# Detector Startup Procedure (XDAQ <-> DCS Integration)

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# Applications Involved

- ➔ Three XDAQ Applications are chiefly involved:

- ➔ PixelFECSupervisor – Controls a crate of PixelFECs. Uses tri-state A4603 voltage information (LV_OFF, LV_ON_REDUCED, LV_ON) for 8 segments of the detector.

- ➔ PixelTKFECSupervisor – Controls a TKFEC board. Uses bi-state A4602 voltage information (LV_OFF, LV_ON) for 8 segments of the detector.

- ➔ PixelDCSFSMInterface – Is queried for A4603 and A4602 voltage information.

- ➔ PSXServer – Is queried for currents.

# Power Supply Granularity
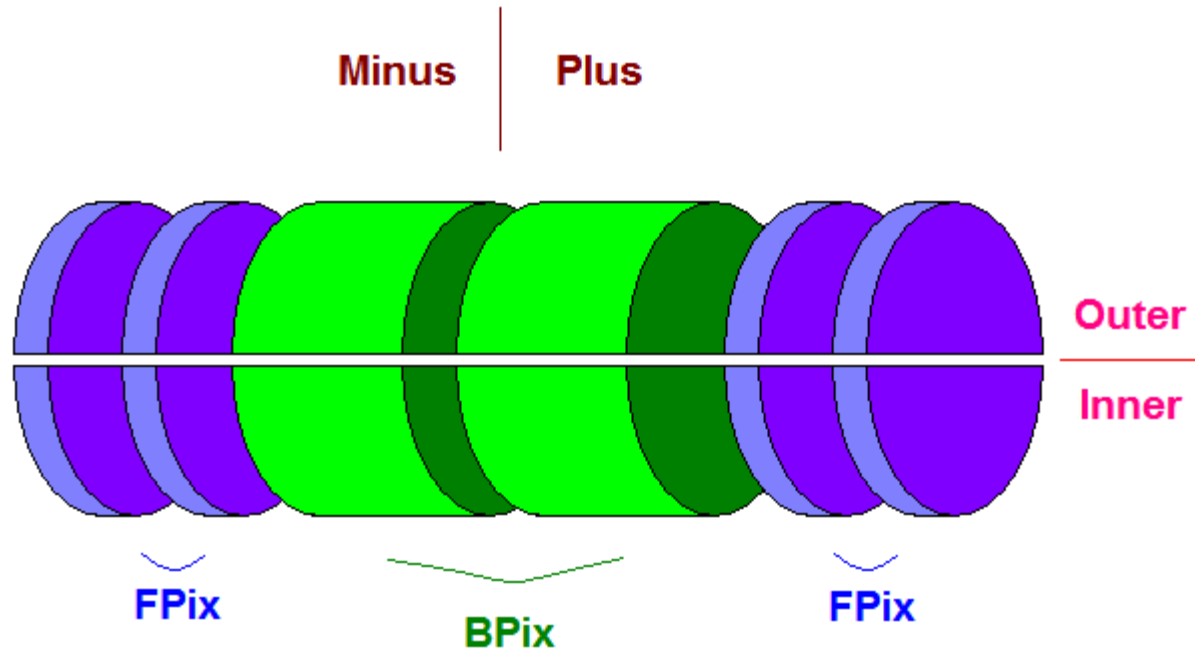


➔ The Pixel Detector is partitioned into 8 segments:

*(Fpix/Bpix), (m/p), (I/O)*

A typical string coordinate would be "*Fpix_BmO*". This takes us to CCU level granularity which is controlled by a channel on the power supply.

# Steps during Startup

✓ PixelFECSupervisor(s) and PixelTKFECSupervisor are initially in their "Initial" state and await the "Initialize" command.

✓ On receiving the "Initialize" command, PixelFECSupervisor(s) and PixelTKFECSupervisor independently query PixelDCSFSMInterface with the SOAP message:

> *<fsmStateRequest name="PixelFECSupervisor" type="PxlFEC" instance="1">*
> *</fsmStateRequest>*

✓ The PixelDCSFSMInterface responds with information regarding the voltage states with a SOAP message of the form:

> *<fsmStateResponse>*
> *<state partition="FPix_BmI">LV_ON</state>*
> *...*
> *<state partition="BPix_BpO">LV_OFF</state>*
> *</fsmStateResponse>*

✓ The PixelFECSupervisor(s) and PixelTKFECSupervisor update their tri and bi state member data according to the response from PixelDCSFSMInterface. This concludes the "Initializing" transition and both the PixelFECSupervisor(s) and PixelTKFECSupervisors land in their "Halted" states.

# Steps during Startup

✓On receiving the "Configure" command, PixelFECSupervisor(s) and PixelTKFECSupervisor check the status of their member data. If the appropriate voltages are set then they go ahead with the next step else transition to the "Error" state.

▪ PixelFECSupervisor queries the PSX Server for the currents and then loads the ROCs' DAC settings. The PSX Server is queried again for the currents as a change in the current consumption is expected. If this is seen then we proceed to the next step or else we transition PixelFECSupervisor to the "Error" state.

✓ PixelFECSupervisor sends a SOAP message to PixelDCSFSMInterface to raise the Analog Voltages.

> *<fsmStateNotification>*
>  *<state partition="FPix_BmI">ReadoutCHIPS_INITIALIZED</state>*
>   *...*
> *</fsmStateNotification>*

▪The PixelDCSFSMInterface responds back with the raised values of the Analog Voltages. PixelFECSupervisor resets its tristate member data if this went fine or else transitions to its "Error" state.

✓ PixelFECSupervisors load their ROCs' DAC, mask and trim settings. PixelFECSupervisor loads the slow I2C settings for CCU boards, Port Cards etc.

✓PixelFECSupervisor(s) and PixelTKFECSupervisor land in their "Configured" state.