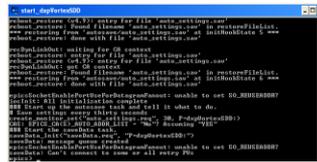


# How to Operate DXP-Saturn with a Vortex SDD



- Connect Vortex to its power supply (blue box) and power it on.
- Connect parallel port cable to *Fuji PC* to the DXP-Saturn/Blue Box.
  - User name: dxp
  - Password: \*\*\*\*\* (Ask DP staff)
  - Log on to: "FUJIPC1 (this computer)"
- Start EPICS IOC & medm screen with "start\_VortexDXP" icon.

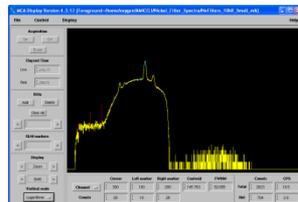


EPICS IOC



MEDM Control Screen.  
Base PV: dxpVortexSDD:mca1

- You can also access the MEDM screens from APSshare:
  - From XOR machines, it is located at: /APSshare/DetectorPool/start\_dxpVortexSDD
- (Optional) Start IDL MCA Display



To access EPICS spectra:

File → Foreground → Open Detector ...  
(PV = dxpVortexSDD:mca1)

- EPICS DXP help: <http://cars9.uchicago.edu/software/epics/dxpDoc.html>
- IDL MCA help: <http://cars9.uchicago.edu/software/idl/mcaDisplay.html>

# Standard EPICS settings for DXP-Saturn



The DXP implements two filters , each with a specific purpose. The Trigger Filter lacks energy resolution but efficiently counts hits with minimal pile-up or deadtime. The Energy Filter is slower, but has better resolution at lower energies.

The screenshot shows the 'single\_dxp\_top.adl' window with the following settings:

Parameter	Trigger Filter	Energy Filter
Peaking Time (usec)	0.15	1.00
Trigger Level (keV)	0.52	0.00
Gap Time (usec)	0.00	0.50
Max. Width	20.00	20.00

Parameter	Value
Cut (%)	5.00
Enable cut	No
Filter length	1024
Threshold (keV)	2.00
Auto thresh.	Yes

Parameter	Value
Preamp gain (mV/keV)	1.700
Max. Energy	22.000
% ADC Rule	5.00
Counts	1
Rate (ICR OCR)	0.1

Additional controls include: Start, Stop, Erase/Start, Erase, Done Status, Elapsed, Preset, Real time, Live time, % Dead time, Read (1 second) for MCA Status, MCA Data, and DXP Params, Wait for client, Client Wait, Scans, and Save/restore status.

## Trigger Filter:

- Do not change Peaking and Gap Times.
- Raise Threshold if counts appear in the 0 energy bin of the MCA plot.

## Energy Filter:

- Long Peaking Times improve energy resolution (~130 eV), but increase pile-up. Watch the deadtime if you lengthen this parameter.
- Keep Trigger Level low.

## Baseline:

- DXP samples between hits to measure dark response of detector. This sets the reference voltage used to determine the energy of an x-ray hit. In general:
  - Short filter length better for low-frequency noise (drift).
  - Long filter length better for higher frequency noise.

# Standard EPICS settings for DXP-Saturn



Preamp Gain and Max Energy tend to move around features (peaks) within the MCA spectrum. They should be adjusted carefully.

**Max Energy:** Proper adjustment will determine how many MCA bins map across a specific feature. It is good practice to set this as low as you can, but high enough to span the energy range you want to study. Bear in mind that the Vortex detector efficiency drops rapidly around 20 KeV so this should typically be <20 KeV.

Setting this higher will move features closer to 0 on the horizontal scale, and setting this lower will move features further from 0.

**Preamp Gain:** Changing this will move features around. A lower value will move peaks closer to 0 on the horizontal scale, and a higher value will move peaks further from 0. A reasonable value is somewhere around 1.5-3, with a good starting value being around 2.