus allowing you to build complex and high channel count designs with speed and ease.

A Truly modular architecture that replaces conventional boards with the versatility required for innovation in MIMO and Multi-Channel applications. Modules or even entire units can be stacked and

aggregated for large scale designs and easily connected to your PC for control, data I/O or as hardware in the loop for simulation.



### Design from your Comfort Zone

C700 goes all the way to help you focus on your job. The system can be fully programmed & controlled right from your design tool or system level simulation environment of choice (MATLAB<sup>®</sup>, LabVIEW<sup>®</sup>, .NET... etc.) in addition to a multitude of programming languages (VHDL, C and many others). This allows reusing the same test bed during the design and prototyping phases completely eliminating inconsistency and guaranteeing a streamlined testing procedure

thought the project lifecycle. No more you will need to create new complex and expensive test bed for your prototype, now Design engineers can easily move back and forth testing the code AND the actual prototype side by side greatly accelerating debugging and design iteration.

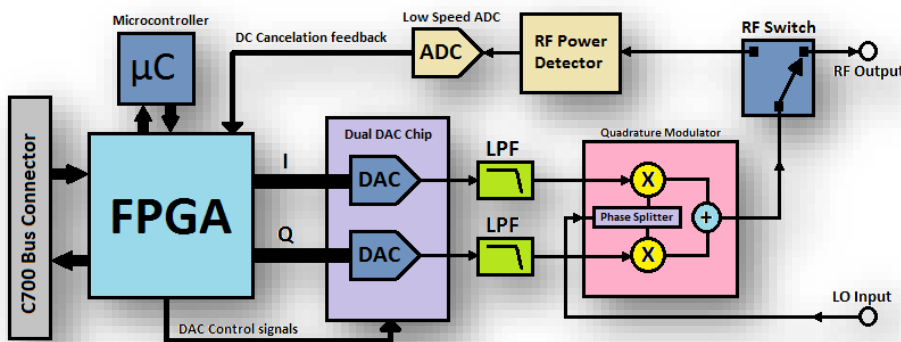
Module firmware natively supports programming the FPGA with custom HDL code through direct JTAG access, this allows developers to use separate design environments for HDL development and for system level testing simultaneously and independently.

automated test station. C700 VSM Modules can function as standalone or integrated:

- Arbitrary Vector Signal Generator
- Spectrum/Signal Analyzer
- Network Analyzer
- Channel Emulator

Replace expensive and complicated Measurement Benches with testing tools are fully integrated with your testbed and design environment.

### Customize it to your need



Need high RF Power?  
Better Sensitivity?  
Developing for a specific FPGA chip? The C700 customization services are intended for developers who want to tailor their development platform to their applications and move from development to deployment in one smooth

SpectraTronix C700 modules give developers the ability of generating complex baseband I/Q signals through VHDL programming of its fully configurable FPGA blocks then Vector Modulate them to an RF Carrier up to 6 GHz. Similarly, for the receive chains HDL Developers can easily implement system functions inside the FPGA and (optionally) use the connected PC for pre/post processing

step. C700 RF modules can be fit with a wide selection of FPGA & SoC chips from Altera® & Xilinx® for maximum versatility. Moreover, different RF Front-Ends and entire RF Subsystems can be incorporated (or custom designed) within the module in order to best match it to your target system. This is a unique feature to the C700 platform that eliminates any inconsistency arising from hardware change.

### All Testing Tools Built-In

The RF characteristics of the C700 outperforms traditional Test & Measurement Equipment of its class, enabling the use of C700 Modules as general-purpose test equipment or even fully optimized

## General Specifications

Frequency range	0.4 GHz to 6 GHz
Frequency accuracy	$1 \times 10^{-7}$ (Warm-up time 1 minute)
Frequency resolution	100 KHz (1 Hz with VSM or VSD modules)
Number of channels	Scalable from 1 to 1000
IQ resolution	16 bits
Real time bandwidth	40 MHz/channel
(More bandwidth is achievable through channel aggregation)	
Bus speed	700 Mbps (Per single chassis)
Number of slot /chassis	5, 8, 16 or 32
Reference signals	10 MHz IN, 10 MHz OUT
Internal oscillator	OCXO
System clock	50 MHz
System controller	USB2, Embedded AVR

## FPGA

FPGA Configuration	Downloadable via JTAG port
Standard FPGA Chips	Cyclone III, Cyclone IV

## RF Specs (Generator/Transmitter modules)

Phase noise	<-87 dBc (1Hz normalized) @ 10 KHz from carrier, 1 GHz. (Optional -107 dBc)
Amplitude accuracy	<0.5 dB (Typical 0.2 dB)
Switching speed	<10 us (Within $\pm 160$ MHz from LO frequency )
Sweep time	<1 ms (Within 1 GHz band)
RF output power	-37 dBm to -7 dBm. Overrange -87 dBm to -7 dBm (Optional amplifiers/attenuators available)

## RF Specs (Demodulator/Receiver modules)

Max. RF input level	$\leq 12$ dBm
SFDR	>70 dB
Sensitivity	<-90 dBm (Optional low noise amplifiers available)
Amplitude accuracy	<0.5 dB (Typical 0.2 dB)
Image rejection	>40 dB (Optional 80 dB. Refer to UDC modules specifications)

## Physical characteristics

System housing	Mini, Orchestra, and Field housing
Power supply	9-18 VDC (optional AC power supply integrated in system housing)
System cooling (Optional)	Forced air
Operating temperature	+0 °C to +50 °C
Operating Humidity	<95% rel. humidity
ROHS	All C700 components are ROHS Compliant

## Ordering Information

Base Unit	C700-BU-xx <sup>iv</sup>
Synchronization Module	C700-SYNC1
Master Controller Module (Embedded)	C700-AVR1
Slave Controller Module (Embedded)	C700-AVR1s
Master ARM Controller Module (Embedded)	C700-ARM
USB2 Communication Module	C700-USB2
PLL Module (100MHz to 6 GHz)	C700-PLL1e
PLL Module (4 GHz to 8 GHz)	C700-PLL2
PLL Module (6 GHz to 12 GHz)	C700-PLL3
PLL Module (10 GHz to 18 GHz)	C700-PLL4
Vector Signal Demodulator / Receiver (0.7 to 2.7 GHz)	C700-VSD1e
Vector Signal Demodulator / Receiver (0.4 to 6 GHz)	C700-VSD2e

## Options & Accessories

System Housing for field applications	C700-Field-xx <sup>v</sup>
System Housing for laboratory applications; 8 slots	C700-Orchestra
Compact system housing; 5 slots	C700-Mini

All system housings include cooling system and AC/DC power supply

## Other Accessories

Multi-band omnidirectional antenna; 0 dBi gain.	A-M210
Phase stable low loss cable assembly, SMA-male	CSS-03p-xx
RF adapter SMA female to N-male	AD-SN-6
Synchronization cable for multi system; 4 way	CS-4

For any information about prices, future developments, recommendations, or customizations kindly contact **Sales:** [sales@spectratronix.com](mailto:sales@spectratronix.com)

<sup>i</sup> Altera® is a trademark and registered in U.S.

<sup>ii</sup> MATLAB® is a registered trademark of MathWorks.

<sup>iii</sup> LabVIEW® is a trademark of National Instruments.

<sup>iv</sup> XX is the number of slots; 05, 08, 16 or 32

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