



High Energy Physics



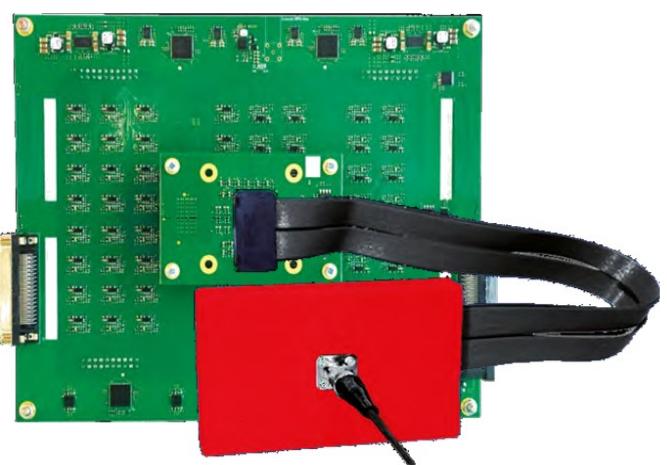
Multichannel Spectroscopy



Labs and Education



Industrial



KEY FEATURES

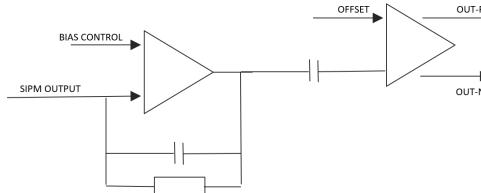
- ◆ 64-ch Analog Frontend Board for SiPM biasing, signal preamplification and shaping
- ◆ 64-channel Readout System kit available:
 - DT5550AFES Analog Frontend
 - 2 x DT5550 Readout System
 - Extension micro-coaxial cable with input connector for SiPM with simple pinout
 - SCI-Compiler license
- ◆ Complete system for waveform digitization, imaging and spectroscopy
- ◆ SiPM input and bias lines on a single connector with simple pinout to adapt to **readout any kind of SiPM**
- ◆ Great input dynamic range (up to 6000 photoelectrons) for calorimetry applications
- ◆ Ideal for high-resolution spectroscopy
- ◆ Radiation Tolerant system
- ◆ **DAQ software** provided for free with the 64-ch Readout System kit
- ◆ Optional ready-to-use detector kit:
 - PCB equipped with 64-ch Hamamatsu SiPM matrix S1361S-1050N, directly compatible with DT5550AFES input connector
 - Dark box for SiPM board testing

DESCRIPTION

The **DT5550AFES** is an **analog frontend board** designed for SiPM readout.

It is a multichannel **preamplifier & shaper** to be used in conjunction with one or two DT5550, to digitize the shaped signal. This system allows to read out up to 64 independent channels, making the solution ideal to perform **imaging** and **high-resolution spectroscopy** with SiPM matrices and arrays.

Opposed to widely available ASIC-based solutions, the DT5550AFES is based on discrete preamplification stages, so that it allows the **direct sampling of the analog signal generated by the SiPM**. Moreover, the **large input dynamic range** allows to use the board for particles calorimetry applications.



The analog frontend consists in independent transimpedance shaper amplifier (TIA), followed by a single-ended to fully-differential amplifier. Differential signals guarantee a better immunity to noise and crosstalk between channels, and can be carried **several meters away for digitization process**, without any degradation.

A power supply module (CAEN A7585D) for SiPM biasing is mounted onboard, providing a common voltage in the range 20-85 V, with the possibility of individual channel adjustment. SiPM temperature is monitored using a digital temperature sensor. Thanks to this feature, a temperature feedback on the bias voltage is implemented.

The **DT5550AFES**, in conjunction with two **CAEN DT5550** open-FPGA boards, realizes a complete 64-channels readout system for SiPMs, with programmable signal processing capabilities. The system can be used for **waveform digitization, imaging and spectroscopy** purposes. The kit comes with **SCI-Compiler**, the CAEN user firmware generator and compiler for easy FPGA programming, and a ready-to-use **readout software** for waveform recording and spectra acquisition.



Detector Kit

The DT5550-AFES can be used to readout any kind of SiPM, thanks to the input connector of the micro-coaxial extension cable, exposing input and bias lines with a simple pinout. Moreover, it is available an optional detector kit consisting of a PCB equipped with a 64-ch Hamamatsu matrix S1361S-1050N and a dark box for detector testing. The SiPM PCB is a small square board which can be connected directly on the DT5550AFES input connector or adjusted in a different geometry with the micro-coaxial extension cable.

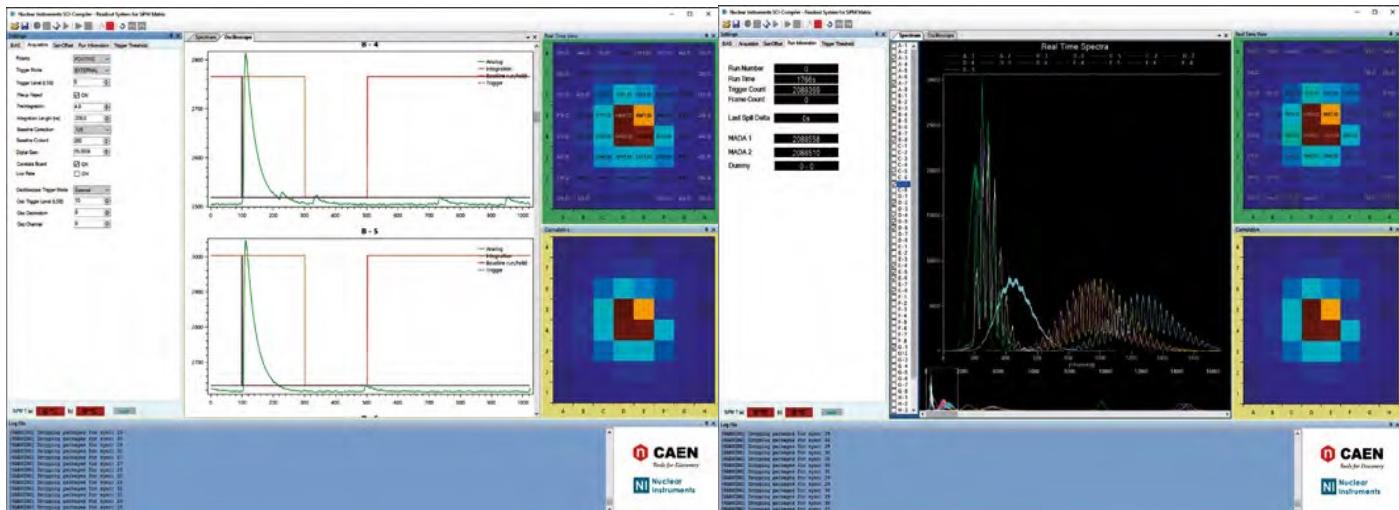
The SiPM PCB project is available for free in order to help the user in the customization process.



SCI-Compiler and Readout Software

The 64-ch Readout System kit comes with a **ready-to use DAQ software**, provided for free in order to control the analog stage, acquire the waveforms, calculate the energy spectrum and 2D image in realtime. The software is fully compatible with the kit default firmware loaded on the DT5550 and it is open source for further user customization.

The user can reprogram the DT5550 with a custom signal processing algorithm, using **SCI-Compiler** to easily manage the FPGA firmware development (license INCLUDED in the DT5550AFES+DT5550 kit).



Ordering Option

Ordering code **Description**

WK5550AFES6A	DT5550AFES– 64 ch Analog Frontend and Readout System (2xDT5550 included)
WA5550AFES6A	DT5550AFES– 64 ch Analog Frontend for SiPM
WKDETAFES6XA	64 ch SiPM matrix kit for DT5550AFES

