



Moku Compile

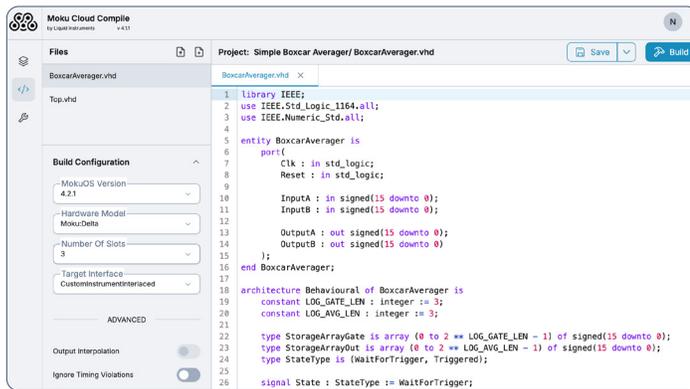
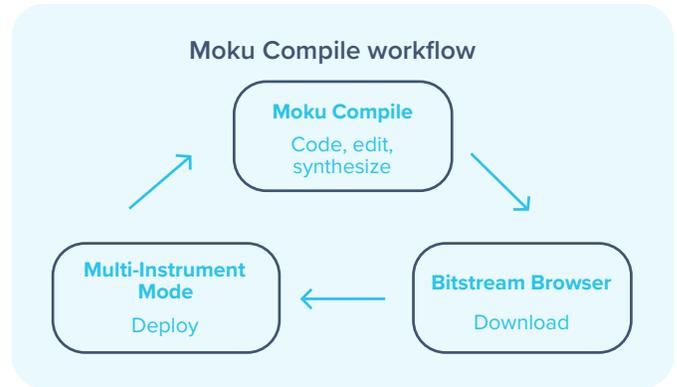
Develop and compile custom FPGA designs for Moku devices



Go beyond standard instruments. Define your own.

Moku Compile enables custom FPGA development for Moku devices. Designs written in VHDL or Verilog are compiled into bitstreams for deployment as Custom Instrument or Custom Instrument+ on the device.

Within Multi-Instrument Mode, compiled designs operate alongside native Moku instruments, with direct access to analogue inputs and outputs and, where available, digital I/O resources.



Flexible compilation environments

Moku Compile balances development speed and security with flexible compilation environments.

Moku Cloud Compile:

- Browser-based compilation environment
- No local FPGA toolchain installation or maintenance

On-premises Moku Compile:

- Compilation within the local network
- Designed for secure or controlled environments

	Moku:Delta			Moku:Pro	Moku:Lab		Moku:Go	
FPGA	RFSoc			Ultrascale+	Zynq 7020		Zynq 7020	
Core clock	312.5 MHz			312.5 MHz	125 MHz		31.25 MHz	
Slots	3 Slots	5 Slots	8 Slots	4 Slots	2 Slots	3 Slots	2 Slots	3 Slots
LUTs	50,000	40,000	20,000	48,400	19,600	12,000	20,000	12,000
Flip-flops	100,000	80,000	40,000	96,800	39,200	24,000	40,000	24,000
Block RAM (36k)	100	100	50	154	60	40	50	40
DSP	500	350	200	432	100	60	100	60
Custom Instrument	312.5 MSa/s			312.5 MSa/s	125 MSa/s	125 MSa/s	31.25 MSa/s	31.25 MSa/s
Custom Instrument Interlaced	5 GSa/s*	1.25 GSa/s*	625 MSa/s	1.25 GSa/s*	500 MSa/s	250 MSa/s	125 MSa/s	62.5 MSa/s

All specifications are per slot.

* May be subject to export control.

[Learn more](https://compile.liquidinstruments.com/) or get started on your custom design at <https://compile.liquidinstruments.com/>



Custom Instrument / Custom Instrument+

Deploy and execute custom FPGA designs on Moku

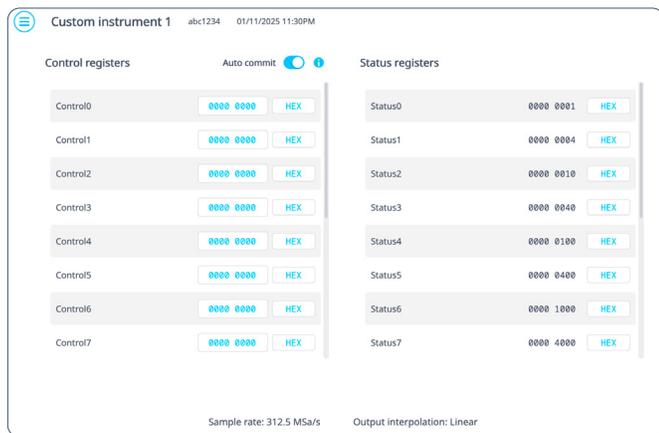
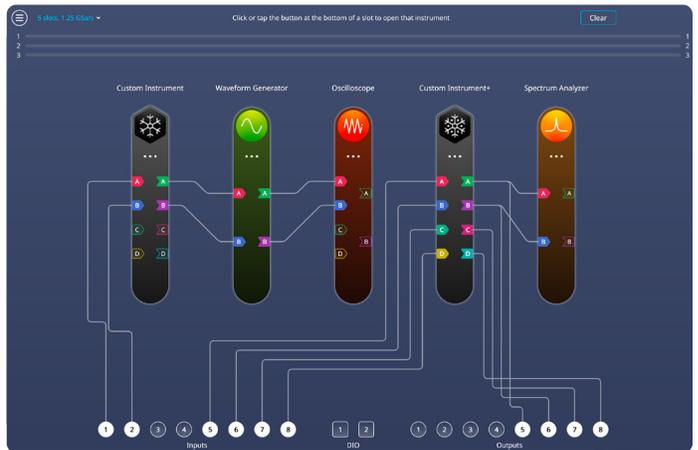


Powerful customization made easy

Compiled FPGA designs run within Multi-Instrument Mode through Custom Instrument or Custom Instrument+, with direct access to device I/O and full integration into the device timing and data architecture.

Native instruments such as the Oscilloscope and Waveform Generator can operate concurrently with the custom design to observe outputs, inject signals, and validate performance on a single hardware platform.

Moku also provides 16 control registers for runtime configuration and 16 status registers for readback. Register updates take effect immediately in the running design, enabling real-time parameter adjustment and system visibility.



Scale your custom design performance

Compiled FPGA designs are deployed on Moku devices as Custom Instrument or Custom Instrument+ configurations. The selected configuration is determined at compilation and defines the operating performance of the design.

Custom Instrument operates at the base device clock rate and is available to all users. Custom Instrument+ enables interlaced designs operating at effective sample rates up to 16x higher and is available with Premium or Enterprise Moku Compile tiers.

Example use cases

- Create custom math functions, apply gain or offset, and create more complex signal processing flows
- Design and deploy a custom instrument like a boxcar averager, specific DC sequencing, or more advanced cross correlation functions
- Create user-defined pulse or function sequences. Digitally sum, subtract, or otherwise combine signals, or create gaussian noise for testing
- Combine with MathWorks® Simulink and MATLAB HDL Coder™ to produce noise generators, random sequences, or square root functions
- Find more extensive code examples on [GitHub](#)

