# Microcontroller

Challenge:

- Liquid Argon temperature suitable;

- No external clk or Vref;

- Easy to program during the building phase;

Atmel ATtiny13 family, working at LN2 temperature.
(https://www.researchgate.net/publication/282648832_Behaviour_ of_ATtiny_microprocessors_at_low_temperatures)

From this we tested a newer generation of ATtiny microcontrollers (ATtiny102) with:

- Smaller package;

- Internal unique 9 byte ID*;

- Less power consumption.
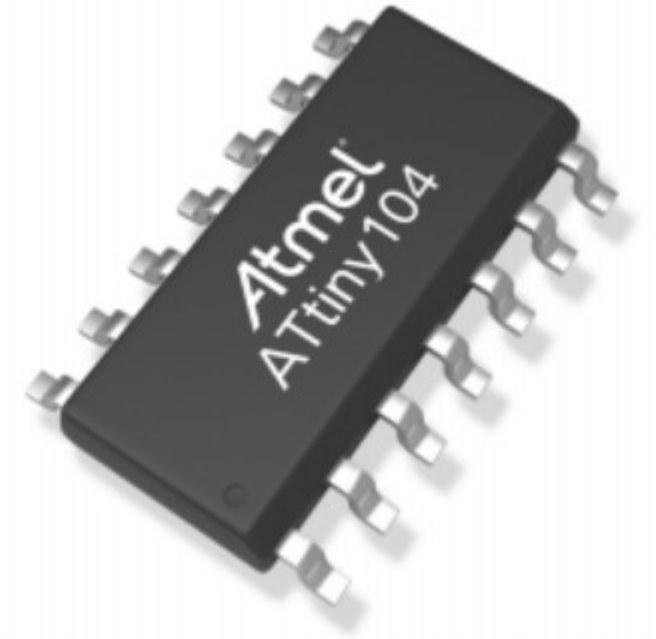
1024 Bytes of In-system Programmable Flash Program Memory
32 Bytes Internal SRAM
5 multiplexed 10-bit ADC
USART
Self Programming
Low Power Idle
Individual Serial Number to Represent a Unique ID.

*The unique ID feature permits to program all the uCs with the same code!

Microcontroller

Fast serial communication implemented:

- Max speed of 1Mbit reached at both room temperature (RT) and LN2

Dual channel ADC (multiplexed) implemented (single conversion mode):

- Tested the functionality and, qualitatively the precision of the conversion both at RT and LN2.

The 5V uC power supply was chosen as dynamic range for the conversion. Internal voltage references (1.1V, 2.2V, 4.3V) can be used too but they must be tested at LN2 temperature.

2x10bit single shoot conversion

The current drained by the uC is almost 5mA@5V.