# Readout Electronics

## Readout ASIC

To read out the GEM-based SDHCAL, we chose an ASIC called MICROROC (MICRO-mesh gaseous structure Read-Out Chip), developed at IN2P3 by OMEGA/LAL and LAPP microelectronics groups. The MICROROC is a 64-channel mixed-signal integrated circuit based on 350nm SiGe technology. Each channel of the MICROROC chip is made of a very low noise fixed gain charge preamplifier optimized for a detector capacitance of 80 pF and able to handle a dynamic range from 1fC to 500fC, two different adjustable shapers (A high gain shaper for small signal and a low gain shaper for large signal), three comparators for tri-threshold readout and a random access memory used as a digital buffer. Other blocks, like 10-bit DAC, configuration register, bandgap voltage reference, LVDS receiver are shared by 64 channels. The package of MICROROC is TQFP (Thin Quad-Flat Package), which means the thickness is 1.4mm.

## Readout System Structure

The readout system structure is developed on SRS (the Scalable Readout System). This readout system allows users to tailor the system size to the needs.