eMUSIC Evaluation Board

enhanced Multiple Use SiPM IC for photodetector readout
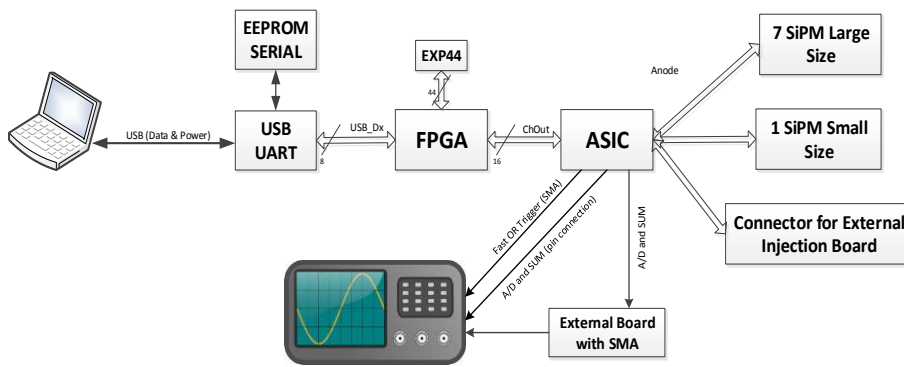
Overview

Fig. 1 Evaluation Board use block diagram

The eMUSIC evaluation board can be used for testing the enhanced Multiple Use SiPM IC for photodetector readout. It provides a multipurpose framework for developing different applications, in prototype or preindustrial phase or long series.

It offers access to all functionalities of the eMUSIC08 ASIC with a comprehensive interface. All inputs and outputs are accessible, together with the access to a computer to manage all the communications and program the functionality and parameters required for testing and/or operation. Figure 1 shows a block diagram describing the functional flow of its use.

Evaluation board functionalities

As can be seen in Figure 2, the Evaluation Board enables a comprehensive interface with the ASIC. Including:

- SiPM Connectors:
    - 7 large size connectors
    - 1 small size connector
    - 1 multipurpose 20 way connector
- Board power supply (5V)
- Micro-USB Interface Connection
- P9: High voltage connector
- Pin Output connectors:
    - Single Ended: Analog or Binary (non-linear ToT).
    - Low Gain and High Gain summation
    - U5: Fast OR trigger SMA output
    - U4: SMA digital single ended output
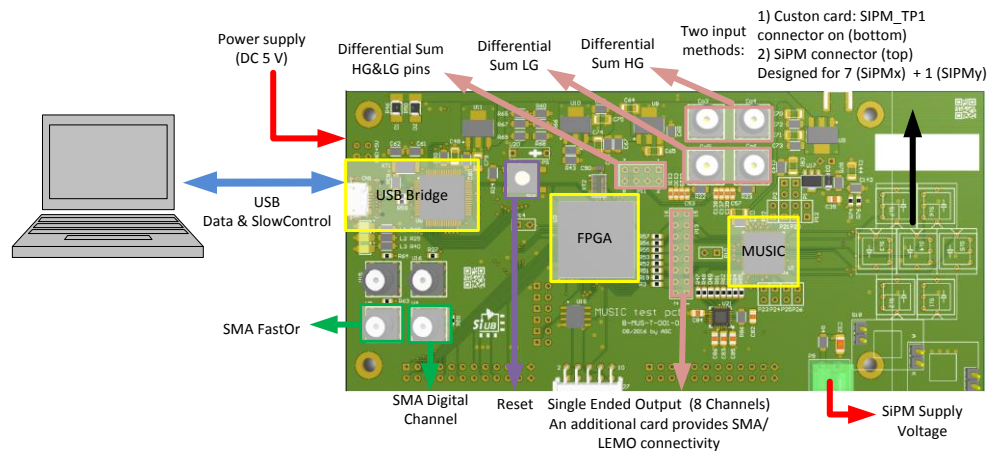- External board for SMA output connectors

Fig. 2 Evaluation Board components description

Results

Summation capabilities of the ASIC are shown below. Fig. 4 (sum of 1 SiPM) shows perfectly identified peaks (photons). Fig. 5 (sum of 7 SiPM) shows that peaks can still be identified, despite of being more affected by noise. Lastly, note that the non-linear ToT readout achieves a single photon time resolution (SPTR) around 100ps.
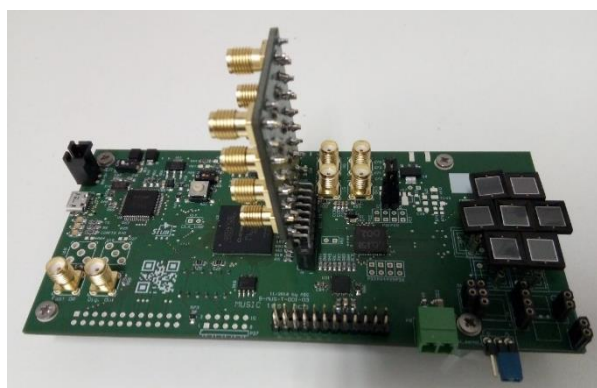

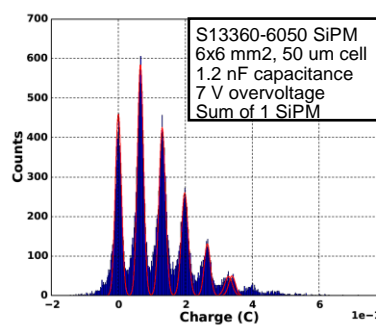Fig 3. Evaluation Board with external SMA output connectors and SiPMs.

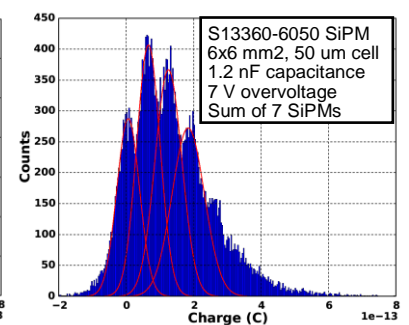Fig 4. Charge histogram of the sum of 1 SiPM input channel.

Fig 5. Charge histogram of the sum of 7 SiPM input channels.

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