



**EMRA 10
EDS ANALYSIS SYSTEM
FOR CITL 8200MK5**

EMRA Introduction & Help

EMRA is written for an Aptec MCA only. Some of the software will run without the card, but then some options such as to acquire and calibrate are not available. (1024 x 768 display recommended Start / Settings / Control Panel / Display / Settings / Desktop Area / 1024 x 768 pixels)

The element identification System for EMRA relates the elements by the relative intensity of their lines under a standard set of conditions. The list also contains associated lines to assist in the identification process. A calibration spectrum is acquired under the same conditions as will be used for the target sample. A ratio (GF or Geometric Factor) is determined between this acquisition and its representation taken from the table. This ratio is then applied between the unknown sample and the table during the search to find a matching element, and again to determine the K-Ratios.

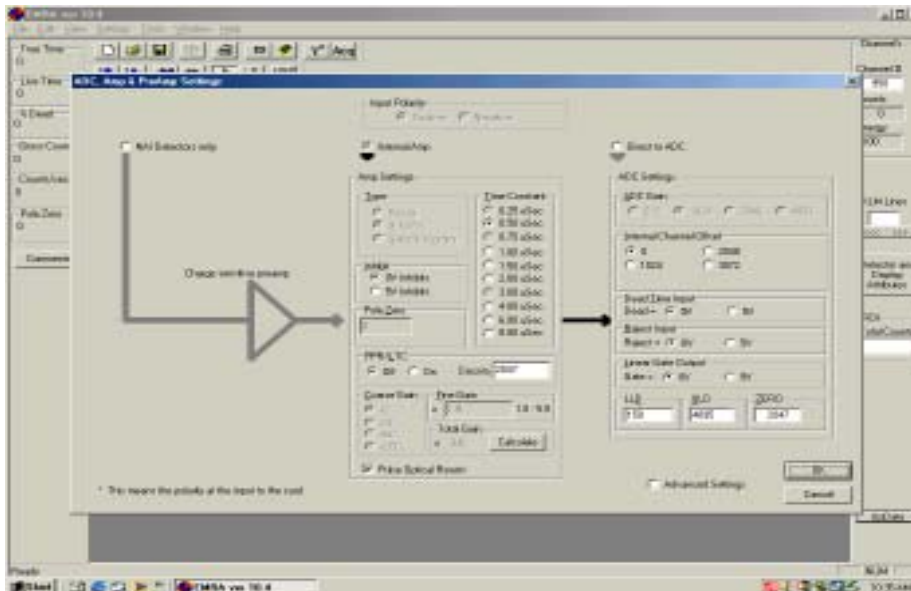
The GF and ev/Ch parameters are automatically calculated but may be over ridden by the operator using the dialog box "Display and detector attributes" on the right hand side of the main screen. This dialog box is intended primarily for information, manipulation is available but not recommended. See section on Calibration below.

What the EMRA software can do:

- Simple Calibration
- SystemAcquire New Spectrum
- Auto ID & Spectrum Analysis
- Display Spectrum
- Input & Output Devices

Setting up the MCA

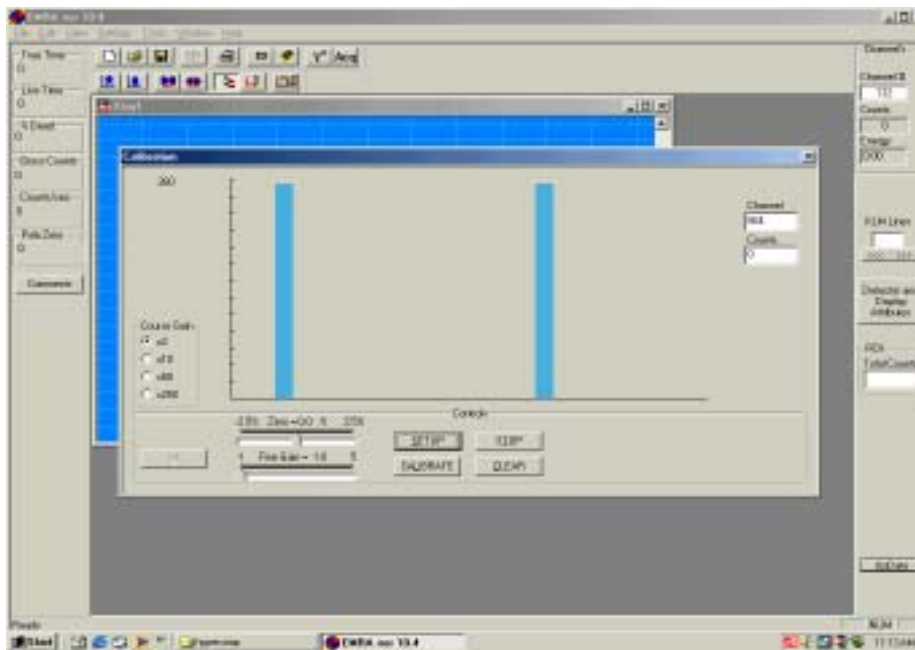
These have been preset at the factory, if there seems to be no data collection when calibrating or acquiring, check that the setting are as in the picture below.

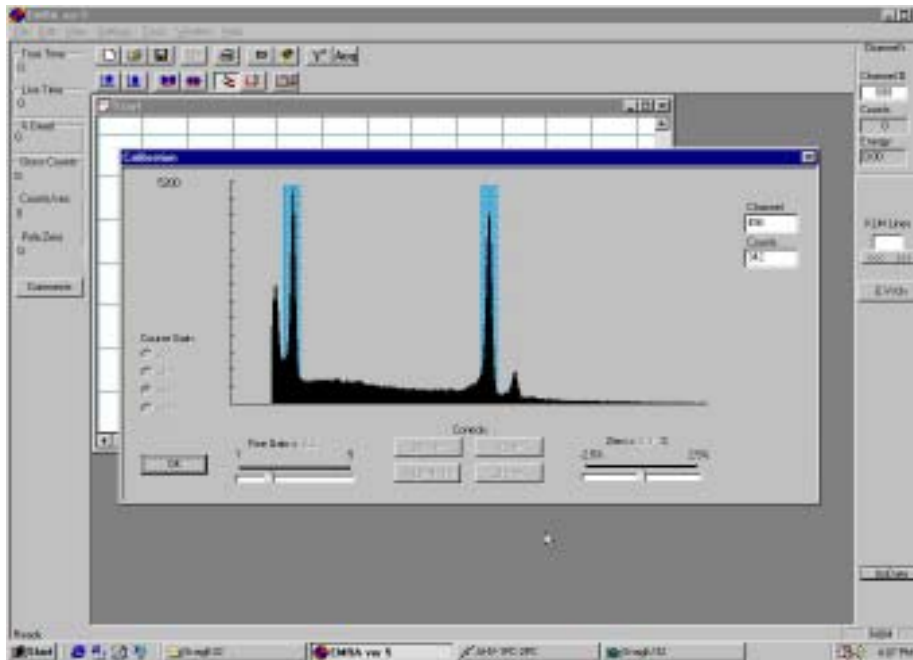


Calibration

Select File from the menu bar and move to Calibrate, A dialog box will tell you the date of the last calibration and give an opportunity to escape.

The next window that appears is the calibrate window, which has two colored ROI's (regions of interest).





The ROI's are intended to contain the Ge La peak (1.188 Kev) and the Ge Ka peak (9.874 Kev). Acquisition commences when the setup button is selected and can be stopped by pressing the stop button.

The method of calibration requires the collection of a spectrum from a pure sample of Germanium, and by adjusting the Fine Gain, Coarse Gain & Zero controls, position the main peaks totally within their respective ROI's as described above. When you are satisfied that the best fit has been obtained press the calibrate button, this will clear the screen and automatically start a 100 sec Acquire. When this is finished the computer will prompt you to continue by pressing OK on the main Calibrate window.

The Calibration is then complete.

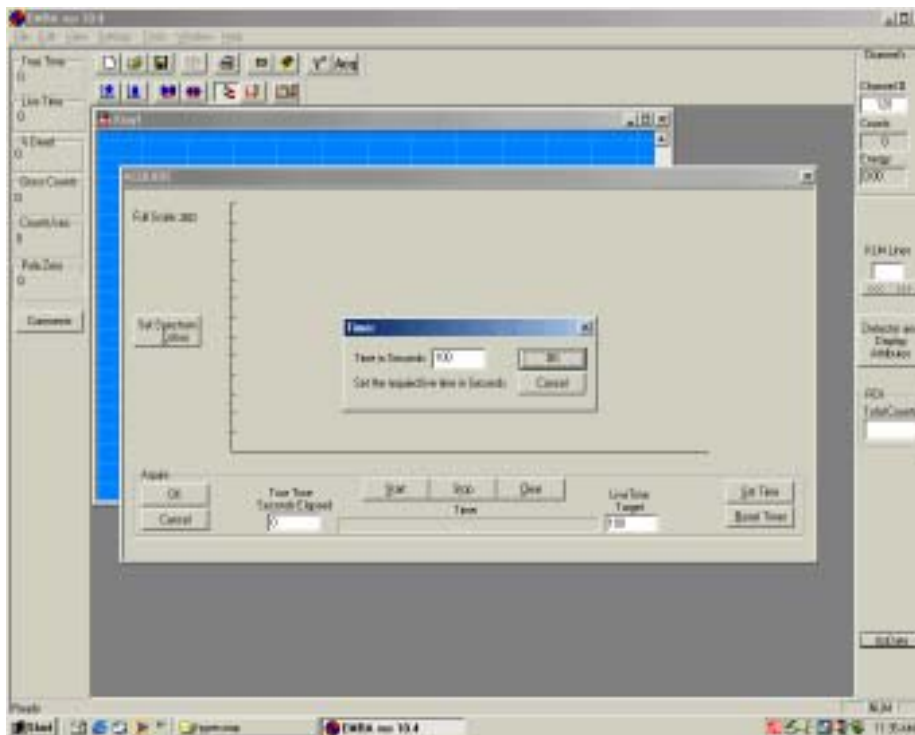
The System Calibration will be recorded in the data file with each acquisition so that the file can be displayed with its own calibration for the KLM lines after the main system has been recalibrated. The current system calibration is not disturbed by this procedure and is automatically available for acquisition of new data.

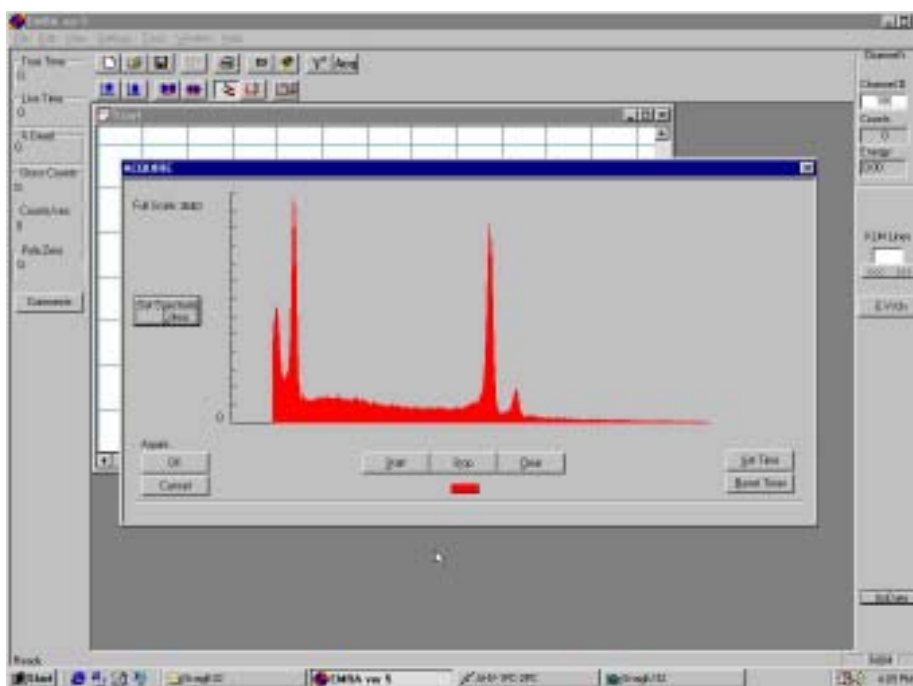
While the GF and ev/Ch parameters are automatically calculated, they may be over ridden by the operator using the dialog box "Display and detector attributes" on the right hand side of the main screen. This dialog box is intended primarily for information, manipulation is not recommended. Changes to this dialog box will affect the display, Auto ID and ZAF, but they are temporary as long as the current spectrum file is not saved to disk. Files saved with the dialog box "Display and detector attributes" modified will have their calibration parameters changed to match the dialog box. The reset system calibration is similar but can not change the system calibration used to acquire new data.

Acquire New Spectrum

The Acquire is entered via the control button on the toolbar.

Window controls allow you to Start, Stop & Clear a spectrum. Collection can be pre-set to a specific Live Time period using the Set Time button on the bottom right of the Acquire window. When the Acquired spectrum is acceptable the OK button will copy the spectrum to the selected window (Overwriting any contents).





Auto ID & Spectrum Analysis

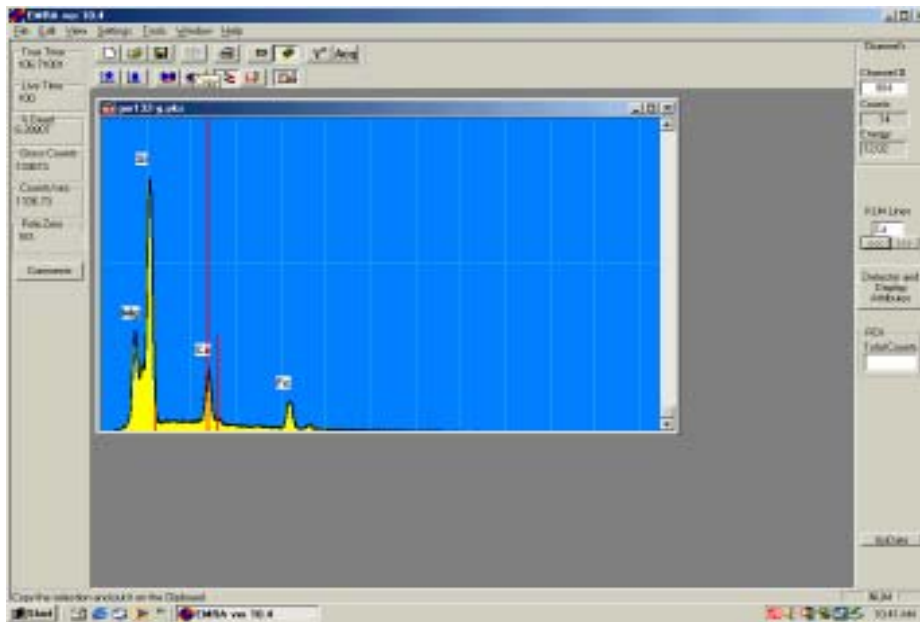
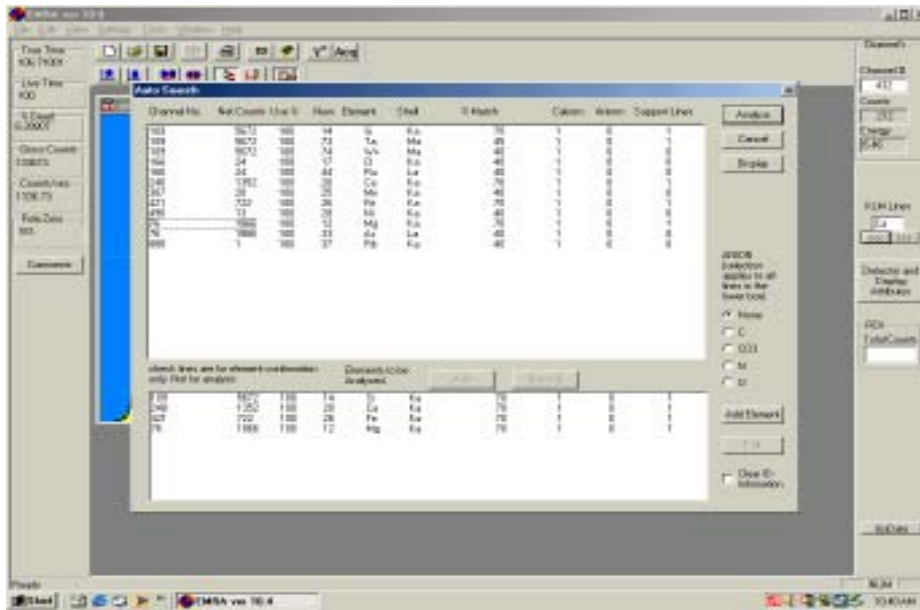
Selecting the ID Control button from the toolbar, with a calibrated spectrum loaded in the current window, will list the major peaks of the spectrum together with a System Assessment as to their identification. A line can be selected with the mouse and copied to the output list with the add button or deleted from the output list with the remove button. The lines in the input list represent the computer selection while those in the output box are operator selected. The operator can add a line to the output list or edit a line in the output list by using the 'Add Element' or 'Edit' buttons on the left of the screen. In both cases, the channel number is automatically set according to the current calibration in response to the element and shell entered by the operator. The EDIT function will display the NET INTENSITY in the chosen channel but the percentage of this which is used for the ZAF routine can be set according to the operator's personal judgment to allow for overlapping peaks. In the case of the ADD function the GROSS COUNTS in the chosen channel are displayed. In this case the percentage used determines the operator estimated net intensity. The peaks in the output list will label the spectrum if the display button left of window is operated.

Auto ID Settings

Two values related to the auto ID feature are available for adjustment from the menu bar. To adjust these settings move to Tools on the menu bar, then select Auto ID followed by Settings, a dialog box will appear with two fields (Filter & Wall).

The Filter is related to the widths of the peaks, which may vary with the resolution of the detector. The Wall is a measure of the minimum size of a peak that is considered significant.

Channel No.	Net Counts	Unit	Elem	Element	Shell	Z	Matrix	Calom	System	Support Lines
103	3672	100	54	Fe	K	54	1	0	0	1
109	3672	100	73	Ta	M	49	1	0	0	1
117	3672	100	74	W	M	40	1	0	0	0
164	24	100	37	Cl	L	46	1	0	0	0
168	24	100	44	Pu	L	40	1	0	0	0
140	1707	100	28	Co	F	79	1	0	0	1
167	20	100	25	Mn	F	46	1	0	0	0
171	722	100	26	Fe	K	52	1	0	0	1
470	71	100	28	Co	F	40	1	0	0	0
74	1868	100	12	Mg	F	76	1	0	0	1
76	1868	100	23	Al	L	40	1	0	0	0
88	1	100	37	Cl	K	40	1	0	0	0



EMRA Display Help

The display consists of 16 control buttons and a menu bar, the menu bar is conventional and duplicates some of the functions of the control buttons.

Menu Bar

View:

Color Settings: Allows access to the color settings, which only effect the selected window and all future loads.

Tools:

Grid Lines: Places scaled grid lines onto background.

Display Offset: Display offset is provided to allow a non-calibrated spectrum to be fitted to the KLM Lines. This new calibration only applies to the selected window and may be rest to the standard calibration, by setting a display offset of 0.

Window:

New Spectrum Window: Creates a copy of the selected window.

New Data Window: Lists the spectrum data in a text format.

Control Buttons

The first 5 control buttons are standard windows functions which are described in the I/O Help page.

The 6th & 7th buttons marked ID & Label are described in the Auto ID Help file.

The 8th button marked Yx Converts the currently selected window to a log representation.

The 9th button marked Acq is described in the Acquire Help file.

The EMRA program allows you to scale the Spectrum, there are 3 method of doing this, as follows:

The first four buttons on the second row operate as follows.

The EMRA program allows you to scale the Spectrum, there are 3 method of doing this, as follows:

Method 1

This method uses the menu bar.

- Move to Tools in the menu bar and select Scale.
- From the side of the drop down menu appears another menu the first 2 items in this menu are Up and Down, Up scales up and Down scales down.

Method 2

This method uses the tool bar.

- On one of the two tool bars there are 2 blue arrows, one pointing up(Scale Up) and one pointing down(Scale Down).

Method 3

This method uses the F keys.

- F1 Scales up.
- F2 Scales Down.

The EMRA program also allows you to Expand and shrink the spectrum on the X axis, there are 3 method of doing this, as follows:

Method 1

This method uses the menu bar.

- Move to Tools in the menu bar and select Scale.
- From the side of the drop down menu appears another menu the third and fourth items in this menu are Explode and Implode, Explode expands on the X axis and Implode shrinks the spectrum on the X axis.

Method 2

This method uses the tool bar.

- On one of the two tool bars there are 2 icon, one has two blue arrows pointing towards each other (Implode) and the other has two arrows pointing away from each other (Explode).

Method 3

This method uses the F keys.

- F3 Implodes.
- F2 Explodes.

The 5th button controls the silhouette/Out line representation of the spectrum.

The 6th button is the display refresh.

The 7th button displays or hides the KLM Energy markers.

Input and Output Devices

The I/O facilities are provided by the Windows program and operate in the same manner as any windows application. EMRA provides for them to be available from the file menu.

Below describes how to Open a Spectrum file:

- Move to File in the menu bar, and then select Open.
- This will create an Open dialog box.
- Move to the correct path.
- Select file then press OK.

0 This will automatically open a new child window and display the spectrum.

1 Below describes how to Save a Spectrum file:

- Move to File in the menu bar, and then select Save.
- This will create a Save dialog box.
- Move to the correct path.
- Enter the desired file name in the edit box labelled File Name.

This will save the file to the path you selected under the file name you entered.

NOTE The printer setup from the file menu should be set to landscape before printing ZAF results

There is an optimum value for these parameters, which give the most comprehensive results. As with most statistical calculations variables tend to operate on several affects at the same time and a trade off of one effect against another must be solved empirically.

In addition there is a check box which allows the operator to suppress the output of 'No Match Found' lines and the complimentary 'check' lines (which are used only to confirm identification of the element). Even if the printout of check lines is suppressed the number of supporting lines for the primary peak will indicate how many have been found