

Taking EXAFS data

Matthew Marcus, Sirine Fakra

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This manual describes the ‘regular’ (not ‘Quick’) EXAFS data-taking program and the procedures for taking data with it. The QXAS manual refers to files and ideas used in the EXAFS program, so this manual should be read before the QXAS manual.

When taking an EXAFS scan, the program performs the following steps:

1. Moving to the desired spot on the sample, either manually or under program control.
2. Optionally, refining the sample position by maximizing the signal as a function of position (auto-aligning).
3. Moving to the start energy of the scan and taking a count, of incident intensity (I_0), fluorescence, and transmission.
4. Moving to the next energy and counting.
5. Repeating step 4 until the scan is done.

Scans may be repeated automatically, at a single spot or multiple spots on the sample. In order to prepare for a scan, the program must be told what signals to count (which range of fluorescence energies), how to count them (detector configuration), and the details of sample positions, what energies to count at, and how long to count at each energy. The need to specify all this is what makes the user interface complex.

Thus, to take EXAFS data, you need to do the following, which will be explained in detail below:

1. Set up the program to detect what you want to detect.
2. Record the ‘offsets’ (dark counts) if the detection system has changed or the EXAFS program has been closed.
3. Decide where you want to go on the sample and change the slit sizes and sample-detector distance for appropriate spatial and energy resolution and count rate.
4. Start the program and specify the scan, including the energy range, sample positions, count times, etc.
5. Start the scan.

I. Setting up detection

There is a file called the ‘scaler map’ which tells the program what signals go in what channels. This file must be set up before the EXAFS program is started. The usual procedure is to find an appropriate one in the directory pointed to by the ‘Scaler

maps' shortcut on the Desktop and copy-paste its contents into the file pointed to by the 'Scaler map file' shortcut. These maps specify that Channel 0 is I_0 , Channel 1 is transmission (if connected), Channel 2 is fluorescence summed from all 7 detector elements, Channel 3 is total counts (all energies) summed from all detector elements, Channels 4-10 are the separate fluorescence signals from each element, and Channels 11-17 are the separate total-counts signals from each element. The detectors are recorded separately so that if a Bragg peak corrupts the signal from one detector, the others are still usable.

If a suitable scaler map does not exist in the `Scaler Map` directory, then you can use the `Scaler map generator` program (on the Desktop) to make it. Start this program, fill in the low and high ROI for the signal you want to count (same as in the MCA), select the type of scaler map (either EXAFS separate detectors or EXAFS summed detectors) and hit `Dolt`. The file will be written into the correct place. Scaler maps are described in detail in Appendix A.

The XIA hardware has a couple of different modes in which it can be set. It's usually in the default mode, which is usually what you want. However, if counting S or Cl, you want to use 'low energy' mode, which changes the criterion for distinguishing noise from real pulses, and if you have a huge background and need to count fast, use 'fast' mode. If you want to pipe in an analog signal using the '8th channel' ('XBIC') mechanism, use '8 channels' mode (see Appendix B). The files which specify all these modes are pointed to by a row of shortcuts near the bottom of the Desktop. Copy-Paste the contents of the appropriate one into the file pointed to by `xia config.cfg`. This is usually not necessary, as the normal mode is OK for most work. *You have to set the scaler map and configuration before starting the EXAFS program or the change won't 'take'.*

When you change edges, you need to change the scaler map and maybe the detector configuration, both of which require stopping and restarting the EXAFS program.

II. Offsets

To get the best linearity from the V/F converters which allow the system to read the analog outputs of the ion chambers, we need to set them so that they produce a positive signal with no beam. This signal must then be subtracted from the recorded counts when a spectrum is taken. Once the offsets are set up and recorded by the EXAFS program, they don't need to be played with until the program is closed or the gains have changed. To set the offsets correctly, go to the BCS computer (<Scrl-Lck> <Scrl-Lck> <Enter>) and choose **Amplifiers->Set Up Parameters...** on the **Beamline 10.3.2** panel. This pops up a window called **Setup Current Amp Parameters.vi**. On the left side is a box labeled **Amplifiers** which offers two choices, **Izero** and **Sample**. **Sample** is actually the transmission chamber (or TEY, if that's what's wired into that current amp). Start by choosing **Izero**. Adjust the **Sensitivity** so that when you turn the beam on, you get a signal <5V on the panel meter when the beam is on. *To make changes in this panel take effect, you have to choose **Function->Save**, otherwise nothing happens.* Typically, a setting of 1nA/V will do, though for small slit sizes, you may need to go to 100pA/V. The **Gain Mode** (right side) should be set to **Low Drift**. **Input Offset current State** should be **On**, and the **Input Offset Current Level** should be 1/10 of the **Sensitivity** if **Sensitivity** is 1nA or more, and equal to the **Sensitivity** if **Sensitivity** is <1nA. That gives a no-beam indication of 0.1V or 1V, according to the **Sensitivity**. The higher setting when **Sensitivity** is smaller is done to make sure we stay off the noise floor. Check that the left-hand panel meter reads 0.1V or 1V when the shutter is closed. If using the transmission chamber or TEY device, perform the same ritual with **Sample** selected in the **Amplifiers** box, and again remember to do **Function->Save**.

Next, return from the BCS computer (<Scrl-Lck> <Scrl-Lck> <Enter> again) and close the shutter. On the **Operations** page of the EXAFS program, push the **Measure offset** button. Wait till numbers appear in the pink **Offsets** indicator. If large numbers appear in the third or fourth entry, push the **Reinitialize XIA Detector** button, wait 5 seconds and try again with the **Measure offset** button. This problem often occurs when switching between mapping and doing EXAFS. When you measure the offsets, you're doing so for all detectors, not just the I_0 and transmission counters. These offsets

are automatically subtracted from the data recorded and displayed, and the offset values are written into the data file headers.

III. Sample and detector setup

To measure the count rates from the sample, the energy needs to be set somewhere in the scan range, above the edge. To move the monochromator, type the energy value you want into the white Target Energy box in the middle of the Operations page and hit the green and black Move Mono button directly above it. This box, and most other functions, accepts energy input in a variety of formats. If a scan (*v.i.*) is already defined, you can type `mid` and that puts you mid-scan, which is usually a good energy for navigation and previewing. Otherwise, here are some examples of how to specify energy, which hold not only for the EXAFS program but most others:

<code>8890</code>	<code>8890eV</code>
<code>cuk+50</code>	<code>50eV above the Cu K-edge</code>
<code>cukf-20</code>	<code>20eV below the Cu Ka line</code>
<code>cel3+20</code>	<code>20eV above the Ce L3-edge (it doesn't know M-edges)</code>
<code>zrk/3</code>	<code>1/3 the energy of the Zr K-edge (assumption: you're actually using a harmonic; rare)</code>
<code>start</code>	
<code>mid</code>	These refer to the currently-defined scan
<code>end</code>	

The `+<number>`, `-<number>` and `/<number>` operators are always allowed, so you could specify something like `end+30/3`, though it's hard to imagine why you'd want to.

Check that the slit sizes are correct. The slits should be set small enough to allow spatial resolution of the features, but not so small as to lose signal unnecessarily. *For good XANES energy resolution, the vertical roll slit should be 20mm or less when above 6keV*, though 30mm is an acceptable compromise. The total count rate into the fluorescence detector should be no more than $3e5$ counts/second. If it is, there are some things which can be done to reduce it: It's always easier to throw signal away than to get more. Here's what you can do:

1. If the saturation is due to lower-energy background, for instance due to Ca when you want to count Fe, then put some Al foil filters in front of the detector. The fitting which holds the Be protector window can hold foils instead. Use up to 5 foils.

2. Roll the detector back to reduce the solid angle. This also reduces the probability of Bragg peaks.
3. Slit down on the roll slits. This reduces I_0 , which could in principle induce noise, but it also cuts down on radiation damage. When dealing with rad-sensitive samples, you want to be as efficient as possible in the use of incident photons.
4. For very sensitive samples, cut down on the JJ slits as well, which reduces the photon density on the sample.
5. If the background is really large and you can't cut it back enough without losing too much of your signal, switch to fast mode on the detector. This move will broaden the energy resolution, but allow you to take four times the count rate.

Find the desired spot on the sample. This can be done using the MCA program, which has a Spot Find feature allowing you to find a local maximum of yield in a given ROI. You can then record the position found in one of the position registers in the Manual Stage.

IV. Setting up a scan

The scan is defined in a file called the scan-def, which can be edited using the Scan Editor, accessible from the **Edit Scan** button on the **Operation** page. You can load a scan-def or save it from the obviously-named small buttons on the **Operation** page. Sample scan-defs for all common edges are stored in a directory pointed to by a Desktop shortcut. You can copy the relevant ones to your data directory (if beamline staff hasn't done so already), load it and edit to suit. If you hit the **Edit Scan** button, you're presented with a tabbed control as shown in Figure 2. The **Scalers** tab is usually not important as it's usually set correctly; it sets the number of scalers to be recorded in the data file. The **Define Regions** tab holds the controls that define what energies the scan covers, the energy grid, and the dwell time per point. The scan proceeds over one or more contiguous energy regions, over which the step size (eV) and dwell time (seconds) is constant. Thus, since we usually want to scan coarsely and quickly over the pre-edge, finely over the XANES region, then more and more coarsely, but with increasing dwell time over the EXAFS, we have to define several regions. The regions are defined by their start energies (the last entry is the final energy), the step-size in eV, and the time per point in the region. The program figures out the time per scan (blue indicator) and the number of points. You can add a region using the **Add Region** button, for instance if you want to scan finely over a glitch for calibration. Most of the pre-made scan-defs do that anyway. You can modify the boundaries of regions and the energy steps, but not

while a scan is running. What you can modify even while a scan is going is the dwell time. This becomes useful if you know that beam is about to dump in 5 minutes and the scan has 7 minutes left. *Data acquisition pauses while the **Edit Scan** window is open, so don't leave it open too long while taking data.*

The next tab is **Files**. This sets the directory into which files get written, the base name, and the scan number. The extension should be left at `.dat`. If the scan number is, for instance, 13, and the **base filename** is `foo`, then the complete data file name is `foo013.dat`. The next scan, unless you specify otherwise, will then automatically become #14, with filename `foo014.dat`. This auto-incrementing helps keep you from overwriting files. The **Title** is written into the file header but does nothing else.

The **Dump** tab sets the criterion for calling a beam dump. The criterion is that the count rate, with offset NOT subtracted, should be greater than the “dump factor” times the offset. A dump factor of 1.2 is usually OK, but if the I_0 is weak, then 1.02 might be better. Yes, this is disgustingly kludgy, but it works.

The **Set** tab is the most complex because it has all the positioning bells and whistles. If the **Use Positioning** switch is down, then all that is disabled, and all you have to set is the number of scans to do. The stage will stay where it is. If **Use Positioning** is up, then the positioning feature is enabled, and the autoalign feature may be turned on. If **Use Positioning** is up (on), then a complicated-looking control in the middle of the tab becomes enabled. This control holds a set of positions (X,Y) and repeat counts. An index spinner on the left lets you scroll through them, starting from #0 (the first one). The **Repeat Count** is the number of times to do the scan at the given position. If you have a set of positions, some of which give weak signals and some strong, you may want to set a **Repeat Count** >1 for the weak ones. The current position, read from the stage, appears on the left. If you push the **Load current pos'n** button, that position is loaded into the **Positions** array at the element displayed at the top. Thus, if the index spinner is set to 5, then you'll set the position for the 6th distinct scan (remember, #0 is the first). You can also load a number of positions at once from the stage position registers, or from a 2-column ASCII text file holding a list of positions, using the small buttons to the left. A square button to the right moves the stage to the position indicated.

A button at upper right writes the list of positions into the position registers of the manual stage.

When positioning is used, the scan number becomes important. That's because the program automatically moves the sample to a position determined by the scan number. The way this works may best be explained using a worked example. Suppose there are 4 positions loaded, and one of them has a Repeat Count of 3, so the Positions and Repeat Counts arrays look like this:

Index	Pos.	Repeat count
0	X0, Y0	1
1	X1, Y1	1
2	X2, Y2	3
3	X3, Y3	1

Now, that defines a cycle of length 6. If we start the program with a scan number of 0 and let it go for 18 scans, data will be taken in the following order:

Scan #	Position
0	0
1	1
2	2
3	2
4	2
5	3
6	0
7	1
8	2
9	2
10	2
11	1
12	0
13	1
14	2
15	2
16	2
17	3

Thus, scans 0, 6, 12... get taken at point 0. *The index of the position at which a scan will be taken is the scan number modulo the cycle length.* The cycle length (total number of scans defined) is given in a blue indicator just to the left of the Position control. The position for each scan is written into the file header so that you can always figure out where any scan was taken.

Next, we can layer yet another useful complication. Samples tend to drift a bit, and data really gets noisy if the beam is just off a hotspot. Thus, we have the auto-align feature, which is the same as the Spot Find in the MCA. Flip up the Use autoalign? switch to enable this feature. This enables another complicated-looking array control whose index spinner is ganged to that of the Positions control. What this specifies is that before each scan, the mono moves to a specific energy (the autoalign energy; mid is usually a good choice for this), then a small map is taken in step-and-repeat mode, centered around the spot specified in Positions. The variables you can fill in are:

Dx, Dy Step size in microns in each direction. For a wide slit size, 2x0.75 microns is good. Go to 1x0.5 for smaller beams.
Nx,Ny # of steps in the X,Y directions. I like to keep this an odd number so that the nominal spot is one of the points.
Time Time to count for on each step
Type The program finds either the maximum (Max) of signal, the minimum (Min) or does no autoaligning at all (None). The reason for including None is that sometimes you want to autoalign on some spots and not on others because they're diffuse or uniform.

If Ny or Dy is 0, then the program will do a 1-dimensional scan in the X direction only. This feature is useful when the element of interest is distributed in a 'ridge' which is much bigger in one direction than the other. For instance, you may want to do a number of spots around a thin coating on a grain, so you would do a 1-D auto-align centered around various spots to find the thick part of the coating at each location around the grain. Of course, a zero Nx or Dx implies a 1D scan in the Y direction.

The program does not attempt to do any fitting or extrapolation. It simply goes to the position at which it saw the maximum (if Max type) signal. It then adds a vector amount to all positions equal to the difference between the found spot and the initial center. This is a way of tracking a drifting sample. Thus, if it finds the hotspot to be 2 microns to the left of where specified in the Position register, it will move all spots 2 microns to the left in 'anticipation' of continued drift.

Because there are a lot of parameters to fiddle with, there are load/save buttons which put the parameters into a buffer so that you can copy to another position.

The last switch to look at on the **Set** tab is the **Mono Freeze** switch. If this is up (default), the mono translation gets moved to the appropriate position for mid-scan and stays there through the scan. This is done because the mono translation motion is quantized and causes subtle steps in the data which can look like EXAFS. However, at low energies (S, Cl), the mono translation has to move enough to keep up to make this freezing inappropriate. When this mode is in effect, the **Move Mono** button turns blue. In pre-made scan-defs, this switch is set appropriately, so you don't need to worry about it.

The next and last tab is the **Plot** tab, which defines the default plot specification ("plotspec"). We might be recording 18 scalers, but we actually want to look at only one combination at a time, such as $\ln(I_0/I_{\text{trans}})$ or $(F_0+F_1+F_2+F_3+F_4+F_5+F_6)/I_0$. This combination is what the plotspec defines. It is defined as *Numerator/Denominator*, optionally with the natural log taken. *Numerator* is a sum of scalers checked off, or 1 if none are checked, and same with *Denominator*. These choices are shown graphically with buttons which are bright for on and dim for off. Some examples:

```

* .....
* ..... ln(Scaler0/Scaler1) [ln(I0/Itrans)]
. * .....
. . * .....
. * ..... Scaler2/ Scaler0 (total fluor./I0)
* .....
. . . * * * .....
* ..... Scaler4+Scaler5+Scaler6
. . . . . (usually, F0+F1+F2)

```

Remember that the identification of scalers with signals (I₀, fluorescence, etc.) depends on the scaler map, so what's shown above is based on the usual and may be different if the scaler map is different.

The `plotspec` is written into the header of the datafile and also becomes the default on the Plot page, where the actual spectrum gets displayed. You can change the `plotspec` on the Plot page any time by clicking appropriate lights. *Note that the `autoalign` works on the basis of the signal defined by the `plotspec` currently displayed.* This is usually what you want and what's intuitive, but can bite you if you're not careful.

After all that setup work, you may want to **Save** the scan-def. If you hit the big red Stop button, you will be prompted to do so. On startup, the program reads in the last saved scan-def.

V. Running a set of scans

OK, you've found your spots on the sample, set up the scaler map and scan-def, verified the count rates and slit sizes are appropriate and want to start some scans going and go to dinner,. First, check a couple of things – make sure the number of scans is set as you want (not necessarily the number in cycle), the offsets have been taken, gains on the current amps are correct, and the scan number is what it should be so that the stage goes to the right position and files don't get overwritten unless you want them to. Now you can push the rectangular **Start** button and switch to the **Plots** page (Figure 3). While a scan is running, various controls are grayed out and the Start button becomes an **Abort** button. If `autoalign` was specified, that happens before the scan proper is started. The **Abort** button won't work until any `autoalign` step has been performed.

The large plot in the **Plots** page shows the spectrum as it's being acquired. The **Plot specification** control sets what's plotted. **Autoscale** sets the X limits of the plot to the limits of the scan and the Y limits to those of the data. **Full range X**, if it's down, makes the X limits of the plot equal to those of the data, that is the scan so far. **Cursor** turns on a cursor, whose position may be read below the graph. **Differentiate** does a numerical derivative of the data.

The short plot below the main one shows I_0 , but with a smooth (cubic polynomial) divided out and the log taken, the better to show small fluctuations such as glitches. Thus, a 1% glitch shows as a dip of depth equal to 0.01. What's I_0 ? We never

really defined it elsewhere in the program. The definition is heuristic, based on the plotspec, and goes like this:

If there's only a Numerator or Denominator, but not both, use that.

If there's both Numerator and Denominator, and the ln(plot) light is on, use Numerator. Otherwise, use Denominator.

This definition does what you usually want, in transmission and fluorescence modes.

Sometimes, you want to see if a feature in the signal reflects something in I_0 . It's thus useful to have the cursors of both plots track. Thus, there is a **Cursor tracking** control which makes the I_0 plot's cursor track that of the main plot, the other way around, or lets them be independent.

Other indicators on the main page, to the left of the Operation/Plots tabs include the current energy and position, the current scan number and filename (or those of the scan to be run next if a scan is not already running), and a couple of diagnostic indicators for the monochromator and stage. The most important of these for routine running is **There yet?** which is on if the mono has reached its last commanded energy. If the mono is moved using the BCS computer, it will never "get there" because this program doesn't know what was intended at the other computer. To fix that, go to the **Operation** page and hit **Mono really got there** (square button) and that should fix it.

VI. Other functions

This section covers some other features. One of these is how to calibrate the monochromator. To do this, run a scan of your favorite calibrant, read it into the data computer, do **Regularize Energies** in the EXAFS Editor program, and find the energy at which the known feature occurs. Now, with no scan running, use **Move Mono** to move to the energy at which the feature appears. Next, enter the energy at which the feature is supposed to appear into the **Target energy** box and push the tiny **Reset mono** button. This button is intentionally small because people have pushed it without intending to. Often, the calibration feature is the inflection point in a scan of a foil, which is intended to be the edge position, say the Cr K-edge. In that case, you can enter `crk` into the **Target energy** box. The program has the values from the Kraft compilation stored in it, which are the values in the `glitches_recent` file.

The other important feature on the **Operation** page is the **Measure** panel. This pop-up lets you monitor the signal as a function of time, which can be handy for locating a hotspot or checking for drift. When you enter this panel, it measures the combination of scalers defined by the plotspec defined on the **Plots** page. However, you can select any plotspec. Then, it reports an effective count rate. This is derived by dividing the chosen sampling time into 10 sub-samples and evaluating the standard deviation among the sub-samples. The effective count rate is defined as the rate at which an ideal Poissonian counter would have to be running in order to have a signal/noise (mean/std. deviation) equal to what's observed. This is the only way we know of to define a count rate for an analog scaler (as I_0 usually is) or a ratio. Thus, it's possible for F or I_0 to have a low effective count rate but F/I_0 to be better. By default, the count time is 1 second/sample. If you change it to 30sec and wait, you will often find that the effective count rate goes down – a lot. This shows that there is noise in the system which is not white but goes up at lower frequencies. Often, this problem can be traced to sample motion or drift. In any case, the existence of such noise can be an argument for using QXAS. Making such a measurement with a 30 second count time is tedious, but it can show problems which otherwise would only become apparent after running a whole scan.

VII. Checklists

Here is a condensed checklist for taking scans.

Before starting the EXAFS program:

- Set scaler map for desired elements (detector ROIs)
- Check detector configuration (fast, normal, low-E, 8th channel)
- Check I_0 and (if needed I_{trans}) gains and offsets.

Navigation on sample:

- Make sure energy is within scan range, above the edge.
- Verify that the slits are correctly set for count rate, energy resolution and spot size.
- Use MCA or map to navigate and find spots.

Setting up scan:

- If you've changed any gains, take an offset.
- Check scan-def for energy regions, filename, directory.
- Find your spots and set up the scan either for not moving on the sample, moving from spot to spot automatically, or moving and autoaligning. Save the scan-def.
- If in doubt, move to each spot and use the Measure panel to verify proper signal level.

Running the scan:

Verify settings one last time.

Push run button.

Before leaving, make sure you get at least one edge recorded to be sure nothing obvious has gone wrong.

For changing edges:

Save the present scan-def and stop the program. If you want to scan at the same positions at the new edge, write the positions into the stage's position register (button in the Set tab of the Scan Editor).

Change scaler maps and, if needed, detector config.

Restart the program.

Check the current-amp gains, and if needed, take offsets.

Read in the appropriate scan-def for the new edge and edit appropriately for the sample positions, filenames, etc.

Start the scans.

Appendix A: Scaler maps

The typical scaler map file looks like this:

```
[Gate]
board=1
counter=0
[Scaler 0]
type=660x
counter=1
board=1
[Scaler 1]
type=660x
counter=3
board=1
[Scaler 2]
type=XIA
detector=-1
roilow=556
roihigh=615
[Scaler 3]
type=XIA
detector=-1
roilow=0
roihigh=2047
[Scaler 4]
type=XIA
detector=0
roilow=556
roihigh=615
[Scaler 5]
type=XIA
detector=1
roilow=556
roihigh=615
[Scaler 6]
type=XIA
detector=2
roilow=556
roihigh=615
[Scaler 7]
type=XIA
detector=3
roilow=556
roihigh=615
[Scaler 8]
type=XIA
detector=4
roilow=556
roihigh=615
[Scaler 9]
type=XIA
detector=5
roilow=556
roihigh=615
[Scaler 10]
type=XIA
```

```
detector=6
roilow=556
roihigh=615
[Scaler 11]
type=XIA
detector=0
roilow=0
roihigh=2047
[Scaler 12]
type=XIA
detector=1
roilow=0
roihigh=2047
[Scaler 13]
type=XIA
detector=2
roilow=0
roihigh=2047
[Scaler 14]
type=XIA
detector=3
roilow=0
roihigh=2047
[Scaler 15]
type=XIA
detector=4
roilow=0
roihigh=2047
[Scaler 16]
type=XIA
detector=5
roilow=0
roihigh=2047
[Scaler 17]
type=XIA
detector=6
roilow=0
roihigh=2047
[Scaler 18]
type=end
```

The [Gate] section specifies where on the counter/timer board the gate pulse is generated and should not be changed. Each subsequent section describes a scaler in terms of what kind of detector it is and any parameters. Channels 0 and 1 are counter channels on the NI 6602 counter/timer board; these are wired into the outputs of a dual V/F and generally should not be changed. The other scalers are from the XIA electronics which read the fluorescence detector. This detector has 7 elements, numbered 0-6 (#5 has recently gone dead). Thus, the line `detector=6` for Scaler 10 refers to one of these elements, the last in the list. A line specifying `detector=-1`, as in Scalers 2 and 3,

refers to all channels, summed. Thus, we see that this scaler map works as described in Section I above. The reason we record the total counts (roilow=0; roihigh=2047) is for deadtime correction. *The last entry must be for a fictitious last scaler whose type is end.* There are rare occasions when one wants to make different assignments of scalers. For instance, in one case we were interested in Cl and S, to be recorded in a single scan. To do this, we used the following scaler map:

```
[Gate]
board=1
counter=0
[Scaler 0]
type=660x
counter=1
board=1
[Scaler 1]
type=660x
counter=3
board=1
[Scaler 2]
type=XIA
detector=-1
roilow=212          Sulfur
roihigh=246
[Scaler 3]
type=XIA
detector=-1
roilow=234          Chlorine
roihigh=273
[Scaler 4]
type=XIA
detector=-1
roilow=0
roihigh=2047
[Scaler 5]
type=end
```

This sample didn't exhibit Bragg reflections at the low energy for Cl and S, so we didn't bother recording separate detectors. There is an 'extra' scaler 3 wedged in there for chlorine (the words Sulfur and Chlorine don't appear in the actual file). The scaler map is always read from a file which for historical reasons is C:\MAM\EXAFS Code\2_6602+XIA.cfg. You don't need to know this as the Desktop shortcut points to it. The QXAS program also uses a scaler map, but it's different from this one and described in the QXAS manual.

Appendix B: XIA configuration files

This part will cease to apply when (if) we switch over to using only the new (XMAP) hardware instead of the current CAMAC-based system. The file looks like this:

```
[XIA TCP/IP]
IP address = "131.243.76.226"
Port # = 10000
Path to Start TCP-IP VI = "/C/MAM/EXAFS code/XIA/Start TCP-IP for
XIA.vi"

[Detector Config]
Config file path = "/C/MAM/EXAFS code/XIA/Detector
support/Configs/V6_1us.scg"
Normalization = FALSE
```

The [XIA TCP/IP] section is actually a fossil and doesn't change but has to be there because the code for reading the file still expects it. The only thing that changes is the file specified in the `Config file path` line (this line appears broken in this manual).

The available choices are:

V6_1us	Normal, 1 μ s peaking time
V6_1us_8channels	Normal, but with the 8th channel
V6_point25us	For fast counting, 0.25 μ s peaking time
lowE_V6_1us	For low energies (<~3keV)
lowE_V6_1us_8channels	For low energies (<~3keV), 8th channel recorded

When the switchover occurs to the new hardware, then the functions of this file will be taken over by the Instrument Driver and this file will go away.