

SCI-Compiler PRO

**Graphical
Programming
Language for CAEN
Open FPGA Boards**



SCI-COMPILER

Open FPGA

Features

- **Block-diagram-based** programming tool for CAEN **Open FPGA** boards
- Designed to ease FPGA access even to non-expert programmers
- 100+ advanced signal processing blocks for Physics and Nuclear Engineering: Trapezoidal Filter, Charge Integration, TDC, Oscilloscope, MCA and many more
- **Remote Customization Service** for compilation and simulation with minimal local setup
- Sci-Compiler SMART learning and evaluation kit
- SciSDK - A unique Software Development Kit for any compatible board
- Stay up-to-date with Sci-Compiler upgrades by subscribing a **yearly license renewal**
- Embedded tools for debugging and firmware testing

Description

Sci(entific)-Compiler is an innovative software tool to program the **Open FPGA** of CAEN boards. It makes use of block diagrams instead of VHDL/Verilog firmware programming language to generate and compile a custom firmware, thus allowing to accelerate custom designs, even for non-expert FPGA users. SCI-Compiler is an **automatic firmware generator** that, starting from a graphical diagram, generates a firmware code that implements the required function. Moreover, SCI-Compiler is able to generate C++/Python example software code to be used in **Windows** and **Linux** for DAQ software implementation. SCI-Compiler uses a prebuilt library set containing more than 100 blocks that implement complex function (MCA, Oscilloscope, Digitizer, TDC) commonly used in Physics applications.

What is Sci-Compiler

The increasing use of programmable logic devices in trigger and data acquisition systems makes clear that having a general purpose platform and technicians dedicated to the firmware development is becoming more and more important. The advantage of employing programmable logic devices with respect to standard logic modules (like NIM logic modules) is remarkable: a single programmable logic device includes the potentiality of hundreds of thousands of standard logic modules. For the technicians, who usually work with standard logic modules, the use of specific languages like VHDL or Verilog for the firmware development could represent a limitation in the spread of these powerful devices. We introduce an innovative method to simplify the firmware development. This method is based on a graphical programming interface consisting of blocks specifically developed for nuclear physics applications. For instance, any trigger logic could be implemented by connecting specific blocks in the graphical interface, as easily as physically connecting NIM modules in a rack. The SCI-Compiler software allows to develop both purely digital applications, exploiting blocks like scaler, counter, pattern matching, logic Analyzer and state machine, and analog processing applications, such as custom multichannel Analyzer using charge integration, trapezoidal filter, spectrum and oscilloscope blocks. In addition, the SCI-Compiler software provides the function to read and test the ASICs, enabling the user to develop a sequencer for the ASIC control. The SCI-Compiler software focuses the attention only on the functional blocks of the application to be implemented and does not require a deep knowledge of the device in use, enabling the employment of programmable logic devices also to users who are not experts in firmware development.

For Beginners

SCI-Compiler SMART is a **hardware + software** kit for non-expert users who are approaching the open FPGA programming. The kit is provided to people not skilled with FPGA coding, with the exact purpose of evaluating SCI-Compiler capabilities and learn how to design custom firmware using the block-diagram method. It includes:

- 1x DT1260, 2 Channel, 65 MS/s, 12 bit ADC unit with Open FPGA.
- 1x SCI-Compiler Lite license working with the DT1260 unit only.

The combination of SCI-Compiler + basic hardware allows not only to learn FPGA coding with block-diagram method, but also to test the functionalities of the firmware on a real device.

Advanced Hardware

SCI-compiler has been designed to generate code for some particular hardware platform designed by CAEN. Presently, **SCI-Compiler PRO** license supports the following CAEN products:

- **DT5495 - V2495** Programmable Logic Units
- **DT5550** DAQ System with User Programmable FPGA and sequencer
- **DT5550W** Weeroc ASICs Development system
- **R5560** 128-channel Open FPGA Digitizer with differential inputs
- **R5560SE** 128-channel Open FPGA Digitizer with single-ended inputs
- **DT5560SE** 32-channel Open FPGA Digitizer
- **2740-2745** Digitizer Families

OS	Windows Framework required	Supported CAEN Board	Local Compiler option (*)	Remote Customization Service
Windows 10 - 64 bit	4.0 or higher	V2495 - DT5495	18.0 or higher	COMING SOON

Windows 10 - 64 bit	4.0 or higher	DT5550 - DT5550W - DT5560SE- R5560 - R5560SE	2017.4	AVAILABLE
Windows 10 - 64 bit	4.0 or higher	2740-2745	N/A	AVAILABLE
Windows 10 - 64 bit	4.0 or higher	SMART kit	2020.2	AVAILABLE

() Not required if using SCI-Compiler remote customization service.*

Developed in collaboration with Nuclear Instruments.

Related Products

DT2740



64 Input Channel 16 bit 125 MS/s Digitizer

VX2745C

VX2495

VX2740



64 Input Channel 16 bit 125 MS/s Digitizer

V2745



64 Channel 16 bit 125 MS/s Digitizer with Programmable Input Gain

V2740



64 Channel 16 bit 125 MS/s Digitizer

V2495



Programmable Logic Unit PLUS

R5560SE



128 Channel 14 bit 125 MS/s Open FPGA Digitizer

DT2745



64 Channel 16 bit 125 MS/s Digitizer with Programmable Input Gain

VX2745



64 Input Channel 16 bit 125 MS/s Digitizer with Programmable Input Gain

DT5550W



Complete Readout System based on Weeroc ASIC

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