Eurogam project EDOC112

Developpement graphique

ANALYSIS FUNCTIONS and ERGONOMICS

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Chapter 1

INTRODUCTION

The purpose of the present paper is to outline the major aspects of the graphical interface for offline-online.

Specifications concerning ergonomics, functions and data structures are presented.

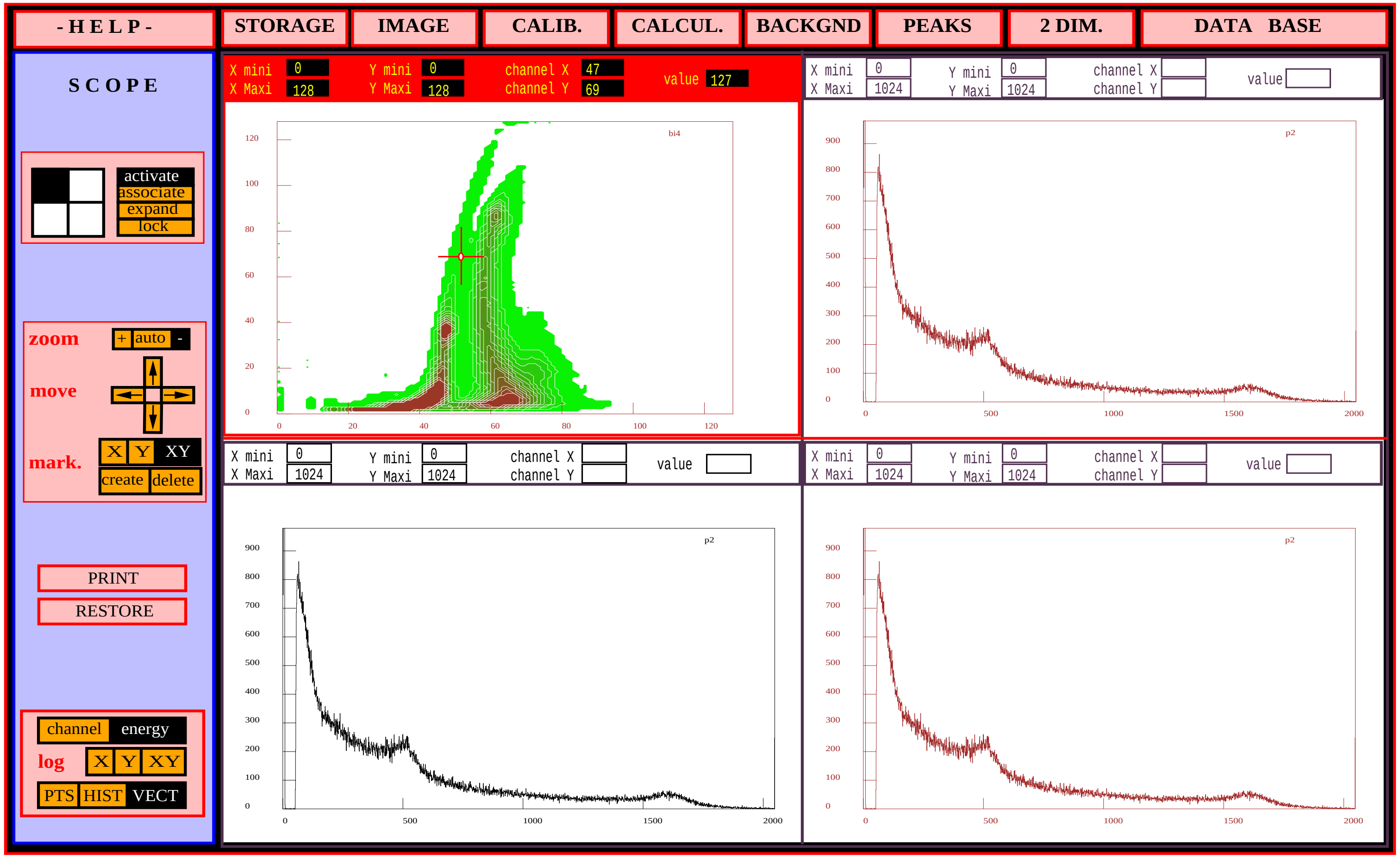
At the beginning of each section, the general requirements are defined and the essential elements are subseqently specified.

For the following, we require that:

- A spectrum is stored like it appears on the screen.
- The commands are focused on a single independant display area of the position of the cursor.
- The applications functions can be easily modified.

This work is independant of the toolkit used in the development environment. The mack-ups show a graphic structure and not a look.

We expect to show more precise screen models created under Dev-Guide (Open Look).



X mini 0
X Maxi 128
Y mini 0
Y Maxi 128
channel X 47
channel Y 69
value 127

X mini 0
X Maxi 1024
Y mini 0
Y Maxi 1024
channel X
channel Y
value

X mini 0
X Maxi 1024
Y mini 0
Y Maxi 1024
channel X
channel Y
value

X mini 0
X Maxi 1024
Y mini 0
Y Maxi 1024
channel X
channel Y
value

Fig 1: Spectra analysis interface.

Chapter 2

ERGONOMICS

2.1 General rules

The user can store his work like it appears on screen.

The user doesn't have to manage several windows belonging to the same application.

The user has to be able to run and set parameters of a function without the need of specific syntax.

The commnads for image manipulations are always available on the screen (scope area).

2.2 Storage of an analyse work

A lot of physicists would like to store the result of work realized on the screen. The peaks detected, the fits and so on would be stored on disk, and systematically displayed with the spectrum. This characteristic should always be active and transparent for the user.

The command SAVE assumes the storage of the spectrum and its attributs (CALIBRATION, BACKGROUND, ...).

The work attributs are associated with the spectrum and not with the display software. They have to be able to be used by others programs. This specification imposes a data structure sufficiently flexible to describe the attributs (see Chapt IV).

2.3 Structure of the visualisation screen

2.3.1 Structure of the visual window

The window has 3 fonctionnal areas:

- THE MENU BAR.
- THE SCOPE AREA.
- THE DISPLAY AREA.

2.3.2 The menu bar

The popup menu buttons are drawn on top of the screen.

The popup menu buttons have to be at the same position in different applications.

We propose the following outline (from left to right)

- HELP menu
- STORAGE menu (data storage, print,....)
- IMAGE menu (Display management: color, cut-paste,......)
- The other popup menus specific to the application (calcul, set up, ...)
- DATA BASE menu

2.3.3 The DISPLAY area

The display area can be divided in seveal areas in witch the spectra are drawn. The partition must be set by the user. Several spectra can be drawn in each display area, but, in this case, the commands act on all the spectra.

At the same time, a single display area is active.

The active display area receives the commands independently of the position of the mouse cursor. The pointed channel it value and other informations are written at the top of each display.

The color of the frame of the display area depends on its status (see SCOPE AREA) so that the user can identify the active display area and its associates.

2.3.4 The SCOPE area

The scope area permits to manage the images. Its functions are:

- DISPLAY AREA's STATUS: A four position commutator define the status of the selected area.
- DISPLAY AREA's SELECTION: A diagramm symbolises the partition of the display area. The part selected is set with the status of the display area's status commutator.
- ZOOM: The ZOOM command is runing on the active display area and its associates.
- MOVE: Move the active display area and its associates step by step.
- MARKERS: A three position commutator defines the markers that can be created (X: vertical, Y: horizontal, XY: rectangular area). A two positions commutator sets the create or delete mode.
- PRINT: Print the active spectrum and its associates
- RESTORE: Restore (from disk) the active spectrum.

- CHANNEL-ENERGY: Set the display mode (counts or energy).
- LOG: Set the LOG axes display (X, Y or the both).
- PTS-HIST-VECT: Set the display mode for the histogramms (points, vectors or histogram).

All this commands don't need confirmation or validation.

2.4 Display screen partition

The software permits to display several spectra simultaneously on the screen.

Every spectrum has its display area. The status of the display area is managed by the user.

- WORK AREA: A work area is a part of the display area. A work area can display one or more spectra. The command acts on all the spectra drawn in a work area.
- ACTIVE AREA: A single work area is simultaneously active . All the commands are applied to the active area. All the commands are apply to this area independently of position of the mouse cursor.
- ASSOCIATED AREA: This aera is associated with the active dislpay area. The associated area receives some command simultaneously with the active area.
- EXPAND AREA: The expand display area displays the part between markers of the active display area.
- LOCK AREA: The lock area cannot be activated or associated. Lock is a flipflop command.

2.5 Command system

The commands are executed from menus. There parameters are set by dialog boxes. The mouse is used to manipulate buttons, menus and to check spectra channels.

The most frequently used commands can be executed directly from the keyboard.

- USE OF THE DIALOG BOXES: All the keyboard X-events are focused to the opened dialog box independently of the position of the mouse cursor. The dialog box must be drawn out of the active dislay area and its associates, but in the screen. It must be possible to use the mouse to check channel when a dialog box is opened.
- USE OF THE MOUSE: All the commands of all the applications must have the same usage of the mouse buttons. The functions of the buttons can be defined by the toolkit.

- USE OF THE KEYBOARD: The most frequently used commands can be executed directly with a key code without using the menu.(CTRL S for "save" p.e.). One of the validation buttons must be overlined and activated in case of "RETURN" key input (default).

Chapter 3

FUNCTIONS

3.1 Menu structure

Each group of functions is associate with a menu (Fig 2).

- HELP menu: Access to the online help.
- STORAGE menu: Management of the data file of the application.
- IMAGE menu: Management of the image on screen.
- CALIB. menu: Commands used to calibrate the spectra.
- CALCUL. menu: Commands used to do mathematical operations among the spectra.
- BACKGND: menu Commands used to describe and extract the background.
- PEAKS menu: Commands used to search and describe peaks.
- 2 DIM. menu: Commands associated with 2 dim's spectra.
- DATA BASE menu: Access to the data base.

3.2 Function description

01 ——————————————————————————- ——————————————————————————-

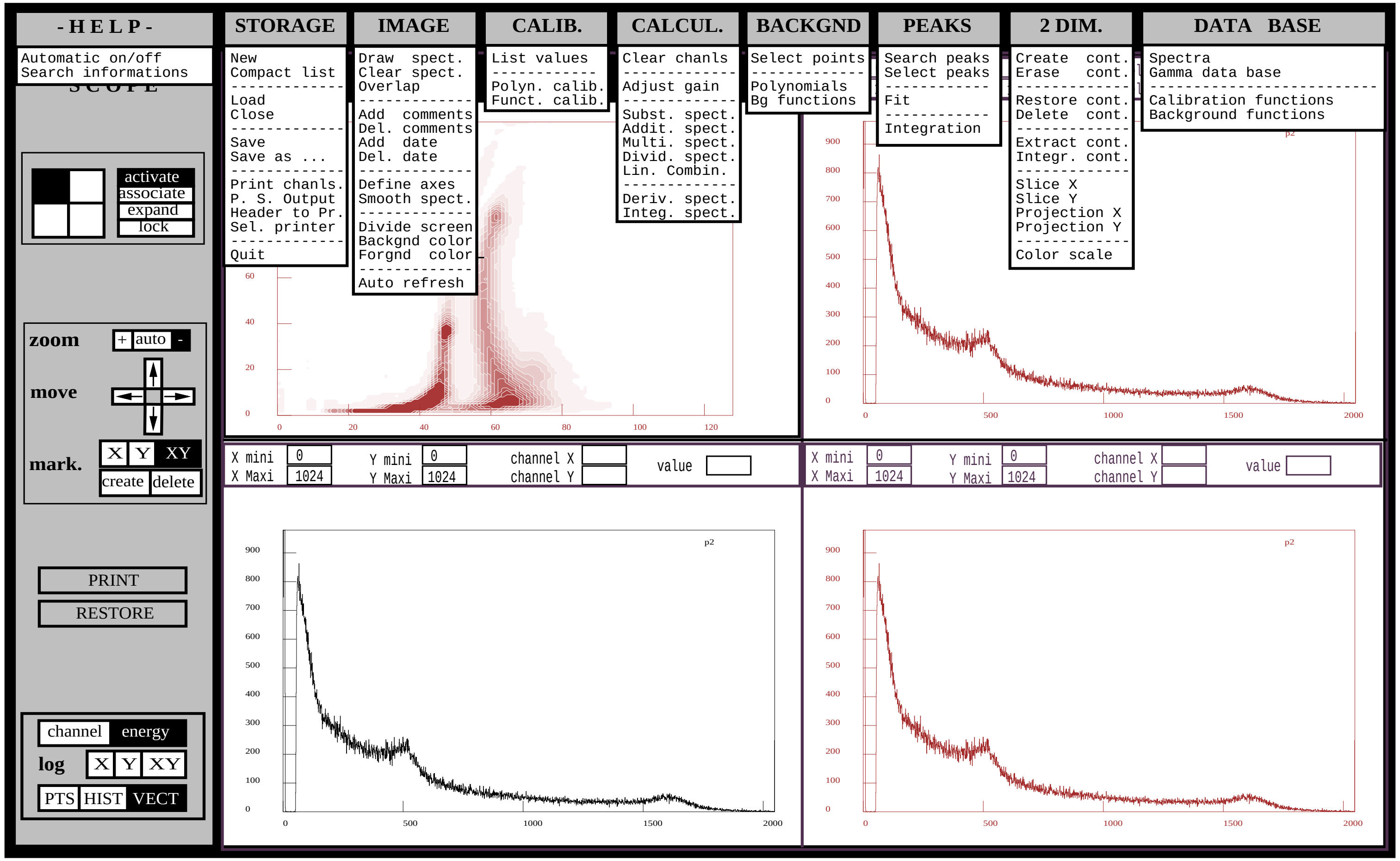
COMMAND : ACTIVATE
FUNCTION : Activate the selected display area.
CALL : SCOPE area.
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: This command is one of the 4 positions of the commutator.

02 ——————————————————————————- ——————————————————————————-



X mini 0
X Maxi 1024
Y mini 0
Y Maxi 1024

Fig 2: Content of the popup menus (Just 1 menu can be opened at the same time)

COMMAND : ASSOCIATE
FUNCTION : Associate the selected display area with the active display area.
CALL : SCOPE area
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: This command is one of the 4 positions of the commutator.

03 ——————————————————————————————- ——————————————————————————————-

COMMAND : EXPAND
FUNCTION : The selected area display the part between markers of the active display area.
CALL : SCOPE area
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: The EXPAND display area cannot execute commands.

04 ——————————————————————————————- ——————————————————————————————-

COMMAND : LOCK
FUNCTION : The selected display area can't be active or associated.
CALL : SCOPE area.
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: LOCK-UNLOCK is a flipflop command.

05 ——————————————————————————————- ——————————————————————————————-

COMMAND : ZOOM
FUNCTION : Make a zoom on the image of the active and the associated display areas. The zoom display the zone between
: the markers. If no markers exist, the images are zoomed step by step.
CALL : SCOPE area.
DIAL : no

- PARAMETERS -
FIXED : zoom step
SELECTED :
READ :

- ATTRIBUTS -
READ : Part to draw
MODIFIED : Part to draw

COMMENTS:

06 ——————————————————————————————- ——————————————————————————————-

COMMAND : MOVE
FUNCTION : Move step by step the image of the active and the associated display areas.
CALL : SCOPE area
DIAL : no

- PARAMETERS -
FIXED : move step
SELECTED :
READ :

- ATTRIBUTS -
READ : Part to draw
MODIFIED : Part to draw

COMMENTS:

07 ——————————————————————————————- ——————————————————————————————-

COMMAND : MARK.

FUNCTION : Create or delete markers in the active and the associated display areas.
CALL : SCOPE area
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ : MARKERS
MODIFIED : MARKERS

COMMENTS: The position of the markers is selected with the mouse.

08 ——————————————————————————- ——————————————————————————-

COMMAND : PRINT
FUNCTION : Print the spectrum of he active and the associated display areas with the print
: header (list of attributs to print).
CALL : zone SCOPE
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS:

09 ——————————————————————————- ——————————————————————————-

COMMAND : REFRESH
FUNCTION : Draw the active spectrum from storage device (annul the modifications in memory).
CALL : SCOPE area
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS:

10 ——————————————————————————- ——————————————————————————-

COMMAND : CHANNEL-ENERGY
FUNCTION : Display the channels values in count or energy.
CALL : SCOPE area
DIAL :

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ : calibration, scale.
MODIFIED : scale.

COMMENTS:

11 ——————————————————————————- ——————————————————————————-

COMMAND : Log X-Y-XY
FUNCTION : Display the axe X, Y or the both in log scale.
CALL : SCOPE
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ : LOG-LIN
MODIFIED : LOG-LIN

COMMENTS: The axes are display in linear scale by default.

12 ——————————————————————————- ——————————————————————————-

COMMAND : PTS-HIS-VECT
FUNCTION : Select the display mode for histogramms (points, vector ou histogram).
CALL : SCOPE area

DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ : PHV
MODIFIED : PHV

COMMENTS:

13 ——————————————————————————- ——————————————————————————-

COMMAND : AUTOMATIC ON-OFF (help)
FUNCTION : Set the automatic display of an help window with each command.
CALL : Menu HELP
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS:

14 ——————————————————————————- ——————————————————————————-

COMMAND : SEARCH INFORMATIONS. (help)
FUNCTION : Display a page of informations about the selected keyword.
CALL : Menu HELP
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED :
READ : Keyword.

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS:

15 ——————————————————————————- ——————————————————————————-

COMMAND : NEW (storage)
FUNCTION : Clear the display area, delete the spectra from memory and set the software with default values.
CALL : menu STORAGE
DIAL : yes: alert box for confirmation.

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: A storage is proposed for each modified spectra.

16 ——————————————————————————- ——————————————————————————-

COMMAND : COMPACT LIST (storage
FUNCTION : Compact the numerotation of the list of spectra in memory.
CALL : Menu STORAGE
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS:

17 ——————————————————————————- ——————————————————————————-

COMMAND : LOAD (storage)
FUNCTION : Load in memory, from storage device, the selected spectrum.
CALL : STORAGE menu
DIAL : YES

- PARAMETERS -

FIXED :
SELECTED :
READ : Pathname of the spectrum.

- ATTRIBUTS -
READ : all
MODIFIED :

COMMENTS:

18 ———————————————————————————————————————

COMMAND : CLOSE (storage)
FUNCTION : Clear on the display area and in memory the selected spectra.
CALL : yes
DIAL :

- PARAMETERS -
FIXED :
SELECTED : Spectra idfentifier
READ : Spectra idfentifier

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: Propose a storage for a modified spectrum.

19 ———————————————————————————————————————

COMMAND : SAVE (storage)
FUNCTION : Save the selected spectrum
CALL : STORAGE menu
DIAL :

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ : all
MODIFIED :

COMMENTS:

20 ———————————————————————————————————————

COMMAND : SAVE AS ... (storage)
FUNCTION : Save the selected spectrum with a new file name
CALL : STORAGE menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED :
READ : New file name (defaut: old name

- ATTRIBUTS -
READ : all
MODIFIED :

COMMENTS:

21 ———————————————————————————————————————

COMMAND : PRINT CHANLS (storage)
FUNCTION : Print the list of the channels value of the active spectrum
CALL : STORAGE menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : list of the channels
READ : first and last channel to print (default: all channels)

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS:

22 ———————————————————————————————————————

COMMAND : P.S. OUTPUT (storage)
FUNCTION : Create a Post-Script file describing the active spectrum
CALL : STORAGE menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : create file - print temporary file - create+print
READ : file name.

- ATTRIBUTS -
READ : all
MODIFIED :

COMMENTS:

23 ——————————————————————————— ———————————————————————————

COMMAND : HEADER TO PR (storage)
FUNCTION : select the attributs to print with the "print" command of the SCOPE area
CALL : STORAGE menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : list of the knwon attributs
READ :

- ATTRIBUTS -
READ : all
MODIFIED :

COMMENTS: The list is unique for all the spectra.

24 ——————————————————————————— ———————————————————————————

COMMAND : SEL PRINTER (storage)
FUNCTION : Select the default printer.
CALL : STORAGE menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : List of the avalaibles printers (default: last selection)
READ : Name of a new printer.

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: All the print output are redirected to the default printer.

25 ——————————————————————————— ———————————————————————————

COMMAND : QUIT (storage)
FUNCTION : Quit the visualisation soft
CALL : STORAGE menu
DIAL : yes: alert box for confiramtion.

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: Propose to save the modified spectra (save all in option).

26 ——————————————————————————— ———————————————————————————

COMMAND : DRAW SPECT. (image)
FUNCTION : Draw the selected spectrum in the active display area.
CALL : IMAGE menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : list of the spectra in memory.
READ : name of a spectrum

- ATTRIBUTS -
READ : all
MODIFIED :

COMMENTS: Need an empty active display area.

27 ——————————————————————————— ———————————————————————————

COMMAND : CLEAR SPECT. (image)
FUNCTION : Clear spectrum from the active display area.
CALL : IMAGE menu
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :

MODIFIED :

COMMENTS: In case of overlap, all spectra are cleared.

28 ——————————————————————————————

COMMAND : OVERLAP (image)
FUNCTION : Draw a new spectrum in the active display area.
CALL : IMAGE menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : List of available spectra.
READ : Name of a spectrum.

- ATTRIBUTS -
READ : all
MODIFIED :

COMMENTS:

29 ——————————————————————————————

COMMAND : ADD COMMENT. (image)
FUNCTION : Add a comment in the active display area
CALL : IMAGE menu
DIAL : yes

- PARAMETERS -
FIXED : Max length of the comment
SELECTED :
READ : text ot the comment.

- ATTRIBUTS -
READ :
MODIFIED : comment.

COMMENTS: The position of the comment in the image is selected with the mouse.

30 ——————————————————————————————

COMMAND : DEL. COMMENT. (image)
FUNCTION : Delete a comment in the active display area.
CALL : IMAGE menu
DIAL : yes: alert box for confiramation

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ : comment.
MODIFIED : comment.

COMMENTS:

31 ——————————————————————————————

COMMAND : ADD DATE (image)
FUNCTION : Write the date and the hour at configurable position in the active display area.
CALL : IMAGE menu
DIAL : no

- PARAMETERS -
FIXED : Position of the date into the image.
SELECTED :
READ :

- ATTRIBUTS -
READ : date of the last edition
MODIFIED : date of the last edition

COMMENTS:

32 ——————————————————————————————

COMMAND : DEL. DATE (image)
FUNCTION : Delete the date from the active display area.
CALL : IMAGE menu
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED : date of the last edition

COMMENTS: The date of last edition is deleted in the attributs list.

33 ————————————————————————————

COMMAND : DEFINE AXES (image)
FUNCTION : Define the axes of the active display area.
CALL : IMAGE menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : type of axes (arrow, ..)
READ : Name of the axes, graduation step,....

- ATTRIBUTS -
READ : axes
MODIFIED : axes

COMMENTS:

34 ————————————————————————————

COMMAND : SMOOTH SPECT. (image)
FUNCTION : Smooth the image of the active spectra
CALL : IMAGE menu
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ : SMOOTH/RAW
MODIFIED : SMOOTH/RAW

COMMENTS: SMOOTH SPECT is a flipflop command.

35 ————————————————————————————

COMMAND : DIVIDE SCREEN
FUNCTION : Divide the display area in several display areas.
CALL : IMAGE menu
DIAL : yes

- PARAMETERS -
FIXED : Minimum size of a display area.
SELECTED : Standards screens.
READ : User's screen

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: A new cutting of the display area provoke a new adjustment of drawn spectra.

36 ————————————————————————————

COMMAND : BACKGND COLOR (image)
FUNCTION : Define the background color of the active display area.
CALL : IMAGE menu
DIAL : yes

- PARAMETERS -
FIXED : availables colors.
SELECTED : background color
READ :

- ATTRIBUTS -
READ :
MODIFIED : background color

COMMENTS:

37 ————————————————————————————

COMMAND : FORGND COLOR (image)
FUNCTION : define the color used for draw the active spectrum
CALL : IMAGE menu
DIAL : yes

- PARAMETERS -
FIXED : available colors
SELECTED : color of the spectra and name of the spectrum to modify in case of overlap.
READ :

- ATTRIBUTS -
READ : Color of the spectrum, bidim/histo
MODIFIED : Color of the spectrum

COMMENTS: Command unavailable for 2 dimensions. spectra.

38 ————————————————————————————

COMMAND : AUTO REFRESH
FUNCTION : Set the autorefresh mode for the active spectrum, his associates and expand spectra.
CALL : IMAGE menu
DIAL : YES

- PARAMETERS -
FIXED : Frequency mini, maxi and default.
SELECTED :
READ : Refresh frequency.

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS:

39 ——————————————————————————- ——————————————————————————-

COMMAND : LIST VALUE (CALIB.)
FUNCTION : Make a calibration from a list of points selected with the mouse or with entered with the keyboard.
CALL : CALIB. menu
DIAL : yes

- PARAMETERS -
FIXED : degree max of the calibration polynome.
SELECTED : Calibration functions availables.
READ : degree of the polyn. and list of points

- ATTRIBUTS -
READ :
MODIFIED : calibration, units.

COMMENTS:

40 ——————————————————————————- ——————————————————————————-

COMMAND : POLYN. CALIB. (calib.)
FUNCTION : Calibrate the active spectrum with a user's defined polynomial function.
CALL : CALIB. menu
DIAL : yes

- PARAMETERS -
FIXED : degree max for a calibration polynome.
SELECTED :
READ : degree et coefficients.

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS:

41 ——————————————————————————- ——————————————————————————-

COMMAND : FUNC. CALIB. (CALIB.)
FUNCTION : Calibrate the active spectrum with a function from the data base.
CALL : CALIB. menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : available functions
READ :

- ATTRIBUTS -
READ :
MODIFIED : calibration, units

COMMENTS: In this case, the calibration attribut is an entry point in the data base.

42 ——————————————————————————- ——————————————————————————-

COMMAND : CLEAR CHANLS (calcul.)
FUNCTION : Reset the values of the channels between the markers
CALL : CALCUL menu.
DIAL : yes: alert box for confirmation

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: This fonction modify the value of the count array

43 ——————————————————————————- ——————————————————————————-

COMMAND : ADJUST GAIN (calcul.)
FUNCTION : Adjust the gain af the active spectrum and his associates.
CALL : CALCUL menu.

DIAL : yes + alert box for confirmation.

- PARAMETERS -
FIXED :
SELECTED :
READ : gain

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: This function modify the values of the count array.

44 ——————————————————————————————— ———————————————————————————————

COMMAND : SUBST. SPECT. (calcul.)
FUNCTION : Substract 2 spectra.
CALL : CALCUL menu.
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : spectra to substract
READ : spectre result (default: 1st operand)

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: The attributs of the result spectrum came from the 1st operand.

45 ——————————————————————————————— ———————————————————————————————

COMMAND : ADD SPECT. (calcul.)
FUNCTION : add 2 spectra.
CALL : CALCUL menu.
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : spectra to add.
READ : spectra result (default: 1st operand)

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: The attributs of the result spectrum came from the 1st operand.

46 ——————————————————————————————— ———————————————————————————————

COMMAND : MULTI. SPECT. (calcul.)
FUNCTION : multiply 2 spectra.
CALL : CALCUL menu.
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : spectra to multiply.
READ : spectrum result (default: 1st operand)

- ATTRIBUTS -
READ :
MODIFIED : The attributs of the result spectrum came from the 1st operand.

COMMENTS: Les attributs du spectre resulat sont ceux du 1er operande.

47 ——————————————————————————————— ———————————————————————————————

COMMAND : DIVID SPECT. (calcul.)
FUNCTION : divide 2 spectra.
CALL : CALCUL menu.
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : spectra to divide
READ : spectra result (default: 1st operand)

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: The attributs of the result spectrum came from the 1st operand.

48 ——————————————————————————————— ———————————————————————————————

COMMAND : LIN. COMB. (calcul.)
FUNCTION : Calculate a linear combination of several spectra.
CALL : CALCUL menu.
DIAL : yes

- PARAMETERS -

FIXED :
SELECTED : operands spectra
READ : coefficients, operands spectra, spectrum result (default: 1st operand)

- ATTRIBUTS -
READ :

MODIFIED : The attributs of the result spectrum came from the 1st operand.
COMMENTS: Les attributs du spectre resulat sont ceux du 1er operande.

49 ————————————————————————————————- ————————————————————————————————-

COMMAND : DERIV SPECT. (calcul.)
FUNCTION : calculate the derived du spectrum of the active spectrum.
CALL : CALCUL menu.
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED :
READ : spectrum result (default: active spectrum)

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: The derived spectrum had the attributs of the active spectrum.

50 ————————————————————————————————- ————————————————————————————————-

COMMAND : INTEG. SPECT. (calcul.)
FUNCTION : Calculate the integrated spectra of the active spectrum.
CALL : CALCUL menu.
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED :
READ : spectrum result (default: active spectrum)

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: Les attributs du spectre resulat sont ceux du spectre actif .

51 ————————————————————————————————- ————————————————————————————————-

COMMAND : SELECT POINTS (backgnd.)
FUNCTION : Describe the background from a list of segments.
CALL : BACKGND menu.
DIAL : yes

- PARAMETERS -
FIXED : degree max of the calibration polynome.
SELECTED :
READ : list of segments, degree of the calibration polynome.

- ATTRIBUTS -
READ :
MODIFIED : background

COMMENTS: The segments can be chosen with the mouse or the keyboard.

52 ————————————————————————————————- ————————————————————————————————-

COMMAND : POLYNOMIALS (backgnd.)
FUNCTION : Describe the background with a polynomial function.
CALL : BACKGND menu.
DIAL : yes

- PARAMETERS -
FIXED : degree max of the polynome.
SELECTED :
READ : coefficents, degree of the polynome.

- ATTRIBUTS -
READ :
MODIFIED : background

COMMENTS:

53 ————————————————————————————————- ————————————————————————————————-

COMMAND : BG FUNCTIONS (backgnd.)
FUNCTION : Describe the background with a function of the data base.
CALL : BACKGND menu.
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : available functions.
READ :

- ATTRIBUTS -
READ :
MODIFIED : background

COMMENTS: The background attribut is an entry point in the data base.

54 ———————————————————————————— ————————————————————————————

COMMAND : SEARCH PEAKS (peaks)
FUNCTION : Search, in the channels between the markers, the peaks in the activate spectrum and his associates and
: expand spectra.
CALL : PEAK menu.
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED :
READ : Detection threshold.

- ATTRIBUTS -
READ : peaks
MODIFIED : peaks

COMMENTS: The found peaks are overlined on the screen.

55 ———————————————————————————— ————————————————————————————

COMMAND : SELECT PEAKS (peaks)
FUNCTION : Give the characteristics of the peak selected with the mouse on the active spectrum.
CALL : PEAKS menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED : comment

COMMENTS: The result is written on the display area like a comment

56 ———————————————————————————— ————————————————————————————

COMMAND : FIT (peaks)
FUNCTION : Fit the peaks detected between the markers.
CALL : PEAKS menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : Fit Function, suppress the background(on/off).
READ : Number of peaks.

- ATTRIBUTS -
READ : Background
MODIFIED : peaks-fit

COMMENTS: The fit line is plotted on the display area.

57 ———————————————————————————— ————————————————————————————

COMMAND : INTEGRATION
FUNCTION : Integrate the spectrum between the markers
CALL : PEAKS ,menu
DIAL : yes for display the result.

- PARAMETERS -
FIXED :
SELECTED : suppress the background (on/off), write the result on the screen (on/off).
READ :

- ATTRIBUTS -
READ : background
MODIFIED : Comment

COMMENTS: If the display of the result is on, the result is stored in the attribut list like a comment.

58 ———————————————————————————— ————————————————————————————

COMMAND : CREATE CONT. (2 dim.)
FUNCTION : Create a contour in a 2 dims spectrum. The points defining the contour are selected with the mouse.
: The contour is automatically closed
CALL : 2 DIM menu.
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED : contour

COMMENTS:

59 ——————————————————————————— ———————————————————————————

COMMAND : RESTORE CONTOUR (2 dim.)
FUNCTION : Display in the active display area a contour stored in the list of attributs.
CALL : 2 DIM menu.
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : stored contours
READ :

- ATTRIBUTS -
READ : contours
MODIFIED :

COMMENTS:

60 ——————————————————————————— ———————————————————————————

COMMAND : DELETE CONTOUR (2 dim.)
FUNCTION : Delete from the active display area a contour but let it in the list of attributs.
CALL : 2 DIM menu
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS:

61 ——————————————————————————— ———————————————————————————

COMMAND : RESTORE CONTOUR (2 dim.)
FUNCTION : Display on the active display area a contour stored in the list of attributs
CALL : 2 DIM menu.
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : Stored contours
READ :

- ATTRIBUTS -
READ : contours
MODIFIED :

COMMENTS:

62 ——————————————————————————— ———————————————————————————

COMMAND : Erase CONTOUR
FUNCTION : Delete a contour from the active display area and rase it from the list of attributs.
CALL : 2 DIM menu.
DIAL : no

- PARAMETERS -
FIXED :
SELECTED :
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: La selection du contour se fait en cliquant sur le point de depart

63 ——————————————————————————— ———————————————————————————

COMMAND : EXTRACT CONTOUR (2 dim.)
FUNCTION : Annul the channels out of the selected contour.
CALL : 2 DIM menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED :
READ : Name of the new spectrum (default: active spectrum)

- ATTRIBUTS -
READ : contours
MODIFIED :

COMMENTS: The new spectrum had the sames attributs that the active spectrum.

64 ——————————————————————————————- ——————————————————————————————-

COMMAND : INTEGR. CONTOUR (2 dim.)
FUNCTION : Integrate the count number in the selected contour.
CALL : 2 DIM menu
DIAL : yes for display the result

- PARAMETERS -
FIXED :
SELECTED : display the result on the screen (on/off)
READ :

- ATTRIBUTS -
READ :
MODIFIED : comments

COMMENTS: The result can be stored like a comment attribut.

65 ——————————————————————————————- ——————————————————————————————-

COMMAND : SLICE X (Y) (2 dim.)
FUNCTION : Show a slice (X or Y) of the active spectrum.
CALL : 2 DIM menu.
DIAL : yes for diplay the result.

- PARAMETERS -
FIXED :
SELECTED : save (on/off)
READ : Name of the result spectrum

- ATTRIBUTS -
READ :
MODIFIED : slice (link to the spectrum slice)

COMMENTS:

66 ——————————————————————————————- ——————————————————————————————-

COMMAND : PROJECTION X (Y) (2 dim.)
FUNCTION : Show a projection of the active spectra.
CALL : Menu 2 DIM.
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : save (on/off)
READ : Name of the result spectrum

- ATTRIBUTS -
READ :
MODIFIED : projection (link to the spectrum slice)

COMMENTS:

67 ——————————————————————————————- ——————————————————————————————-

COMMAND : COLOR SCALE (2 dim.)
FUNCTION : Define the color scale for a 2 dims spectum
CALL : 2 DIM menu.
DIAL : yes

- PARAMETERS -
FIXED : Colors available
SELECTED :
READ : Selection of the color slices

- ATTRIBUTS -
READ : color scale
MODIFIED : color scale

COMMENTS: Must be used for define the display threshold.

68 ——————————————————————————————- ——————————————————————————————-

COMMAND : SPECTRA (data base)
FUNCTION : access to the references spectra in the data base
CALL : DATA BASE menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : Available spectra.
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS:

69 ——————————————————————————————-. ——————————————————————————————-

COMMAND : GAMMA DATA BASE (data base)
FUNCTION : access to the gamma data base.
CALL : DATA BASE menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : available datas
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS:

70 ——————————————————————————————-. ——————————————————————————————-

COMMAND : CALIBRATION (BACKGROUND) FUNCTIONS (data base)
FUNCTION : access to the calibration (background) function of the data base. donnee.
CALL : DATA BASE menu
DIAL : yes

- PARAMETERS -
FIXED :
SELECTED : available functions.
READ :

- ATTRIBUTS -
READ :
MODIFIED :

COMMENTS: Protocoles d'acces a la B de D non definis.

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Chapter 4

DATA STRUCTURE

4.1 Spectrum's state

A spectrum can be in one of the three following states:

- STORED: A stored spectrum must be copied into memory from a storage device before displayed. The data associated with the spectrum are the header block, the count block and the attribut list.
- IN MEMORY: A spectrum loaded in memory can be drawn on the screen. The data associated with the spectrum are the header block, the count block the attribut list,and the status. The status indicates the state of the spectrum with respect to the dislay screen ((not)drawn, permissions,....).
- ON THE SCREEN: To manipulate a spectrum, it is necessary to add to the previous data a description of the display environment. (colors, cursors,....).

4.2 Spectrum's description

Each state of a spectrum has specific data (Fig 3).

- The spectrum body (header block + data block+ attributs) is stored on disk during the life of the spectrum.
- The spectrum state (body + status) is stored in memory during the life of the spectrum in memory.
- The spectrum image (state + positions) is stored in memory while the spectrum is drawn on the screen.

4.3 Spectrum body

The spectrum body regroups the header block, the count array and the attribut list and is stored on disk.

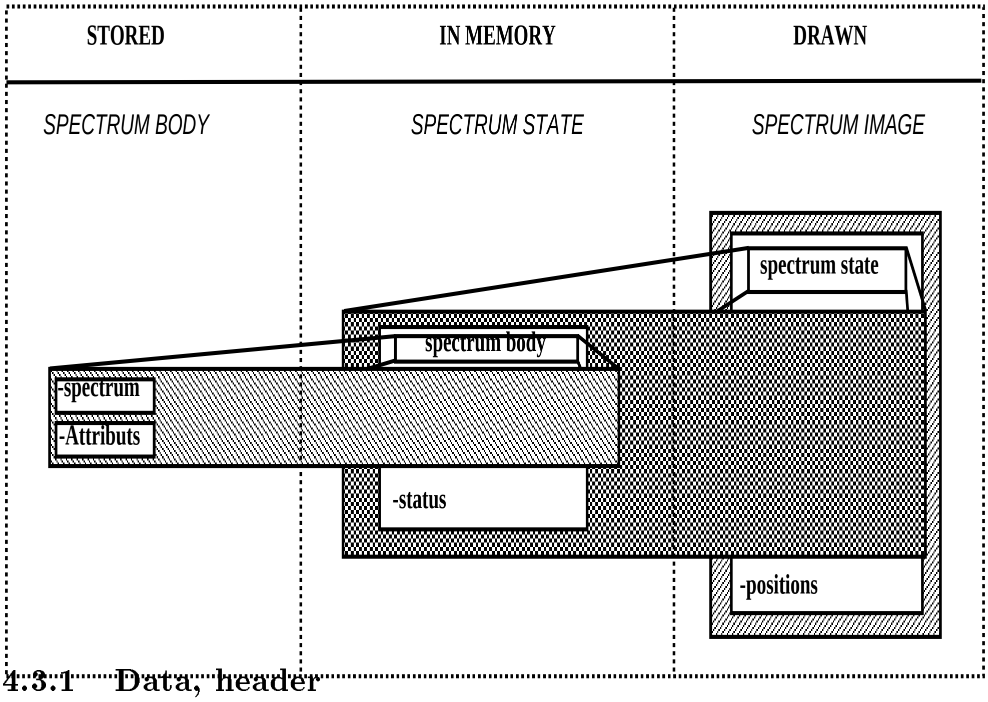


Fig 3: The 3 states of a spectrum with the associates datas groups.

4.3.1 Data, header

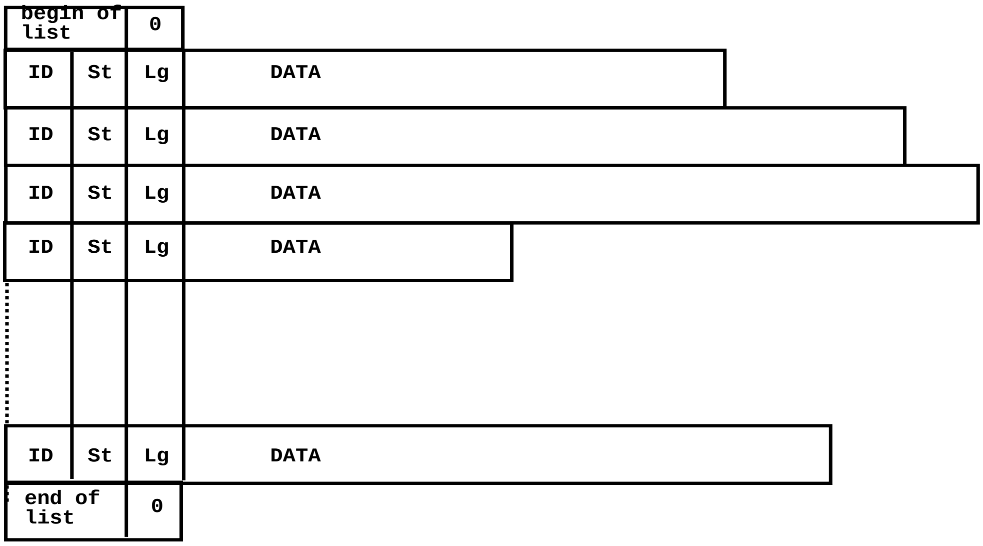
These blocks are defined in EDOC102, (header block = n*512 bytes, data block = n*512 bytes).

4.3.2 Attributs

The attribut list contains the datas (count chanel + analysis work).

Exemples of attributs:

- DRAWING WINDOW: part of the spectrum to draw(Xm, XM, Ym, YM)
- AXES: Graduation, mame of axes.
- ECHELLE: drawing scale.
- LOG-LIN: Flag for lin-log axes
- HISTO-BIDIM:
- SMOOTH-RAW: Flag for smooth drawing
- CALIBRATION: Calibration function.
- CANAL POINTED: Last canal pointed.
- MARKERS: Definition of the markers.
- FIT: Fit of peaks.



ID: Attribut identifier (special char + 4 bytes)
St: Status (unicity, existence,printable, ...)
Lg: Length of the attribut (1 byte)
DATA: Content of the attribut (varaible length)
A nil length attribut terminates the list.

Fig 4: Structure of a list of attributs in memory.

- PEAKS: Definition of selected peaks.
- BRUIT: Background definition.
- PATH: Pathname of the storage file.
- ASSOCIATE SPECTRA: Identification of the associate spectra.
- COLORATION: Drawing color.
- PERMISSIONS: .
- OTHERS ....

The content of the attributs depend on the functions of the different software using the spectrum. It should be possible to add new attributs without modifying those already recorded.

A spectrum hase not necessarily all the available attributs. We store only the defined attributs for a spectrum.

The diversity of attributs doesn't permit recording them with the same format. Ther considerations bring us to structure the attributs in a list composed of a variable number of items. Each item has a varaiable length.

Each function reads the list and interpret the recognized attribut. Each attribut has an identifier, followed by a status, followed by the data length, followed by the data (see fig 4).

Each attribut has a specific data format.

4.4 Spectrum state

4.4.1 Spectrum body

The spectrum state contains the spectrum body (see previous section).

4.4.2 Status

The status describes in memory the state of the spectrum relativeled to the display software.

This structure is created when loaded from disk, and destroy with the "close" command.

Content of the status structure:

- MODIFICATION: The spectrum is modified since the last save.
- ACCUMULATION: The spectrum is accumulating (anywhere)
- RERESH FREQUENCY: Frequency used for the auto refresh mode.
- DRAWN: The spectrum is actually drawn on the screen.
- OTHERS......

4.5 Image

4.5.1 Spectrum state

The spectrum image content the spectrum state (see previous section).

4.5.2 Positions

The position structure contains the paremeters necessary to draw the spectrum on screen.

- IDENTIFICATION OF THE DISPLAY AREA:
- SIZE OF THE DISPLAY AREA: Depends on the screen partition.
- MONOCHROME-COLOR:
- BACKGROUND COLOR:
- ACTIVE/ASSOCIATE/EXPAND/LOCK: Status of the display area.
- OTHERS......

4.6 Structure in memory

The spectrum implantation in memory is defined in document EDOC061. We expect to link the attribut list to the information-1-pointer field of the header (Fig 5).

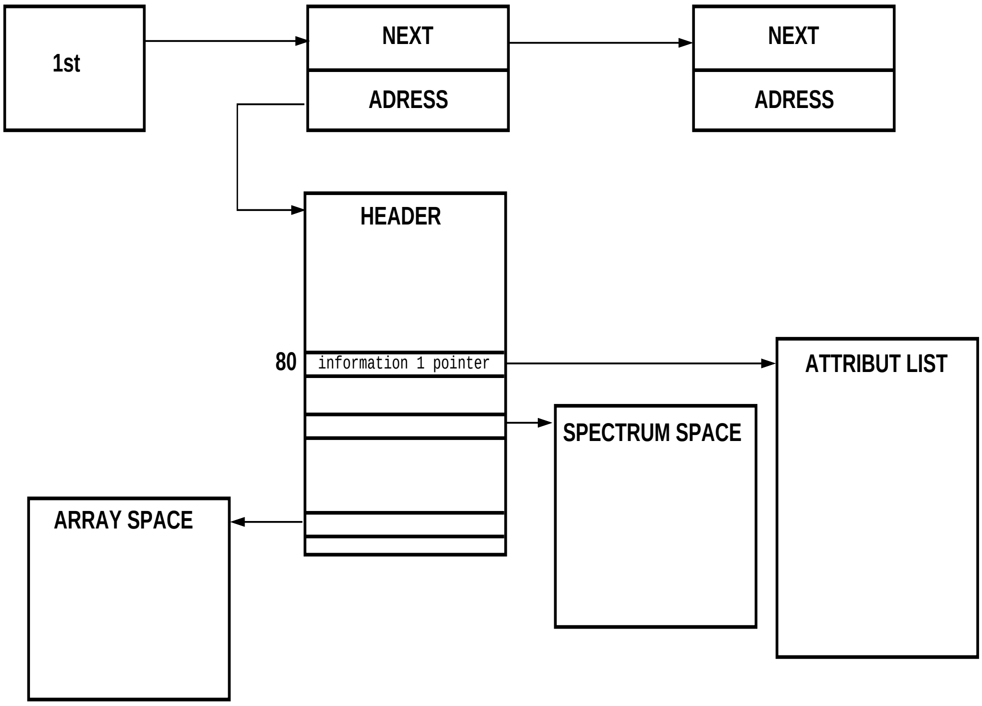


Fig 5: Structure of a spectrum in memory