The Cosmic Ray Collector

Application Program for the Macintosh Computer

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How To Use The Manual

This manual is divided up into several sections because the program it describes is a multiple purpose. There are several versions of this program that are used for different purposes. The program works the same from version to version but graph, data , and collection routines are different. Where specific reference to a graph, data , or collection routine is needed please refer to that section of the manual.

Δ This refers to something that is a note.

How To Use The Program

This application program performs data collection, deciphering and display all in one. The program works like a microphone with many tape decks hooked up to it through all sorts of sound modifiers. The microphone is the RS232 serial port on the macintosh that can "listen" to the Stack, ADC, etc... The sound modifiers are all inside the macintosh. The tape decks are windows on the macintosh screen. Each window can record and display the data it collects in a variety of ways (Histogram, Gray scale, etc...).

Here is a basic sample run of the program.

• First you must hook up the Macintosh to the device by connecting the RS232 cable between them.

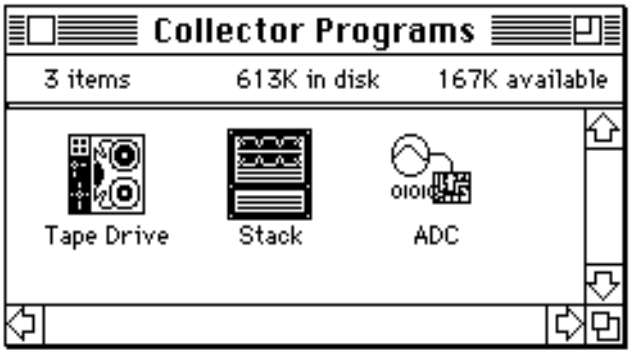
• To collect data from a device you must select and run the program for that device. This is done by selecting the program icon for the device and then selecting Open from the File menu while in the Finder.

Δ Please refer to the Macintosh manual for more information on the Finder.

Δ Please refer to Collection Types and Data Types for more information on programs for specific devices.

Δ Please refer to the introduction on menus for more information about them.

The Program Icons



• Once in the program you must set up some new windows to collect data in. By selecting New from the File menu in the collector program you will create a new window. Then by selecting the type of window and data for this new window, in the Window Type Options Dialog Box, you will create a

graph in this new window. You can adjust the data collection options and display options by using the Options menu. Repeat until all data you want to collect is graphed in a window.

Δ See **Graph Types** and **Data types** for more information on the Window Type Options Dialog Box.

Δ See the Option menu, and **Graph Types** for more information about data and display options.

• Now you are ready to collect data. Windows that you want to have collect data at this time, must be selected and have there window options adjusted for collecting and graph updating. This is done under the Options menu, window item.

Δ See the Option menu for more information on the window item.

• To start the program collecting data select start from the Collection menu. If there is and error collection will stop and you must then check to see if you are using the right program and the device is connected and turned on. Now select Start again.

• If no errors occur then let the program collect until you feel you have enough data. Now select Stop from the Collection menu.

• Using the File menu you can Print, Save, Close, etc.. your windows.

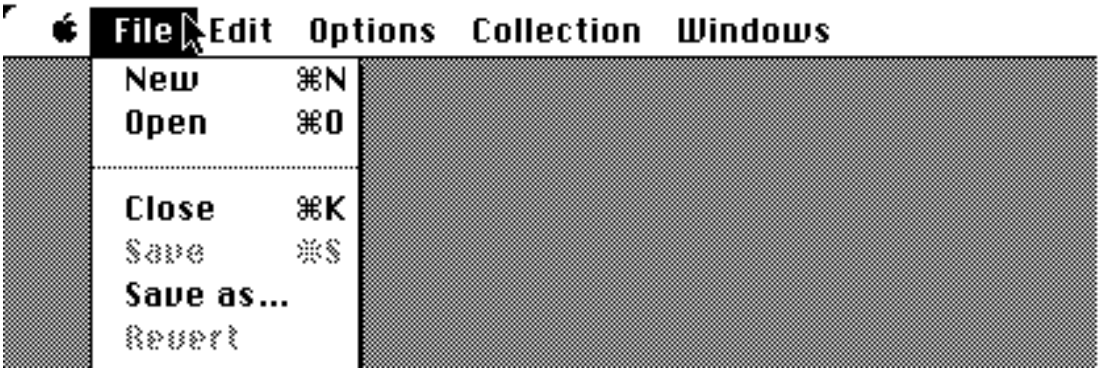
Δ Please refer to the File menu for more information on these functions.

There are many other useful features to this program. Please read about all the menu function Gragh Types and Data Types to get full use of this program.

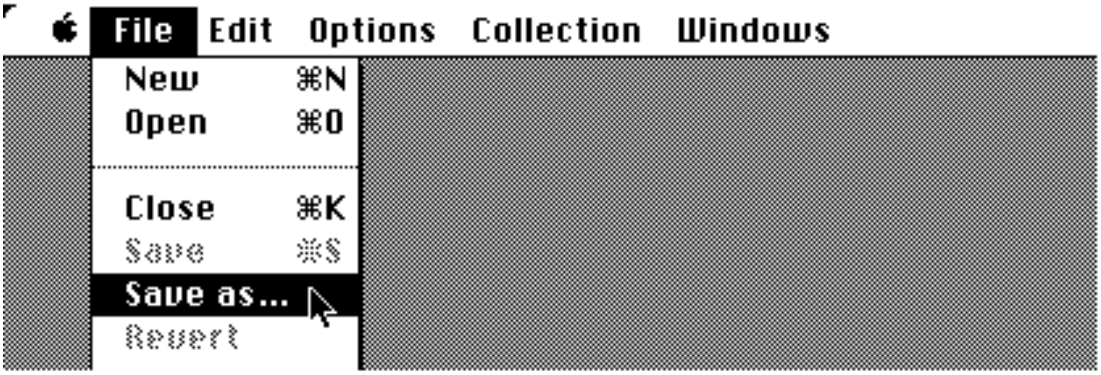
Menus

Menus are the key to using this program. They allow you to perform all the function the program will do.

To access a menu you have to point to the menu you want by moving the mouse to move the arrow over the menu, and clicking the mouse button to make the menu appear. Releasing the mouse button makes the menu go away.



To perform one of the menu items you must hold the mouse button down while moving the mouse to the item you want and releasing the mouse button. Items not available are gray and do not turn black.



Δ The letters opposite an item correspond to a keyboard combination equivalent to selecting the item with the mouse.

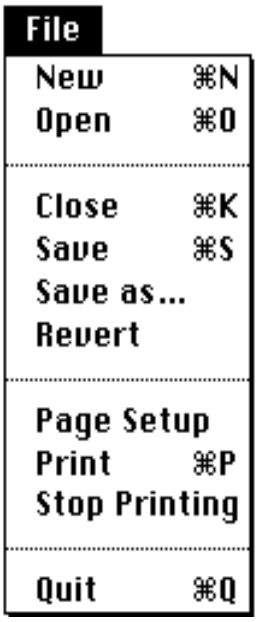
Δ For more information about menus please see the macintosh manual.

The *Apple* menu

• About
This item gives a little information about the program like the version number, modifications and the author.

• *Desk Accessories List*
These items refer to desk accessories that can be accessed at any time while using the program. Refer to the macintosh manual for more information about desk accessories.

The File Menu



• New
This item is used for creating a new window on the desk top. If there is more than one set of data and graphs to put in the window you will be presented with a dialog box to choose them. The new window's title is set to untitled.

• Open
Use this item to load previously saved windows onto the desk top. The Window's title is set to the saved file's name.

• Close
This will close the top window on the desk top. When you are done with a window and wish to remove it from the desk top you can close it. If changes made to the window have not been saved the program will alert you and ask if you want to save or throw away the changes to the window.

Δ You may also close the top window on the desk top by clicking in the small square in the upper left hand corner of the window. The effect is the same as if you had selected Close.

• Save
If the top window on the desk top exists as a saved file you may update that saved file by replacing it with the window.

• Save as…
If the top window on the desk top does not exist as a file or you wish to save the window under a different name use this item and it will request a new name before saving the window to the disk. The window's title is then set to the new name.

• Revert
If the top window on the desk top exists as a saved file this item replaces the window with the last saved version of the window.

• Page Setup
Displays the current page setup dialog box for the printer you are using. Please refer to the printer manual for more information about the page setup dialog box for your printer.

• Print
Displays the current print setup dialog box for the printer you are using. Then it asks you if the printing should be done in the background. Then it prints the top window on the desk top accordingly.

Background Printing

If you selected background printing you can continue working with the program but this slows down the printing process. Printing done in the background can be canceled by selecting Stop Printing from the File menu. You may only print one window at a time so the Print and Page Setup items in the File menu become disabled while you are printing in the background. If you quit the program while printing the the background the program will cancel it.

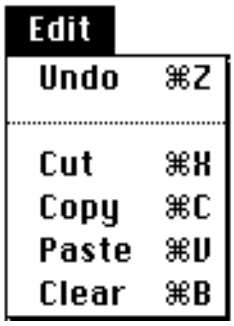
Normal Printing

If you did not select printing in the background then you must wait until the window has been printed before you can work with the program. Printing not done in the background can be canceled by holding down the command key and the period key at the same time.

• Stop Printing
If you specified background printing you can cancel the printing process by selecting this.

• Quit
When you are finished with the program use this item to return to the finder. If changes made to any of the windows have not been saved the program will alert you and ask you if you want to save or throw away the changes to the windows before closing them. If you are printing in the background the program will cancel it.

The Edit Menu



• Undo
This item is not implemented in the program.

• Cut
The program will copy the top window on the desk top contents and put them in the clipboard.

• Copy
The program will copy the top window on the desk top contents and put them in the clipboard.

• Paste
This item is not implemented in the program.

• Clear
This item is not implemented in the program.

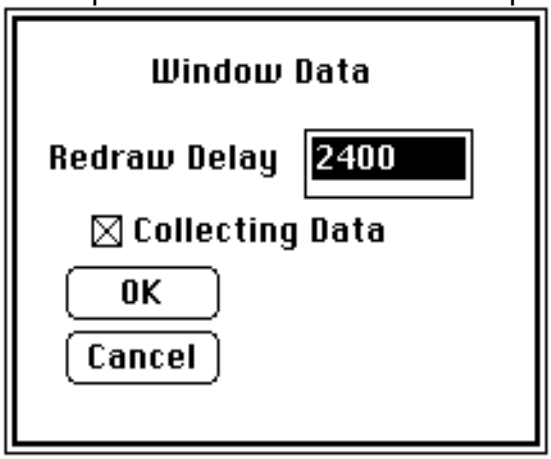
Δ When using desk accessories or dialog boxes the Edit menu items are enabled and perform their function. See the macintosh manual for more information.

The Options menu

• Drawing
Selecting this item displays the drawing options dialog box for the graph type of the top window on the desk top. See **Graph Types** for specific details.

• Data
Selecting this item displays the data options dialog box for the graph type of the top window on the desk top. See **Graph Types** for specific details. Changing the options causes the current graph's data to be cleared.

• Window
After selecting this you will be presented with the Window Options dialog box.



With the Window Options dialog box you can specify if the window should collect data when the program collects data. Also, you can specify in sixtieths of a second how long the program should wait before updating the window when the window and program are collecting data. If you do not want to have the program update the window, set this to zero.

• Type
This displays the window type dialog box. See **Graph Types** and **Data Types** for more information. If there is more than one set of data and graphs to put in the window you will be presented with a dialog box to choose them. Changing the options causes the current window to be reset to its original data and display options.

The Collection Menu

• Start
Selecting this make the program start collecting raw data. Any windows that are collecting data will now receive processed data from the program.

Δ This does not affect your use of the program. It does however, affect the speed at which the program behaves.

Δ You must remember to turn this off by selecting stop if you plan to print a window in the background. Normal printing simply disables all collecting until it is finished printing.

• Stop
Selecting this stops the program from collecting raw data and passing processed data to collecting windows.

• Reset
Selecting this depends on what you are reading from. Please see **Collection Types** for more information. If you are reading from a file then selecting this will make the program start reading raw data from the beginning of the file.

• Record to File
This causes all raw data being read from the device by the program to be written to a file on disk.

• Read from Port
This causes all data to read from the device this program is made for.

• Read from File
Displays a file selection dialog box. All raw data will now be read from that file you select.

The Windows Menu

•Redraw
This updates the top window on the desk top.

•Redraw All
This updates all the windows on the desk top, even hidden ones. Useful if you have disabled redrawing of any window on the desk top.

•Hide
This hides the top window on the desk top. The window is still there but cannot be seen. To see it again select it from the *Window List.*

∆You cannot hide all your windows and you cannot hide system windows.

•Tile
This reposition and makes visible all windows so they are neatly placed next to one another in a tile fashion.

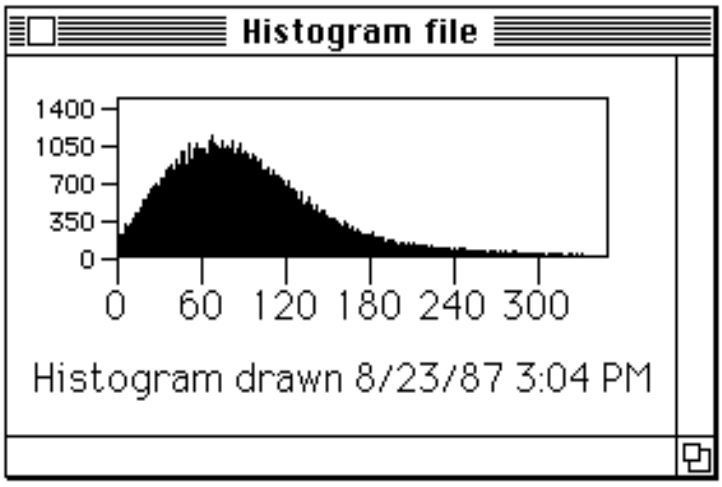
•Stack
This repositions and makes visible all windows so they are neatly stacked.

•*Window List*
All these items correspond to window titles you have on the desk top. Selecting one of them brings that window to the top of the desk top and makes it visible if it is hidden.

Graph Types

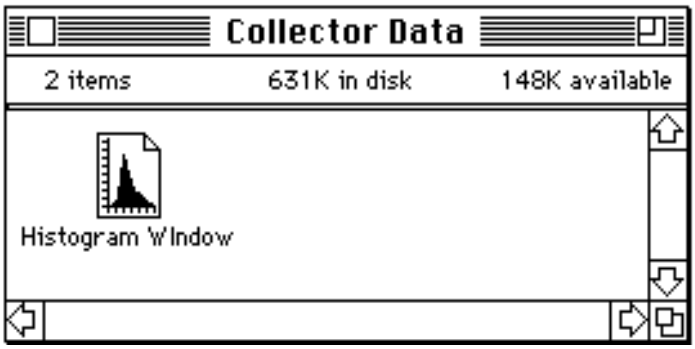
Graphs are contained in windows and are used to display the data the window is collecting. Currently there are two types of graphs; the histogram and the gray scale. More can be added to the program as the need arises. The histogram needs one number, the gray scale needs a pair of numbers. The data that the graph is collecting can be changed by changing the windows type from the Options menu and selecting the Type item. See **Data Types** for more information.

The Histogram Window

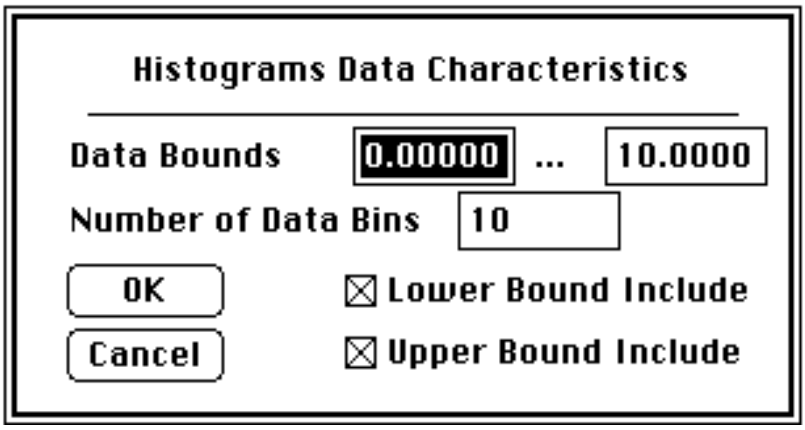


A histogram is a two dimensional graph with a data range on the horizontal axis divided up into bins. Each bin can contain up to 32000 items which is then graphed on the vertical axis as a box with width equal to a bin width and height equal to the number in the bin. The program automatically tacks the date and time onto the title which is drawn below the histogram graph.

The Icon On The Disk



The Histogram Data Options Dialog Box

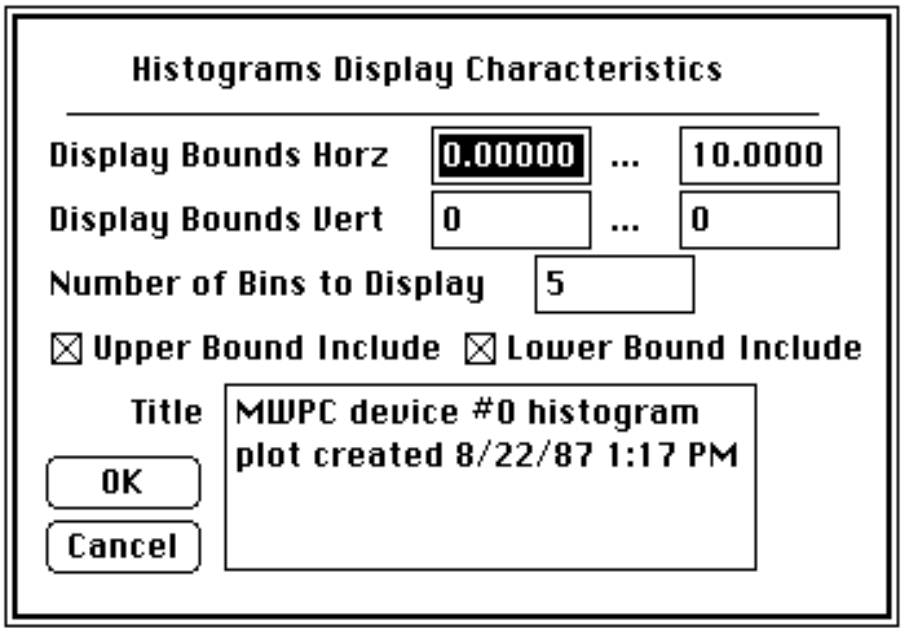


• Data Bounds
This is the range that collected data must fall within to be recorded.

• Number of Data Bins
This is how fine a resolution the data in the histogram has.

• Bound include
Tells the computer to ignore or record values equal to the data range bounds.

The Histogram Display Options Dialog Box



• Display Bounds Horz
The Range of data to be displayed. If you want to draw anything be sure to set it within the data Bounds.

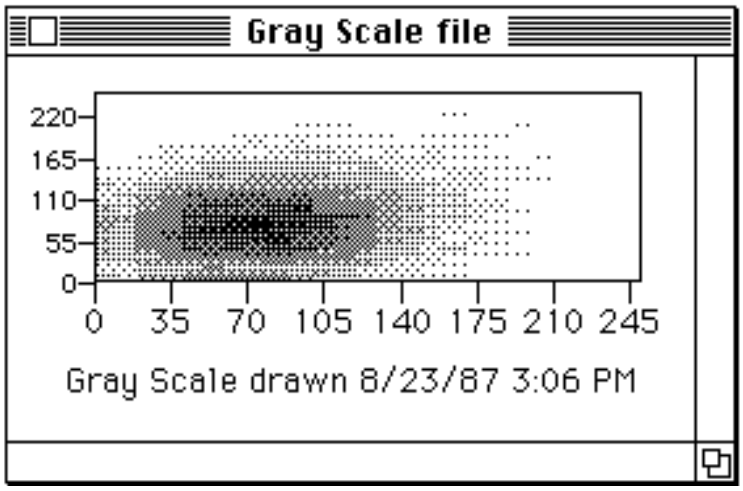
• Display Bounds Vert
If the vertical scale for the display range you are displaying is wrong set this to appropriate values. Setting both to zero invokes auto scaling relative to that maximum number in a bin for the histogram,

• Number of Bins to Display
This refers to the resolution that the program draws the histogram. If it is less than the Number of Data Bins then the graph is only a sample of the data collected. If you are collecting a large amount of data and it takes a long time to draw all the data bins set this to a smaller number. If it is larger than then number of data bins then it will repeat some of the data bins.

• Bound Include
Indicates whether values on the display bounds should be ignored or not.

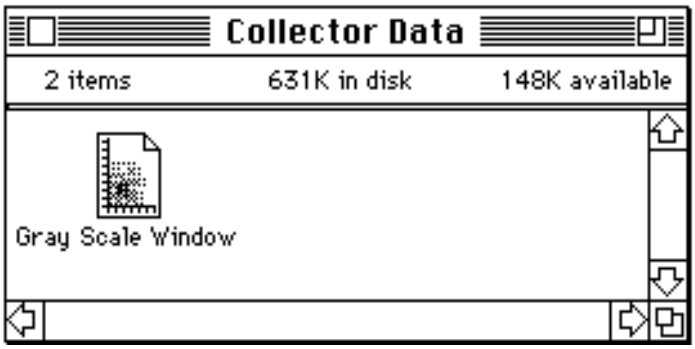
• Title
A line of text that will be printed below the histogram graph. The program always adds the time and date drawn to this line when drawing.

Gray Scale Graph Window

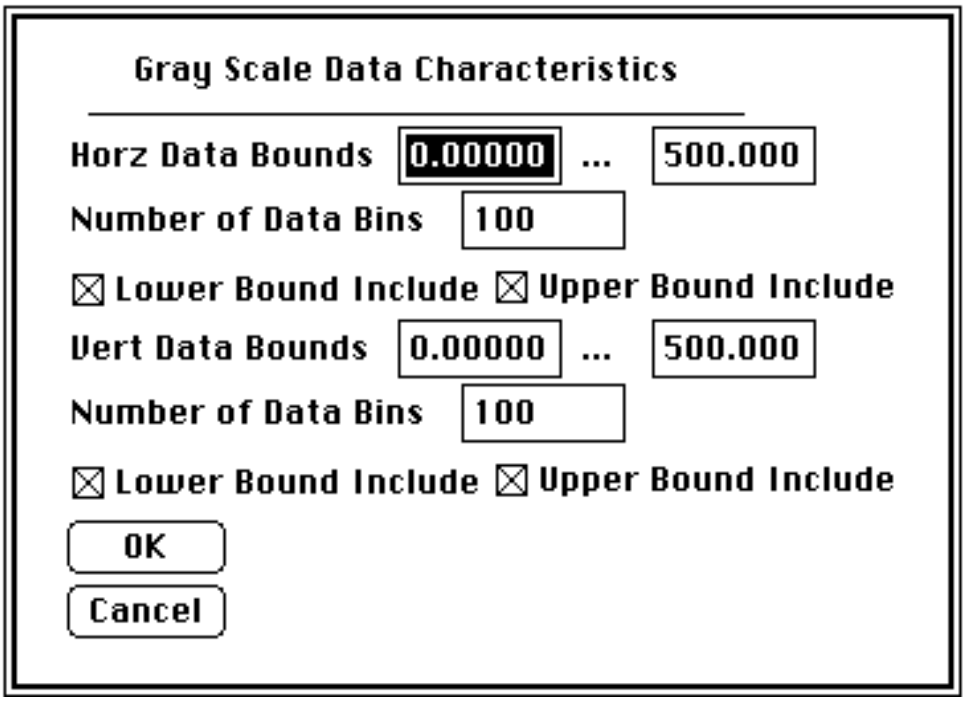


A Gray Scale Graph is a three dimensional graph of a surface with data ranges on the horizontal and vertical axis. This surface is then divided up into square bins each of which can contain up to 32000 items. Each square bin is then graphed as one of sixteen different colored squares. Dark squares corresponds to large numbers and light one small numbers. If a bin's value is outside the display options set range the square will be drawn with one of two diagonal patterns, one for above the other for below the set range.

The Icon On The Disk



The Gray Scale Data Options Dialog Box



• Horz Data Bounds
This is the horizontal range that collected data must fall within to be recorded.

• Number of Data Bins
The resolution of the horizontal data range.

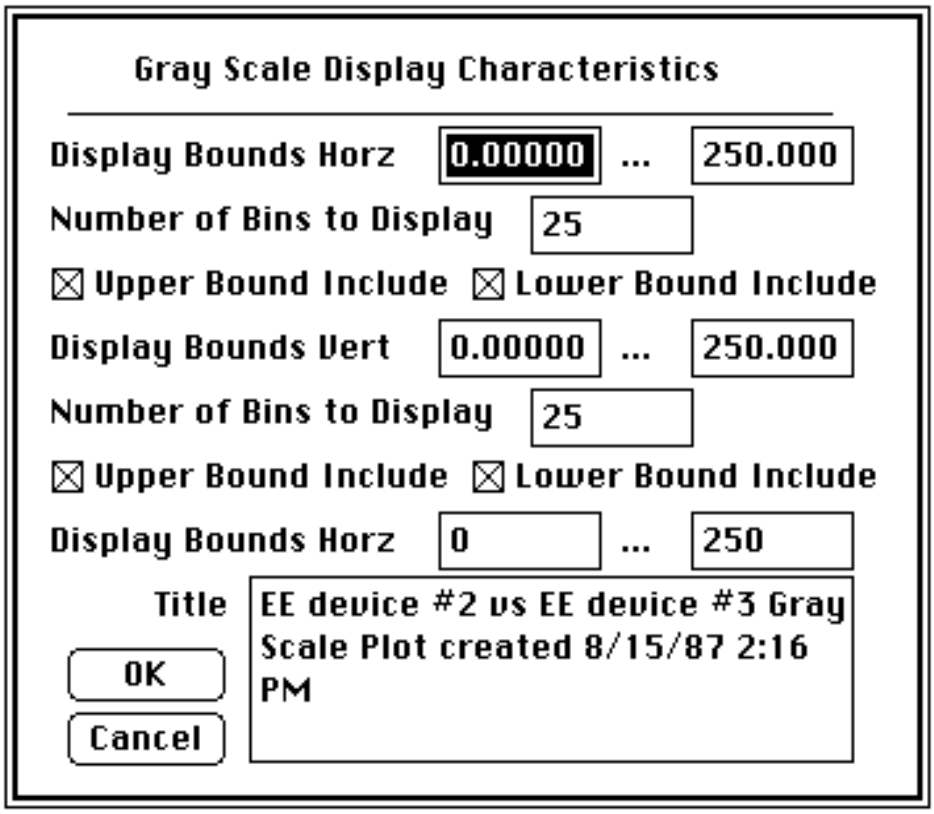
• Bound Include
Indicates whether values falling on the Horizontal data bounds should be recorded.

• Vert Data Bounds
This is the vertical range that collected data must fall within to be recorded.

• Number of Data Bins
The resolution of the vertical data range.

• Bound Include
Indicates whether values falling on the vertical data bounds should be recorded.

The Gray Scale Display Options Dialog Box



• Horz Display Bounds
The horizontal range of data to be displayed. If you want to draw anything be sure to set it within the data Bounds.

• Number of Display Bins
The horizontal resolution that the program draws the histogram. If it is less than the Number of Data Bins then the graph is only a sample of the data collected. If you are collecting a large amount of data and it takes a long time to draw all the data bins, set this to a smaller number. If it is larger than then number of data bins, then it will repeat some of the data bins.

• Bound Include
Indicates whether values on the horizontal display bounds should be ignored or not.

• Vert Display Bounds
The vertical range of data to be displayed. If you want to draw anything be sure to set it within the data Bounds.

• Number of Display Bins

This is the vertical resolution that the program draws the histogram. If it is less than the Number of Data Bins then the graph is only a sample of the data collected. If you are collecting a large amount of data and it takes a long time to draw all the data bins set this to a smaller number. If it is larger than the number of data bins then when the program draws the histogram it will repeat some of the data bins.

• Bound Include

Indicates whether values on the vertical display bounds should be ignored or not.

• Title

A line of text that will be printed below the gray scale graph. The program always adds the time and date drawn to this line when drawing.

Data Types

There are two data versions of this program currently written. One program is for the ADC the other is for the Stack. The ADC has only one decoded data type and only one decoded data number of that type where as the Stack has many types and decoded data numbers of those types. To choose which decoded data goes into which window we have a window type options dialog box that is different for each set of decoded data types.

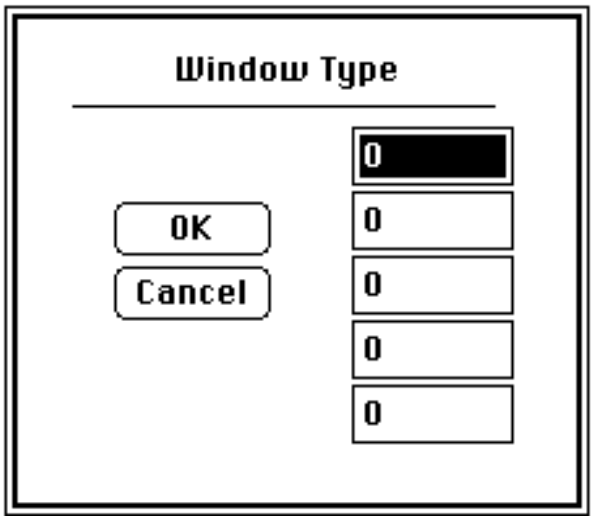
ADC Data Type

Since there is only one decode data type and one decoded data number of that type the only graph usable is the histogram, the gray scale takes two numbers. There is no need to have a window type options dialog box.

Stack Data Types

There are two graphable decoded data types coming from the stack, the MWPC and the EE device decoded data. There are 3 MWPC's and 15 EE devices. See the HEID manual for more information on the raw data types and how to decode them.

Stack window type options dialog box



There are five numbers that can be entered here, this is a description of what they mean.

• Graph type
    0 for histogram graph
    1 for gray scale graph

• Horizontal data type
    0 for MWPC data
    1 for EE device data

• Horizontal data number
    Δ MWPC 1-3
    Δ EE device 1-15

ΔThese only affect gray scale graphs

• Vertical data type
    0 for MWPC data
    1 for EE device data

• Vertical data number
    Δ MWPC 1-3
    Δ EE device 1-15

Data Collection Types

Currently there are three places we collect raw data from; the tape drive, the stack, and the ADC. The Stack and the tape drive have the same decoded data types because the tape drive simply is used for recording the raw data from the Stack for later processing. This means there are three raw data collection routines, they reside in three different programs.