

RCE Based Cosmic Telescope

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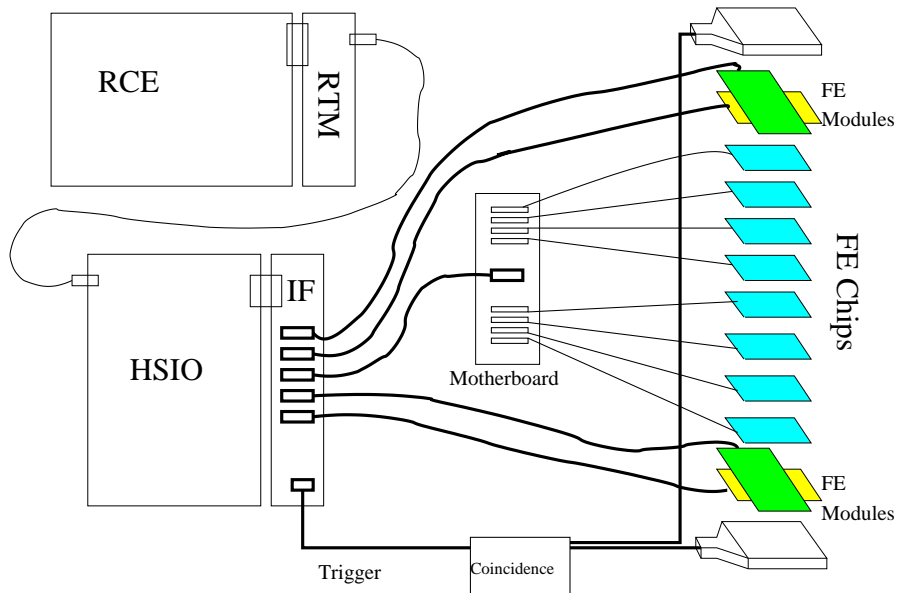


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- A cosmic telescope would be useful to test 3-d sensors.
- The telescope would use scintillators for triggering.
- For tracking 4 pixel modules would be used.
- The pixels would be used as strips (2 modules in x-orientation, 2 in y-orientation) to achieve the necessary resolution.
- The 3-d sensors would be bump-bonded to FE-I3 chips.
- Up to 8 chips can be connected to an MCC motherboard.
- The pixel modules and the motherboard would be connected to the RCE through an interface board.
- All data in one event stream

Setup



- Brian and Philippe will set up scintillators and coincidence electronics.
- We have 5 pixel modules which need to be tested on TurboDAQ.
- We have 2 motherboards which are ready to go (only need 1).
- We have an RCE/RTM and an HSIO. More HSIOs will be fabricated soon.
- The missing piece is the interface board with 5 pixel module connectors and a trigger input.

- The simplest way to provide a trigger is through the HSIO.
- When receiving a trigger signal the HSIO would directly send the level-1 bit pattern “11101” to the frontends.
- This has a short and well defined latency.
- The RCE does not have to know about the trigger, it just waits for the data to arrive.
- The RCE could send a message back to the HSIO to signal that it is ready for more data.
- This addresses point 11 of Su Dong's action items from last week.

- In the present calibration setup the data bitstream formatting is done in software on the RCE.
- This is quite slow right now, and speed will be important with 6 modules to be read out.
- Mike Huffer and JJ Russell have offered to help us with optimizing the code to speed it up significantly.
- One could also think of doing at least a partial formatting in the HSIO.

- Trigger.
- Serialization.
- Multiplexing of 6 data streams onto 1 fiber.
- Selecting modules for downloading configurations.

- Ideally we would use the same format as the present TurboDAQ based telescope.
- The RCE has nfs access and can write out the data to disk directly.
- This would need very little work on the software side.

- The present calibration setup reads a TurboDAQ configuration file and downloads the configuration into the module.
- In principle this should also work with multiple modules.
- Code would have to be added to switch between FE modules.
- Probably not very much work to get this going.

- We want to create a cosmic telescope with RCE DAQ.
- We need a special interface board to connect 5 modules to the HSIO.
- This needs new firmware to handle multiple modules.
- Optimization of the data formatter is on its way.
- Triggering will be done directly through the HSIO.
- Configuration can be done through existing calibration code.