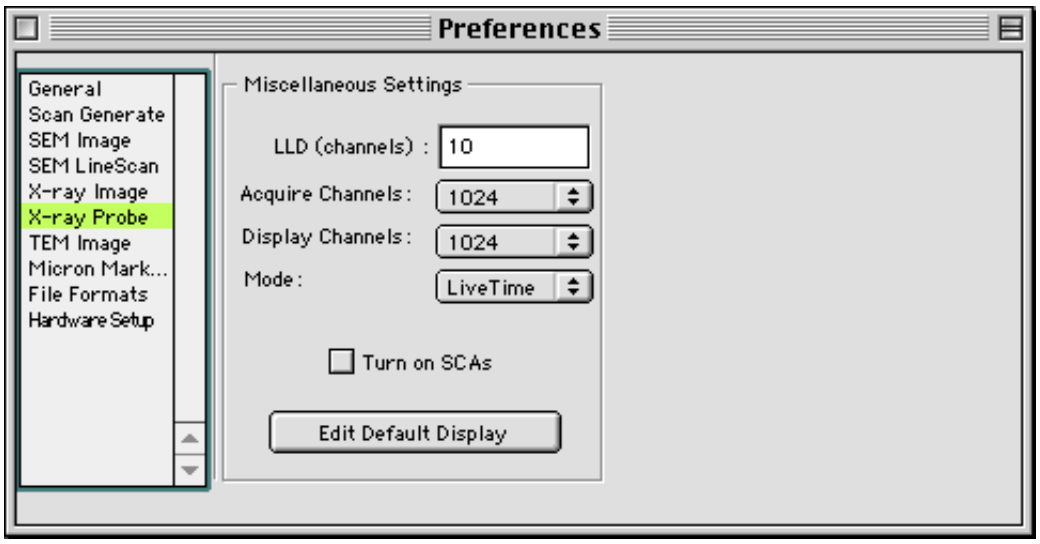
X-ray Probe Preferences

[download as pdf] current for: v1.5.6

The X-ray Probe Preferences panel is shown below:



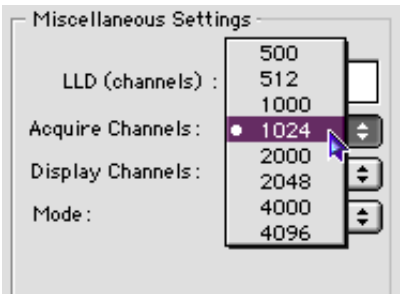
Other Preferences

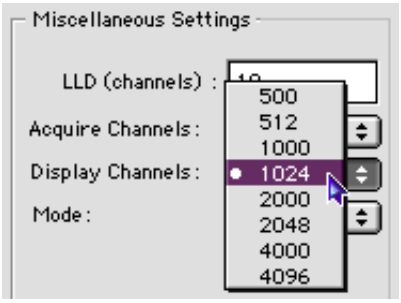
General
Scan Generate
SEM Image
SEM Linescan
X-ray Image
• X-ray Probe •
TEM Image
Micron Marker
File Formats
Hardware Setup

- ***Miscellaneous Settings***

  - ***Lower Level Discriminator***. The **LLD** setting is similar to a low energy discriminator. Our algorithms are pulse processor baseline-sensitive, and constantly compare that baseline to the pulses received. The LLD is interpreted as a minimum difference between the baseline and the current pulse stream (in units of **channels**). The setting is somewhat sensitive and can be used to accept pulses with very low energy; however, if set too low, the SEII will pick up the noise baseline as part of the spectrum. All channels below the LLD will be set to zero before display. The **default** value of **10** should be optimum for most setups. The actual number you use will depend on your noise, your pulse processor and your application. Starting from the default, work down or up to get the desired result.

  - ***Acquire/Display Channels***. Selects the default number of channels either acquired by or displayed in a spectrum window. Selections are 10-based for plotting and display purposes, and power-of-two-based for traditional displays related to channel numbers. Note that these settings will not affect already-opened spectrum windows; they only operate on windows opened after the settings have been made.



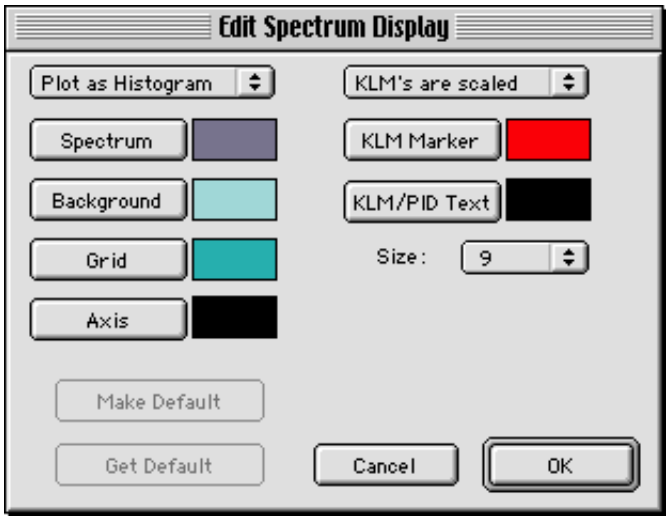


- ***Mode***. The mode can either be **realtime** or **livetime**:

In **realtime** mode, no deadtime information is used to time the acquisition, and the spectrum will acquire for time set in the EDS Toolbar. In **livetime** mode, the SEII internal livetime counter only increments when the pulse processor allows it to, thus incorporating deadtime information; when selected, an acquire time of 1000 seconds (for example) will take longer than 1000 actual seconds, depending on the deadtime statistics of the sample.

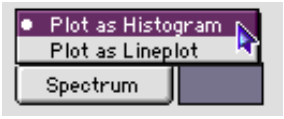
- ***Turn on SCAs***. This checkbox enables streaming of TTL-compatible **S**ingle **C**hannel **A**nalyzer pulses from the Spectral Engine II to a microscope with dot-mapping input capability. See dot-mapping for more information.

- ***Edit Default Display***. Hitting the button opens the following dialog, with which the user can set all **default** colors used in the x-ray spectrum windows. Note that these settings will not affect already-opened spectrum windows; they only operate on windows opened after the settings have been made.

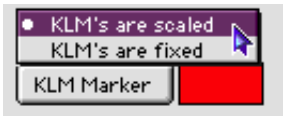


Selecting any button will open the operating system's color services, allowing the user to select the color for that particular aspect of the spectrum display. Note: the **axis** color also sets the color of the **axis label text**.

The default KLM marker text size can also be set.



The default spectrum plotting style can be selected.



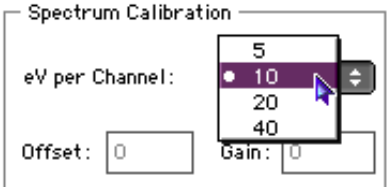
The default scaling of KLM markers can be selected.

- ***Spectrum Calibration***

*Note: the following items only appear in the prefs window for Revolution **1.4.6** and below - they have been **superseded** by the software calibration features in v1.5 and above.*

- ***eV per Channel***. Selects the energy scaling which determines how the acquired spectrum is

displayed along the horizontal energy axis.



Select according to user preference. Maximum energy displayed is the **number of channels** (discussed above) multiplied by the **eV per channel**.

- ***Gain and Offset***. Only available for **SEII Rev. 2.2** boards and higher, these edit fields can be used for minor calibration tweaks. The master equation for binned channel number on the **SEII Rev. 2.2** board is:

$$\left[\frac{V}{2}+\frac{offset}{131072}\right]\frac{4095}{5-\frac{gain}{65536}}$$

where **V** is the **amplitude** of the **PHA analog pulse** in **volts** and the **offset** and **gain** are numbers you enter into the **Spectrum Gain** and **Spectrum Offset** fields (see below). This equation applies to **Rev 2.1 PCI** boards as well, with gain and offset set to zero. For the **Rev 2.1 NuBus** boards, the voltage division factor is 1, not 2, also with gain and offset set to zero.

The **offset** control is a true offset. That is, an incremental voltage is added or subtracted from the incoming signal. However, the **gain** does not control a "gain circuit." Rather, it is applying an offset to the ADC reference voltage. This technique is important to the operation of the circuitry, and is why the equation above is a bit awkward. Although it has the disadvantage of being somewhat non-intuitive, it really is no different than a normal gain and offset amplifier, in that different pairs of gain and offset values may yield the same result.

The gain and offset controls are **not** intended to be primary calibration tools. They are only able to tweak a calibration that has already been performed. 4pi does not recommend an extensive study of this discussion. Simply use the controls to "dial in" the final calibration. The actual end-values of the spectrum gain and offset are not important.

  - ***Spectrum Gain***. For **SEII Rev. 2.2** boards and higher, the ADC reference is controlled by this setting. Values range from -25,000 to +25,000. With an offset of zero, gain can be set to from about **98%** to **102%** of the nominal value.

  - ***Spectrum Offset***. For **SEII Rev. 2.2** boards and higher, the PHA offset is controlled by this setting. Values range from -25,000 to +25,000. With the gain set to zero, this is equivalent to about ± **190 mV**.