Firmware architecture of ESO's new detector controller (NGCII)

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NGCII Firmware Architecture

Architecture

- “Big picture” strategy
- Identifies data flows
- Shows partitioning and subsystems

Design

- Further subdivides tasks
- Define technologies and methods
- Describes interfaces in detail

Implementation

- Source Code
- Specific part of the system

NGCII Firmware Architecture – Overview

What is “NGCII”?

- Modular detector controller based on a 2U 19″ MTCA.4 crate with 5-6 Slots
  - Enable the control and readout of scientific CCD/CMOS detector(s)
  - Can be customized to match requirements of instrument teams

- Controlled by an Instrument Control Software
  - Configure “read modes”
  - Schedule exposures

NGCII Firmware Architecture - Requirements

What is our goal?

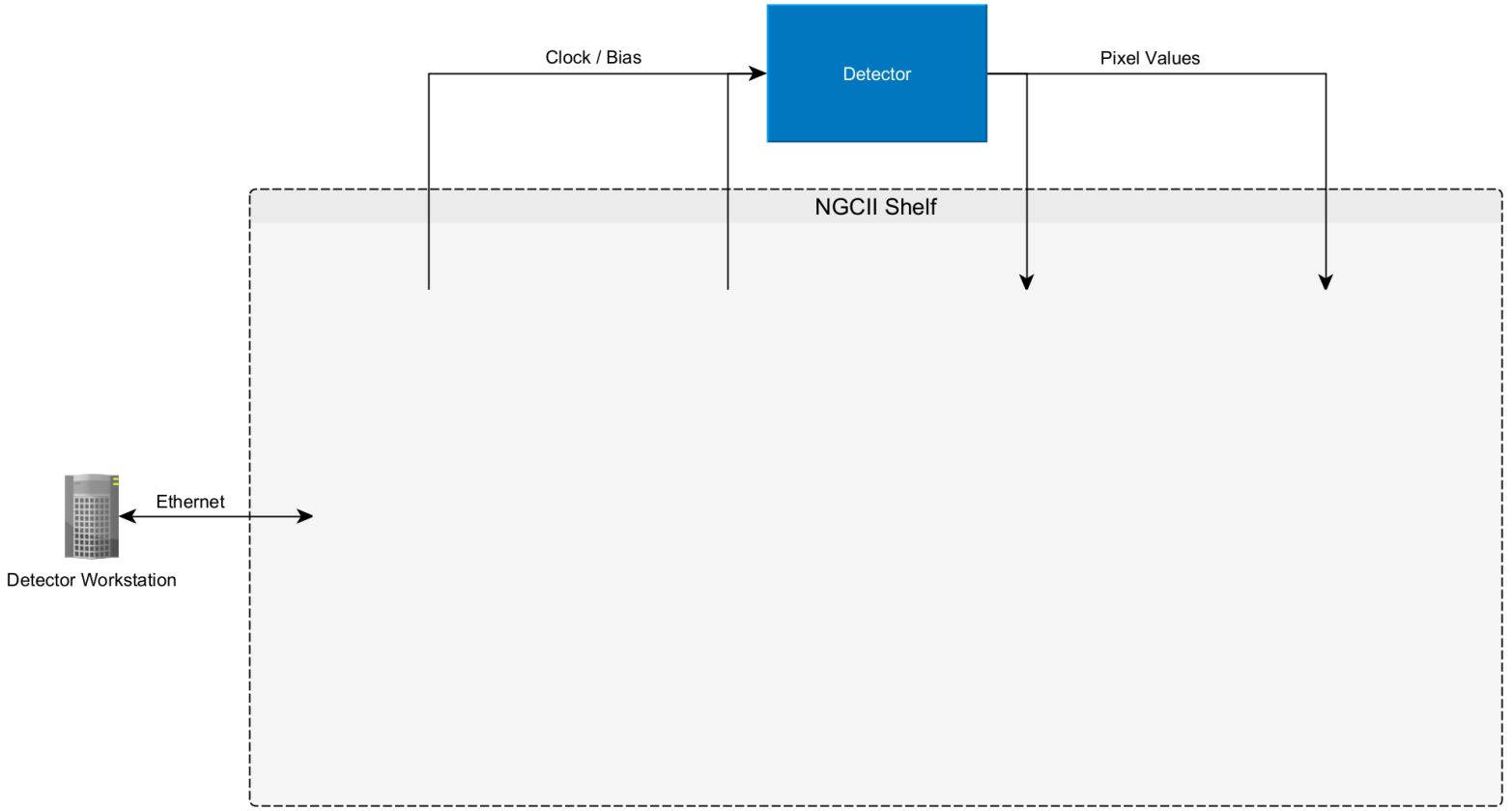
- We want the system to be maintainable
  - The system will be used for a long time >10 years
  - New features or fixes should have minimal impact on the “rest of the system”
- We want to reduce the number of *different* modules
  - Repurpose modules for similar tasks
  - No special firmware version or jumper setting, “When it looks the same, it is the same”
  - Simplifies spare part management

⇒ **Abstraction**

⇒ **Reconfiguration**

NGCII Firmware Architecture – Subsystems

How does this map to MicroTCA?



- Connects to the detector via multiple RTMs
- One “Host Controller” AMC as the interface to data consumers
- Multiple “Module Controllers” depending on system configuration

NGCII Firmware Architecture