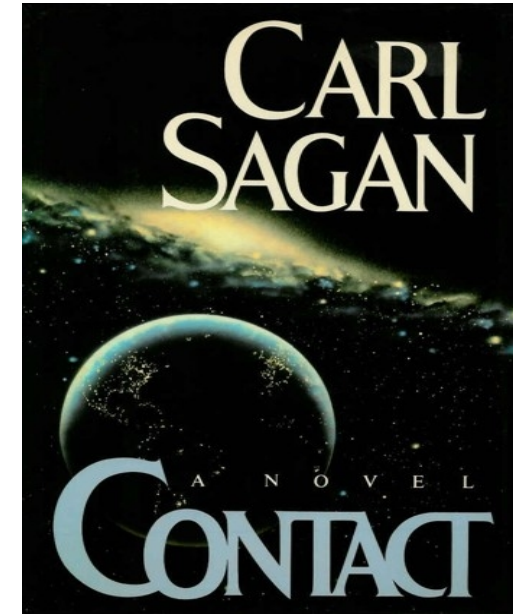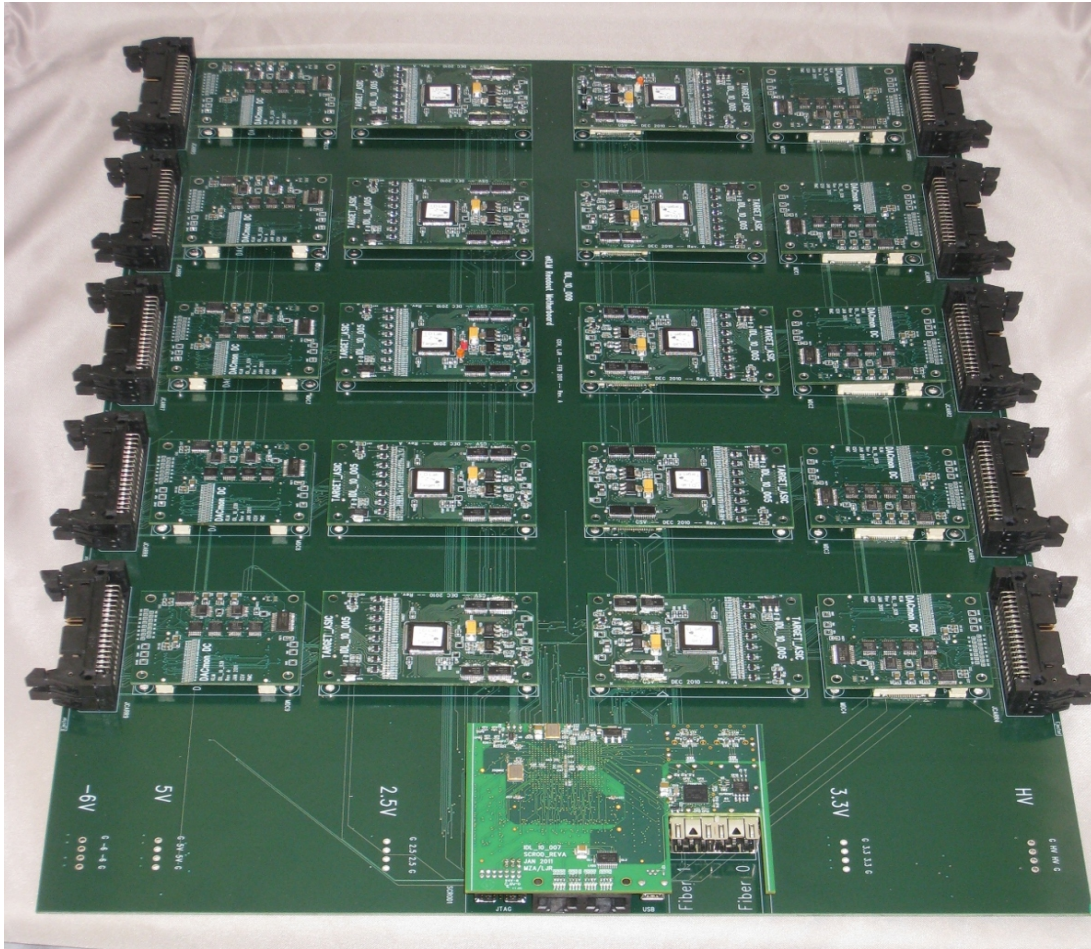# SciFi Tracker Readout System
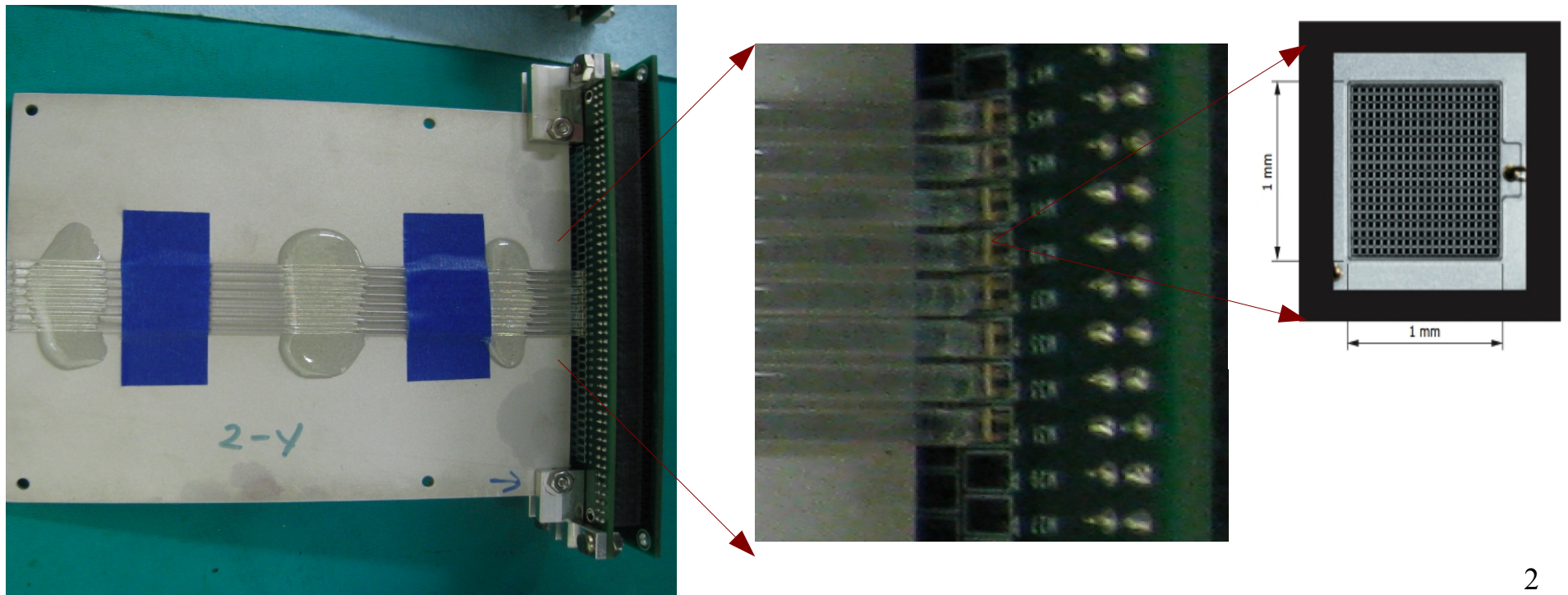

What is SciFi?
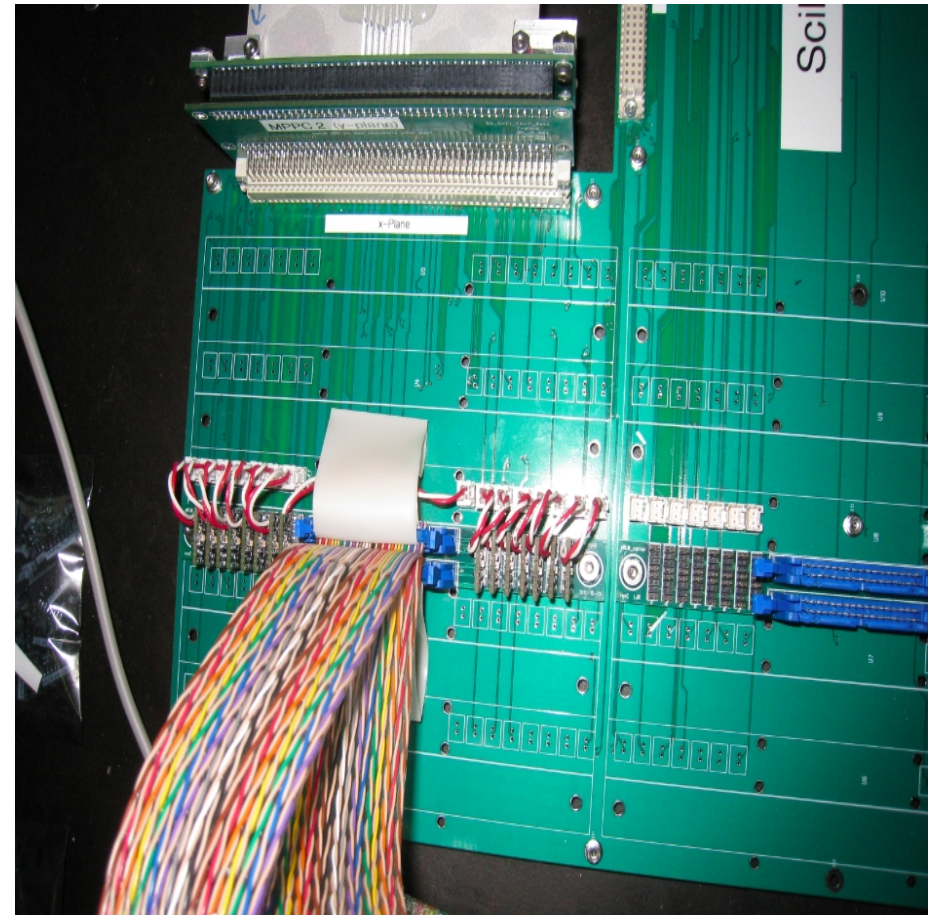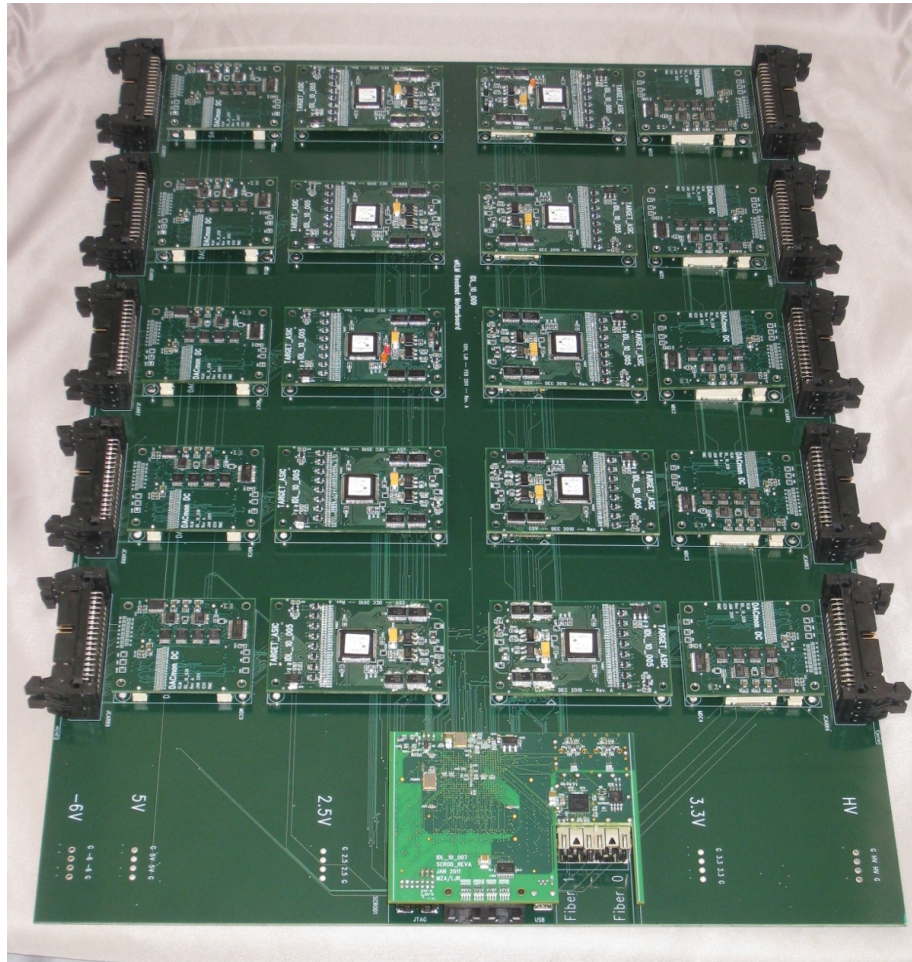
Dmitri Liventsev, Xin Gao, Xiaowen Shi
12/8/2011

SciFi Tracker

- **Sc**intillating **Fi**ber **Tracker**
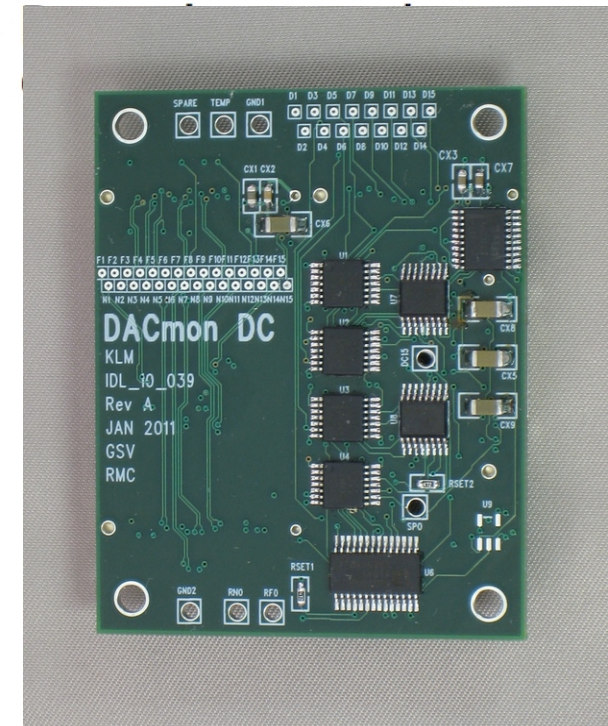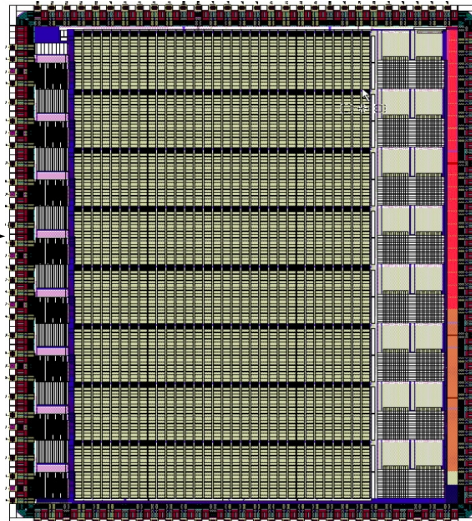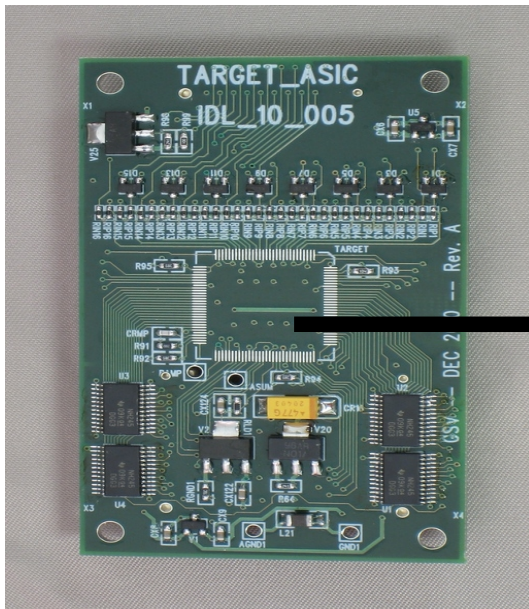- **MPPC(Multi-Pixel Photon Counter)**

Readout System Overview

Readout Motherboard

DAC_MON (10x)

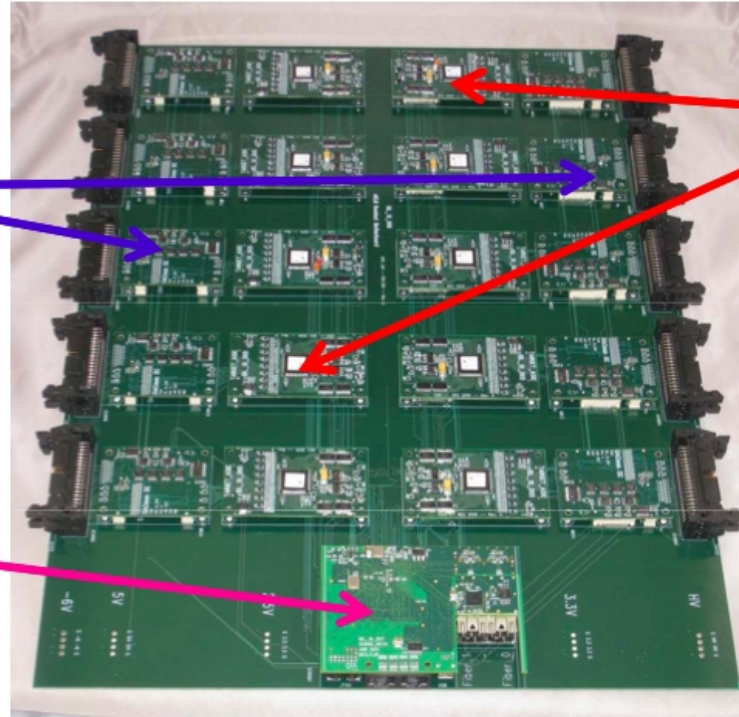TARGET DC
(10x – replace with TARGET3 DC)

SCROD

General Functions Of The Key Parts

- SCROD(Standard Control, Read-out Data): "CPU" of the readout system. Firmware is loaded in the FPGA(Field-Programmable Gate Array) on the SCROD.

- TARGET Daughter Card: Sampling and digitizing the data from channels.

- DAC_MON Daughter Card: Fine tuning the high voltage bias which controls the MPPC gain.

SciFi Tracker Readout System Diagram

PC

USB

SCK

RIBBON CABLE

X10

DAC_MON

AMP CARD

MPPCs

SCROD (FPGA)

DIN

TARGET DAUGHTER CARD(TARGET)

X10
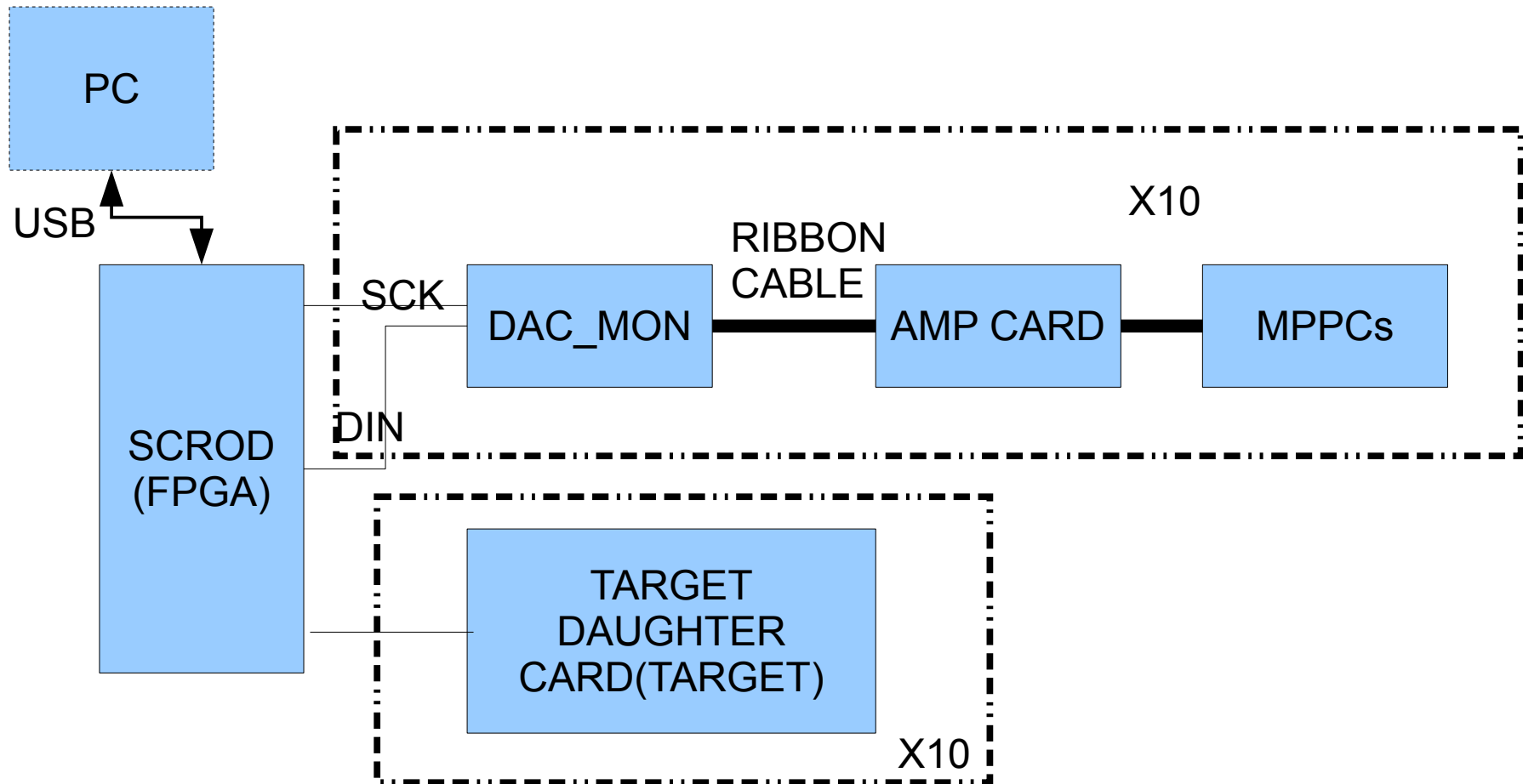
TARGET1 Block Diagram
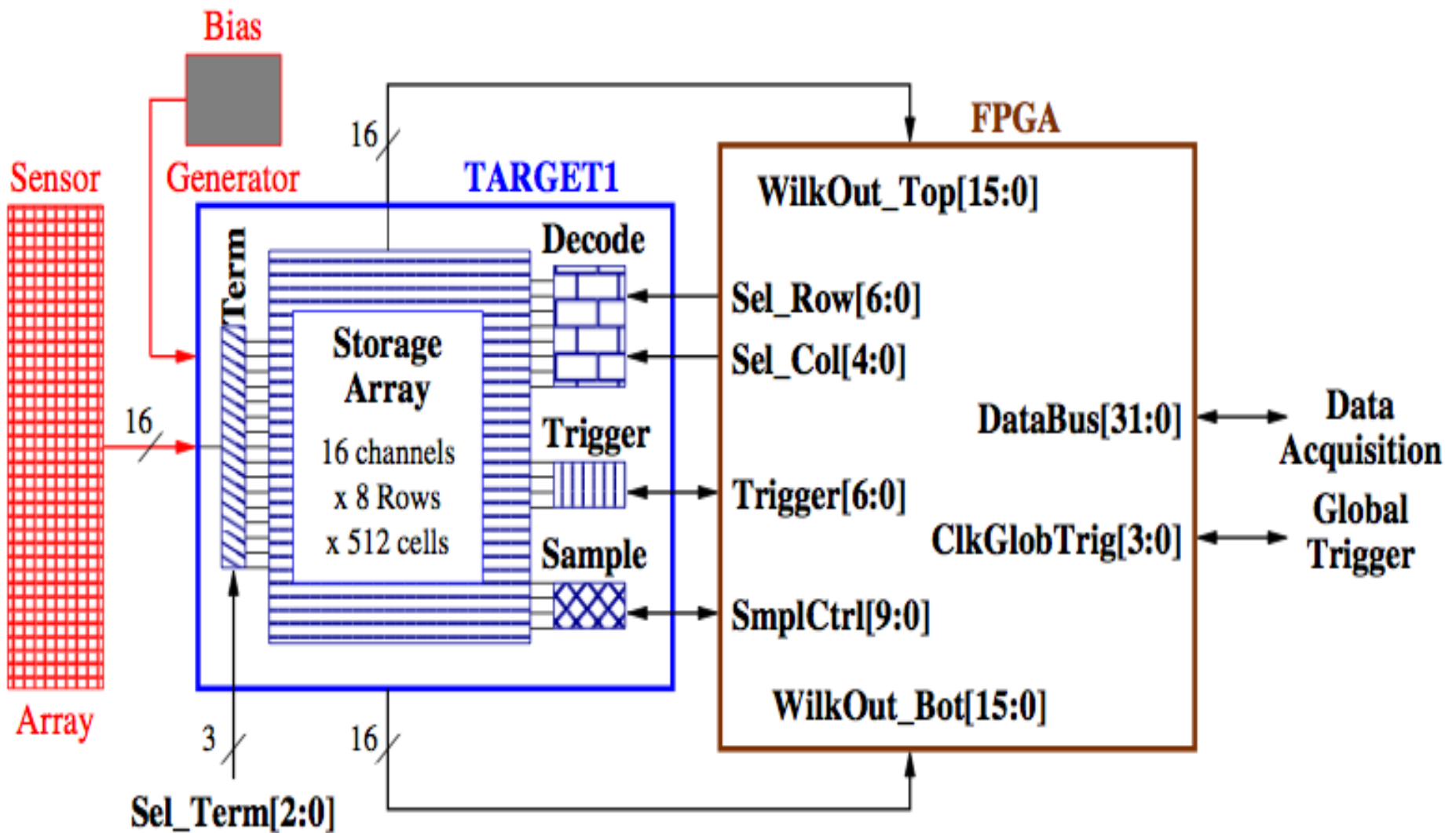
TARGET

• TARGET: The TeV Array Readout with GSa/s sampling and Event Trigger. It's an application-specif c integrated circuit (ASIC).
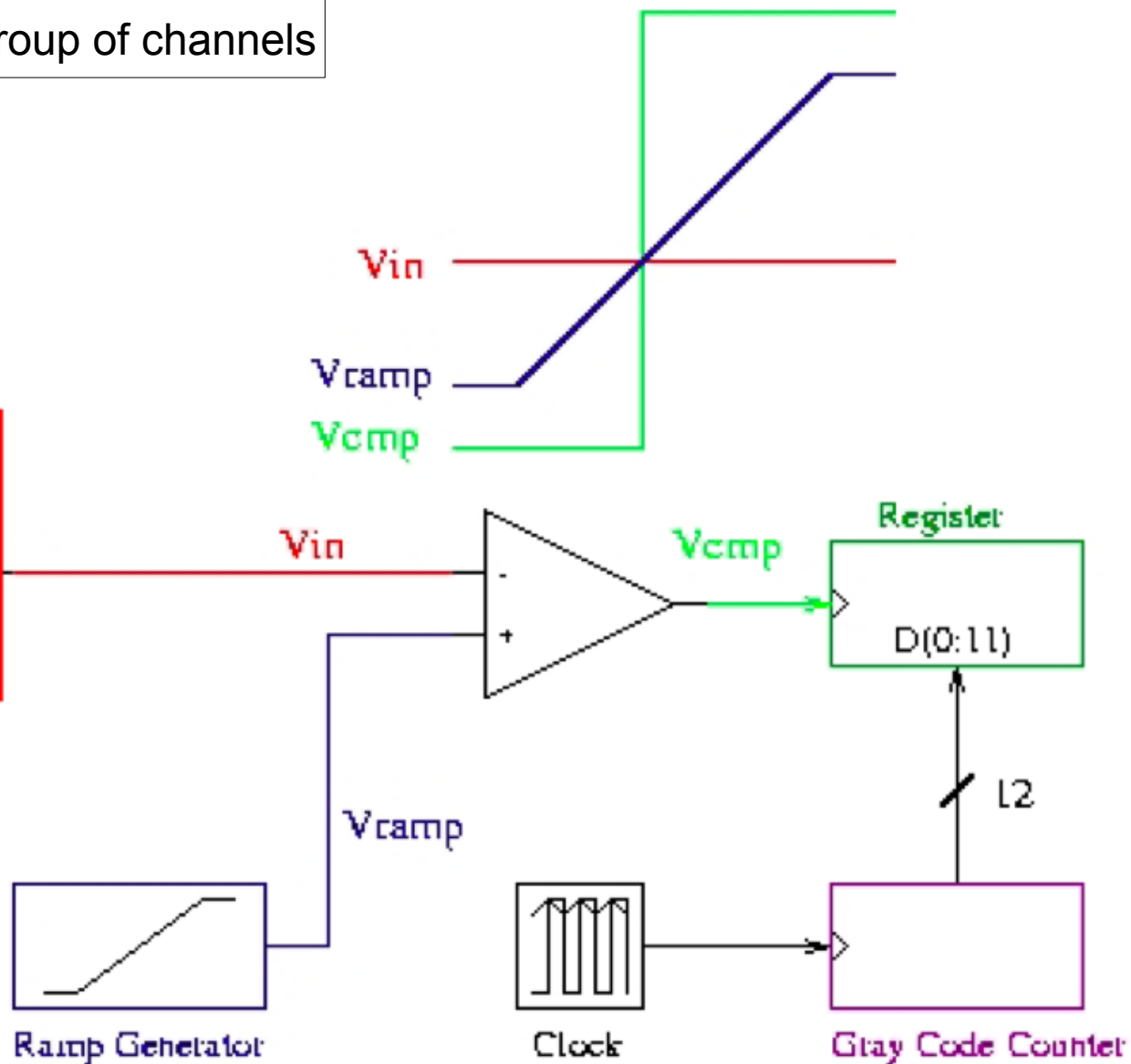
• 16 parallel input channels, 4096-sample/channel

• 1GSa/s for each channel

• Readout time per event: < 20us

• Has two banks of 16 Wilkinson ramps (one for channels 0–7 and one for channels 8–15). so that 32 waveform samples are digitized simultaneously.

Wilkinson ADC

16 Wilkinson ramps for each group of channels

Firmware

- Control TARGET: sampling, data readout and keep the process stable.

- Transferring data between FPGA and DAQ(PC).
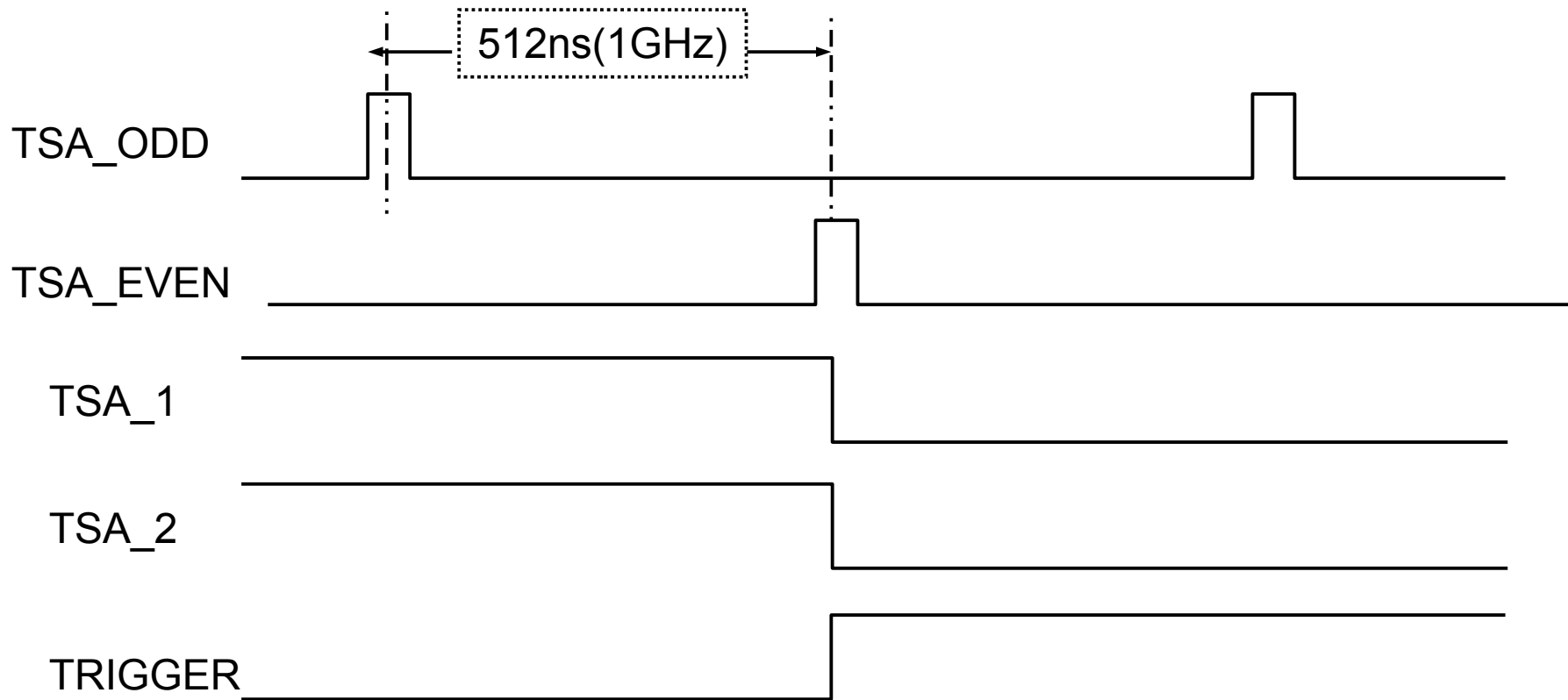
- List of main modules

  CLK_MAIN

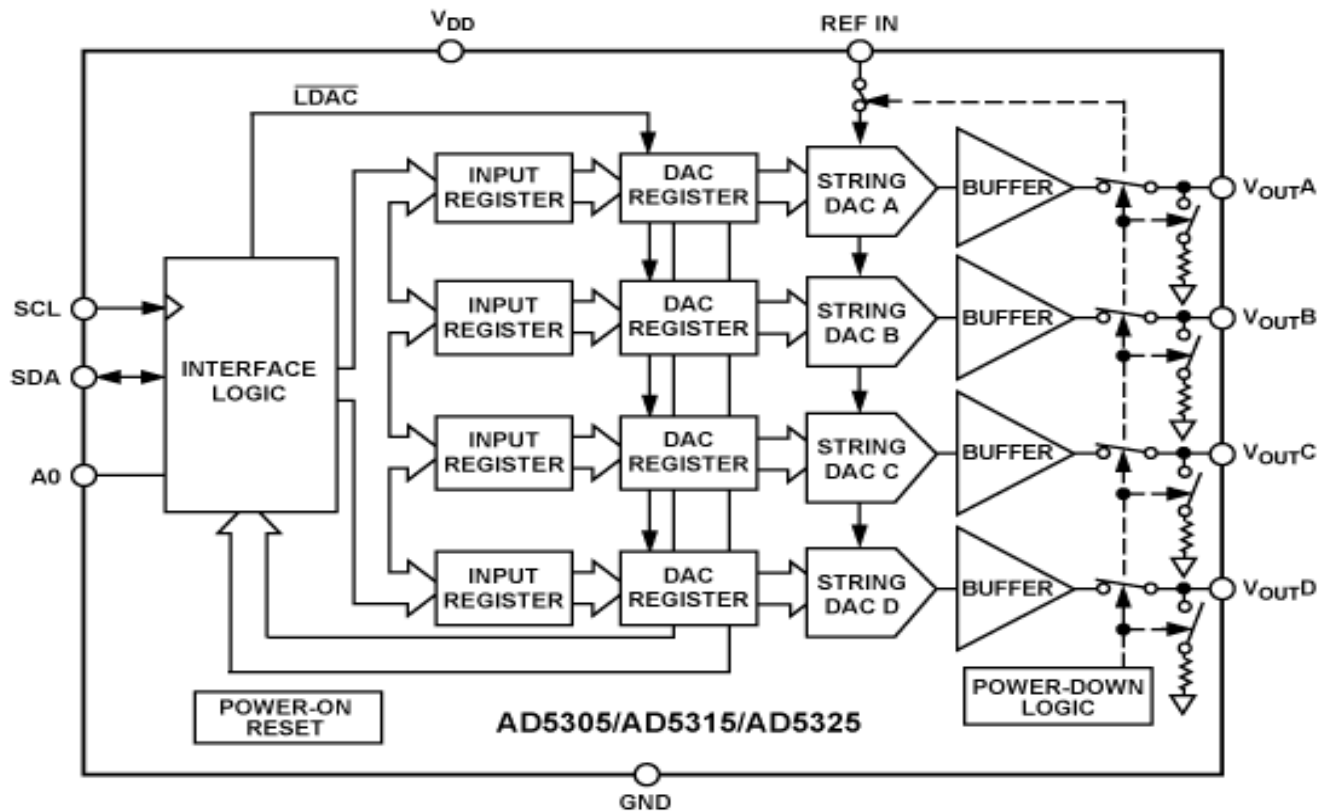 TSA_CTRL

  TARGET_TOP

  DAC_MAIN

Specifications

• Keep TARGET sampling until it is triggered

Specifications

- To set the TARGET sampling speed, we need to adjust ROVDD voltage.
- The DAC on the TARGET daughter card is AD5325(quad voltage output 12-bit DAC)

AD5305/AD5315/AD5325

Summary

- With lots of help, we are now able to get 15 channels(1 TARGET) of readout from SciFi Tracker.

- Nextstep is to get readout from multiple cards.