ORTEC®

Renaissance® Operator

Whole-Body Counter Software for Microsoft® Windows® 8.1 Professional, 7 Professional, and XP Professional SP3

RENP-BW

Software User's Manual

Software Version 7.0

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Advanced Measurement Technology, Inc.
("AMT")

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NOTE!

If you are not fully acquainted with the Windows environment, we strongly urge you to visit the Microsoft website as well as familiarize yourself with a few simple applications before proceeding.

The convention used in this manual to represent actual keys pressed is to enclose the key label within angle brackets; for example, **<F1>**. For key combinations, the key labels are joined by a + within the angle brackets; for example, **<Alt + 2>**.

1. INTRODUCTION

This manual contains all the information you will need to run the Renaissance® Operator Whole-Body Counter program ***after setup has been performed in the Renaissance Supervisor program.*** All of the Operator commands, hardware setup, and the integrated quality assurance (QA) operations are discussed.

- Chapter 2 provides complete instructions on starting the Operator program and performing a measurement, including counting a series of subjects, recalibration, and QA.
- Chapter 3 discusses the Operator program user interface.
- Chapter 4 covers the standard Operator reports.
- Chapter 5 is a reference guide to the Operator menu commands.
- Chapter 6 describes QA.
- Chapter 7 discusses the accelerator (shortcut) key functions in Operator.

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2. SUBJECT COUNTING IN OPERATOR

This chapter tells you how to start the Renaissance Operator program and use it to acquire and analyze whole-body-count data. The results are stored as database records and (depending on the setup parameters selected in the Supervisor program) in associated spectrum, analysis, and report files. Renaissance Operator performs all the data acquisition and analysis, can be set to display the resulting report in Windows Notepad or other programs, and can print the report in two different formats. The **Startup** wizard (Section 2.3) assists you in verifying system setup including gain adjustment, sample and background QA, and energy recalibration.

NOTE	Before using Renaissance Operator, ensure that the "Getting Started" tasks in Chapter 3 of the Supervisor user manual have been completed satisfactorily.

Note that the color and fill properties of the spectrum windows are controlled by the **Display/ Preferences** settings in Renaissance Supervisor.

2.1. Starting Renaissance Operator

Before starting Renaissance Operator, make sure that the Supervisor program is closed so that all of the setup options go into effect. Figure 2 shows the Renaissance start menu. To start the Operator program, type `oper` in the "*Search programs and files*" box on the Windows Start panel, then click the **Renaissance Operator** search result. Alternatively, you can open the Windows Start menu and click **Renaissance** and **Renaissance Operator**.

This will start Renaissance Operator and display the login dialog shown in Fig. 1. The name you enter here will be printed on reports generated during this work session. If an operator password has been set in Supervisor, a case-sensitive password field will also be displayed.

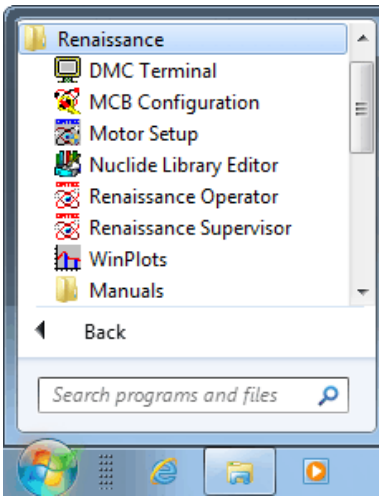

Figure 2. Start Menu.

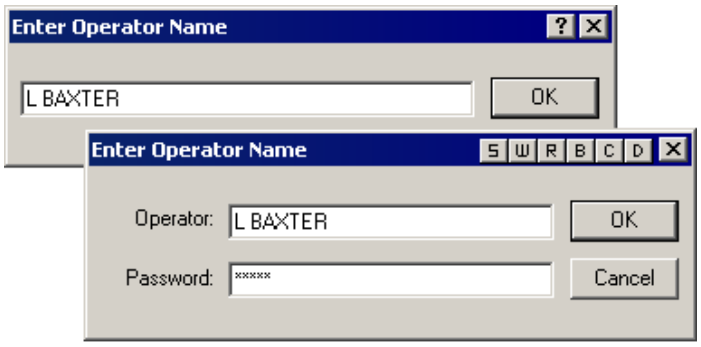

Figure 1. Operator Login.

NOTE To log-in a different operator, wait for all acquisitions and analyses to finish, then close and restart the Operator program.

If you close Operator before the current measurements have been analyzed, *data acquisition will continue to completion, but the analysis will not be performed.* (Should this happen, you can reopen Operator, select the appropriate **Scan Type** and subject, and analyze the configuration in memory [Section 5.3.3] to avoid having to acquire new spectra.)

Figure 3 shows a typical Operator display on startup. In this example, the default **Scan Type** uses two Detectors, which are shown on the left in the **Current Scans** area. For a more detailed discussion of the user interface, see Chapter 3, Display Features.

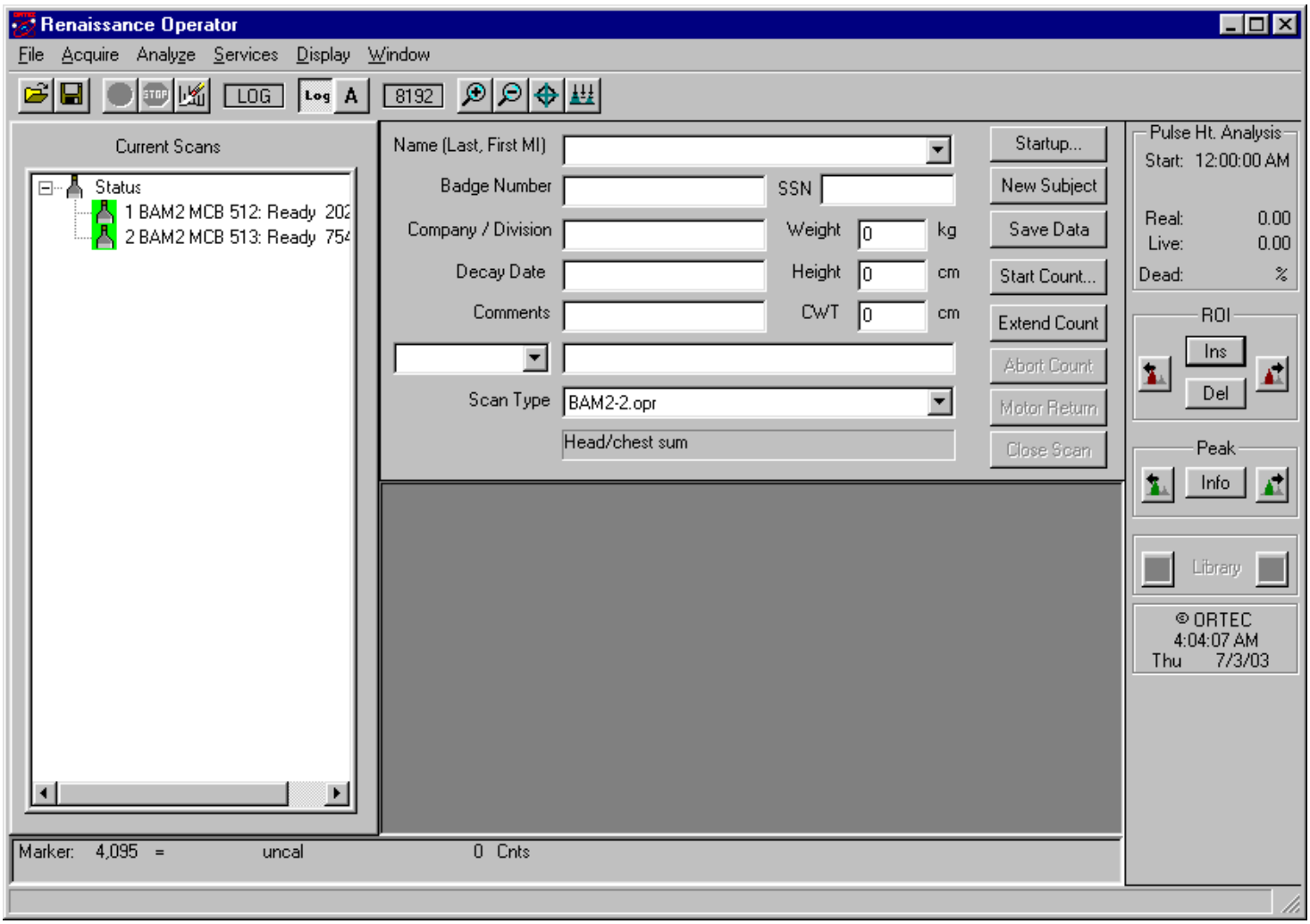

Figure 3. Renaissance Operator Screen After Login.

2.2. Counting Workflow

This section is intended to give you a daily workflow example for counting one or more subjects as efficiently as possible. The instructions here do not include running the **Startup** wizard (Section 2.3), because it is a separate process that may or may not be performed daily.

2.2.1. Counting One Person

To count one subject:

1) Start Renaissance Operator and log in. The opening screen will look similar to Fig. 3. Refer as needed to Chapter 3 for more information on the screen features.

2) Select the **Scan Type** to be used for this measurement. The **Scan Type** droplist contains the list of *scan type* (.OPR) *files* created in Renaissance Supervisor. These parameter sets determine the Detectors and analysis options to be used for scanning a subject.

   The **Status** entry in the Current Scans sidebar will show all the detectors associated with the currently selected **Scan Type**. Double-click a detector entry to display its spectrum window, which will allow you to access the MCB properties, start/stop detectors, etc.

3) At the top center of the display, the *key field* to be entered (either **Name**, **Badge Number**, or **SSN**, as determined by the supervisor; see Section 2.2.4) will be indicated by a droplist button () on the right of the field. In Fig. 3, the **Name** field is the key field.

   - **New Subjects** — To add a new subject to the database, click the **New Subject** button, then enter the information about this person. Duplicate entries are not allowed.

     If the **Key** field is **Name**, you must enter both a first and last name.

     If a **Key** field other than the **Name** is used, be sure to enter a **Name** when counting a subject because the spectrum filenames are based on the subject **Name**. Scan data sets and reports are also recalled by subject **Name**.

     The new subject can be saved using the **Save Data** button. Note that this only saves the subject **Name**, **Badge Number**, and **SSN**. All other fields are only saved when an analysis is performed (whether on a measurement started with the **Start Count** button or on one performed with the **Analyze\Configuration in Memory** command). If you do not use the **Save Data** button, subject data are automatically saved when a count and analysis are completed.

If optional comment categories have been defined (see Section 5.4.6) and you wish to record one or more for this subject, choose the appropriate category from the droplist (located immediately below the **Comment** field name), then enter the text in the field to the right of the list. Select the next comment category and enter its associated text, and so on.

- **Existing Subjects** — For subjects already in the database, click the droplist button for the key field and select the subject from the list. This list contains all entries in the database, ordered alphabetically. If the droplist does not contain the expected entries, the currently selected **Scan Type** might be set up for a different target database (see Step 3). Select the proper **Scan Type**, then reopen the key field list.

4) Enter a **Decay Date**, if applicable. If you enter a date, decay-corrected activities will be calculated even if no correction was specified in the `.SDF` or `.SVD` files associated with the current **Scan Type**. *If you do not enter a date, no correction will be performed.*

5) See Section 2.2.5 for information on using the **CWT** field.

6) When all information has been entered, you are ready to begin acquisition. Once the subject enters the scanner and assumes the proper position for the detector arrangement, click **Start Count**. The preset time specified in the **Scan Type** will be displayed in the Status Sidebar on the right of the screen, the detectors will be cleared, and the count will begin.

   - If the **Scan Type** is set up to analyze summed spectra, a summed spectrum window will be displayed along with an MCS window showing the count rate by detector (see Fig. 26, page 26).

   - For multi-detector groups, a spectrum window will open for each MCB in the group.

   - If using the Motor Control feature, the motor will begin moving as specified by the supervisor. In addition, the MCS spectrum will be displayed, showing the count rate per step. The motor speed will be calculated based on the real time preset set in the **Scan Type** so that the motor reaches its specified **Scan Length** at the time the count is completed.

7) Use the Current Scans Area to monitor the progress of the measurement. The detector icons in this pane indicate the Detector status and input count rate, as well as the number of scans in progress. To open a spectrum window for a particular detector and display its counting presets in the Status Sidebar, double-click its icon. To close the spectrum window click the Close (×) box on its title bar.

NOTE See Section 3.4 for an in-depth discussion of the Current Scans area and the Operator count/analysis/report sequence.

8) A **Maximum Dead Time** alarm can be set in the Supervisor program, with the choice of either (a) automatically terminating the count or (b) giving the operator the choice of continuing or terminating the count. If this alarm has been set and the dead-time threshold is exceeded, a pop-up message will either inform you that the count has been terminated (Fig. 4) or give you the choice of continuing or terminating (Fig. 5).

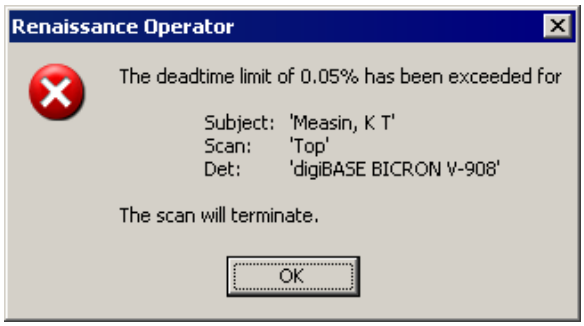

Figure 4. Count Terminated Due to High Dead Time.

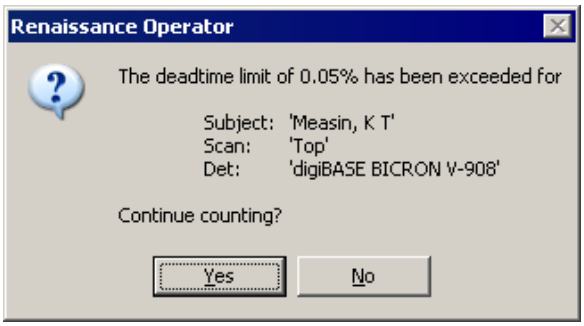

Figure 5. Continue or Terminate?

- If the count is terminated, no analysis will be performed. Refer to your site procedures for further processing of the subject. If using motor control, see Step 12).

- If the count is continued, it will proceed per normal. Go to Step 9).

9) To terminate a count before it has finished, click the **Abort Count** button. A dialog will ask you to select the specific count to be aborted (Fig. 6).

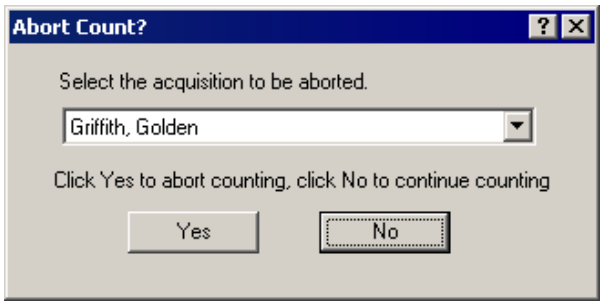

Figure 6. Continue or Terminate?

10) When the counting time has elapsed for each Detector in the group, the status for each Detector will change from **Busy** to **Ready**. Once the analysis is complete, the **Start Count** button will change from gray to black, indicating that it is again active and ready for the next count.

11) Depending on the **Scan Type** settings, Operator will generate one or more reports per subject, which will be displayed in Notepad and/or printed (for examples, see Chapter 4). After reviewing them, close any reports displayed in Notepad or your report display program. If a hardcopy is to be printed, it will begin printing when Notepad closes.

12) If the motor is used for the scan, it will either stop when the scan is complete or automatically return to the **Home** position, as specified in the Motor Setup program. If necessary, click the **Motor Return** button to send the motor back to **Home**.

13) Before allowing the subject to exit, determine if an *extended count* is necessary to improve detection limits or the resolution of questionable peaks. The **Extended Count** button must be active, indicating that an extended count time has been set in the Supervisor program. Have the subject remain in the scanner and click **Extended Count**. If using the Motor Control feature, the motor will return to its home position before the count begins, then move as it would during the initial scan. The preset time in the right-hand Status Sidebar will reflect *the current preset time plus the **Extend** time*. More data will be collected, added to the existing data, reanalyzed, and reported. Note that if a subject is being counted with different detector groups (i.e., under different **Scan Type**s), the correct **Scan Type** and subject must be selected before starting the extended count.

2.2.2. Counting a Series of People in a Single Counting Station

A group of people can be processed in sequence by following the steps above, plus the following.

1) As soon as the first subject's count begins, you can enter the second subject's data. Click the key field droplist to select an existing subject, then complete the remaining fields for the upcoming scan; or click **New Subject** to add a person to the database. If this is a new subject, you can enter the name, badge number, and Social Security Number ahead of time and click the **Save Data** button to retain this information in the database (note that any other information, such as comments and height, *will not be saved until the analysis of this measurement is completed*). Repeat these steps to save the key information, ahead of time, for as many new subjects as you wish.

2) When the first subject's count and analysis (as well as any extended counts and analyses) are completed and all report and subject history windows are closed, the **Start Count** button will switch from gray (disabled) to black (enabled).

3) When the first subject exits the scanner and the second subject enters, click **Start Count**.

4) While the second subject is being counted and the first subject's report is being displayed or printed, complete the scan information for the third subject, and so on.

2.2.3. Using More Than One Counting Station at a Time

If you have two or more counting stations — for example, a StandFast® II and a motorized bed — Renaissance Operator allows you to count multiple subjects simultaneously.

1) As soon as the first subject's count begins, select the **Scan Type** that controls the second subject's detector group. If this detector group is not busy, the **Start Count** button will activate and you can begin the measurement immediately.

2) Enter the second subject's data, then click **Start Count**. Use the Current Scans area to track the subjects and detectors in use.

3) Repeat this process for all available counting stations as desired.

2.2.4. What is the Key Field?

Figure 7. SSN as Key Field.

The supervisor uses the **Services/Operator Scan Type...** feature in Renaissance Supervisor to designate whether **Name**, **Badge Number**, or **SSN** will be the primary or key entry by which subject records will be stored in the database. This key must be unique in the database, that is, if **Name** is specified as the key field, *there can be only one entry of a particular name in the database.* For example, if Smith, Jane A. is in the database, no other Smith, Jane A. can be entered in that database. Similarly, if **Badge Number** or **SSN** is the key, that number cannot be entered again as belonging to a new subject. The key field will be the only one of the three that behaves as a droplist, and will have the standard droplist arrow on the right side; Fig. 7 shows **SSN** as the key field. Once a person's key entry has been entered in the database, her/his entry will be available for selection from the key field.

NOTE When you select a name from the list, verify that the badge and social security numbers are correct. This is especially important for people with similar names.

2.2.5. The Chest Wall Thickness (CWT) Correction

The **CWT** correction is only applied to activity results if the Chest Wall Attenuation option is enabled for the current **Scan Type**.

- If enabled, **CWT** is automatically calculated, based on the formula specified in the **Scan Type**, when the **Height** and **Weight** entries are changed.

- To manually override the calculated **CWT** value, enter a value in this field before starting the scan.

Note that if the CWT attenuation correction has not been turned on for this scan type, the **CWT** field will be disabled and set to zero. No attenuation correction will be applied.

2.2.6. Filenaming Conventions

The filename format for individual spectra and their corresponding reports and analysis files is:

[Scan Type][Subject Name] [Detector Desc] [File Prefix] [Seq No]

where:

Scan Type	=	defined on the Scan Settings page of the Scan Type Wizard.
Subject Name	=	the full subject name from the Operator program.
Detector Desc	=	the Detector **Description** as defined in the MCB Configuration program.
File Prefix	=	defined in the Acquisition Settings dialog (Section ?).
Seq No	=	the **Save File #** defined in the Acquisition Settings dialog.

The format for summed spectra and their corresponding reports and analysis files is:

RenSum [Subject Name] [Detector Group] [File Prefix] [Seq No]

where:

Subject Name	=	the full subject name from the Operator program.
Detector Group	=	defined on the Scan Settings page of the Scan Type Wizard.
File Prefix	=	defined in the Acquisition Settings dialog (Section ?).
Seq No	=	the **Save File #** defined in the Acquisition Settings dialog.

2.3. Startup

The **Startup** button opens the Startup Wizard (Fig. 8), which guides you through routine operations that should be performed periodically to ensure that the system is ready for subject counts. The tasks that can be performed here are preset in the Supervisor program with the **Services/ Operator Permissions...** command.

On initial use of the Operator program, all active tasks will be checkmarked and show a **Pending** status.

Tasks that have been inactivated in Supervisor will be disabled (gray) with a **Skipped** status, and the Startup Wizard will not display a dialog for them.

To skip an active task, unmark its checkbox. Its status will change to **Skipped**, and the Startup Wizard will not display a dialog for that operation. Any active tasks you unmark will remain unmarked until you mark them. Exiting the Operator program does not reset them.

After you have chosen the active tasks to perform, click **Continue** to begin the first task. After each task is completed, the Startup Wizard dialog will be displayed again with a **Completed** status. Click **Continue** to perform the next checkmarked task.

To stop the process at any time, click **Cancel**. Any tasks that have not been completed will not be performed.

At the end of the procedure, the Startup Wizard will open one last time, showing the final disposition of each task. Click **Continue** to close the wizard.

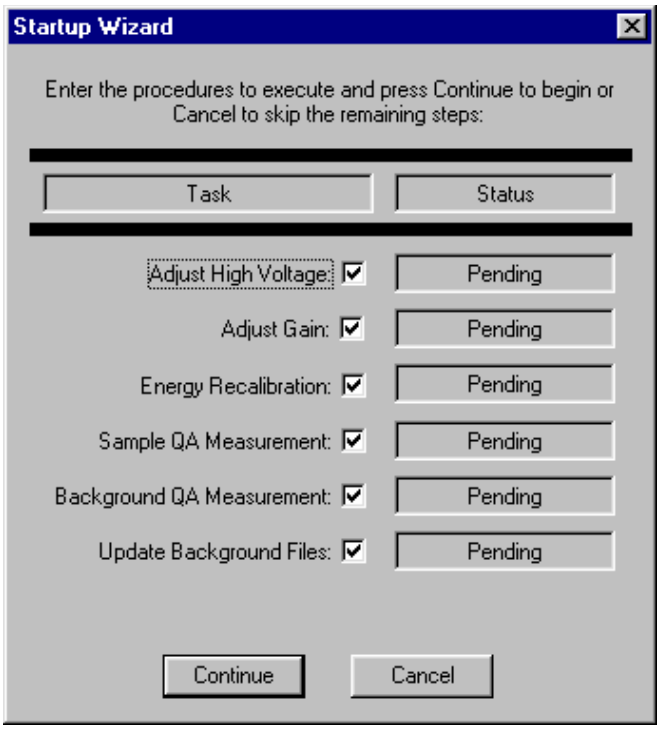

Figure 8. Startup Tasks.

2.3.1. Adjust High Voltage

This task lets you turn on, turn off, or adjust the high voltage for all Detectors in the **Detector Group** specified for the current **Scan Type**. The first dialog in this task (Fig. 9) will display the current HV settings for the Detector(s).

If the HV is on and the current settings are satisfactory, leave the **On** radio button marked and click **OK**.

To turn off the HV, mark the **Off** button and click **OK**.

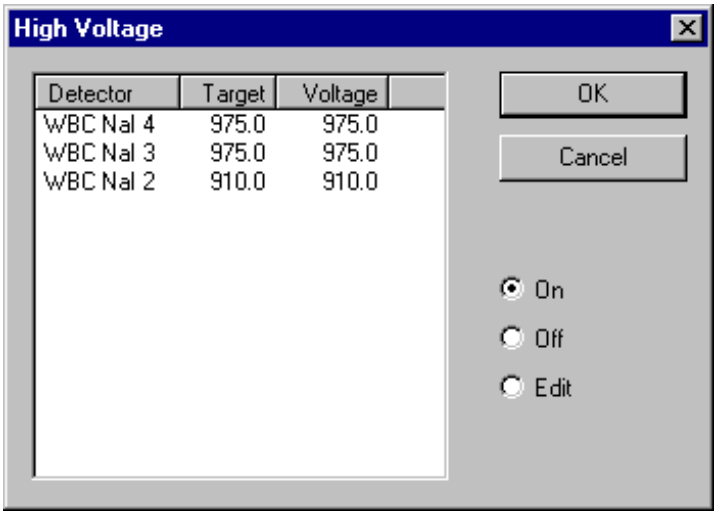

Figure 9. High Voltage Settings for the Current Detector Group.

To adjust the HV for one or more MCBs, mark the **Edit** button and click **OK**. This will open the High Voltage property page for the first Detector (Fig. 10). The details of the dialog will depend on the MCB, and are explained in Section 5.2.3 and the MCB Properties Manual. Adjust the high voltage as needed, then click **Close** to continue the startup. In a multi-detector system, this dialog will be displayed in sequence for each detector in the group.

After the HV setup for all Detectors is completed, click **Close**. The Startup Wizard dialog will be displayed again with the **Status** changed to **Complete**. Click **Continue** to perform the next task. Click **Cancel** to stop the startup at this point; the remaining steps will not be performed.

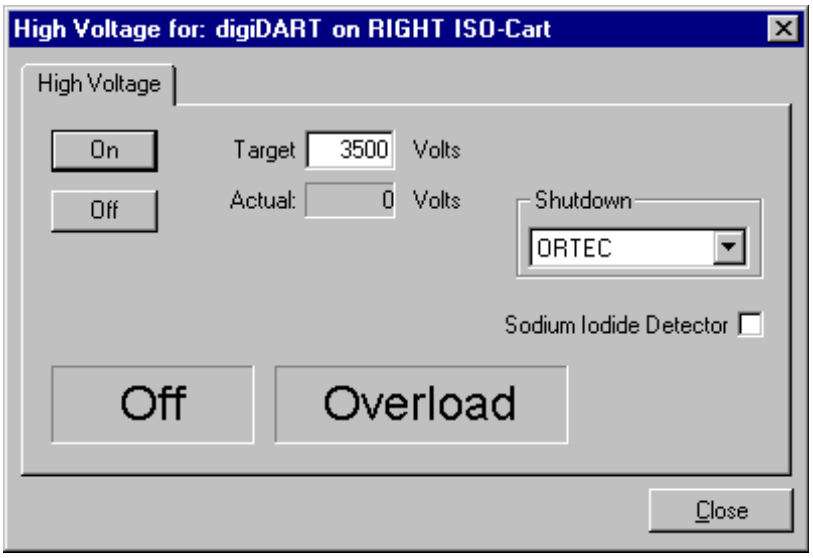

Figure 10. The High Voltage Tab.

2.3.2. Adjust Gain

This option starts the **Gain Adjust** wizard, which is available for NaI detectors only. It performs an automatic gain adjustment for each detector in the group based on a specified ROI. The change is made by acquiring spectra for a source that has the desired peak energy.

NOTE Because all detectors will be aligned on the same ROI peak, alignment should be relatively close for each detector before starting the wizard. In some cases, it might be necessary to adjust the gain manually before using this wizard. Peak alignment is very important when analyzing summed spectra because peak counts are added channel by channel.

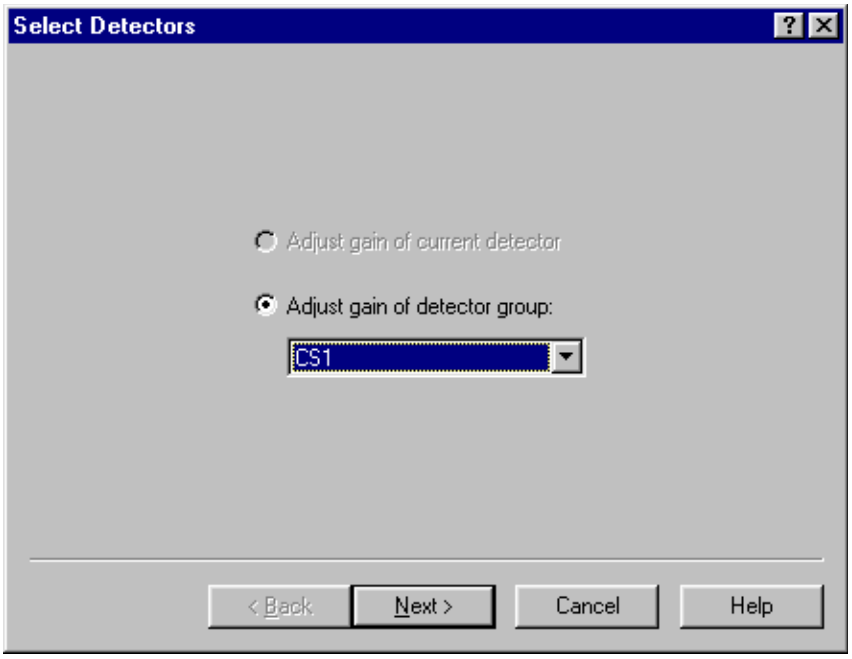

Figure 11. Set Up the Gain Adjust for the Current Detector Group.

The first dialog for the wizard is shown in Fig. 11. Select the current detector or pick a Detector group from the droplist a group, then click **Next**.

The next wizard screen is shown in Fig 12. In this dialog, enter the peak **Center** channel and tolerance. The peak must be within the channel limits defined in the **ROI Low** and **ROI High** values. The ROI need not be marked in the Detector. You can enter a wide range to ensure that the peak will be located. ***The region must contain only one peak.***

Click **Next**.

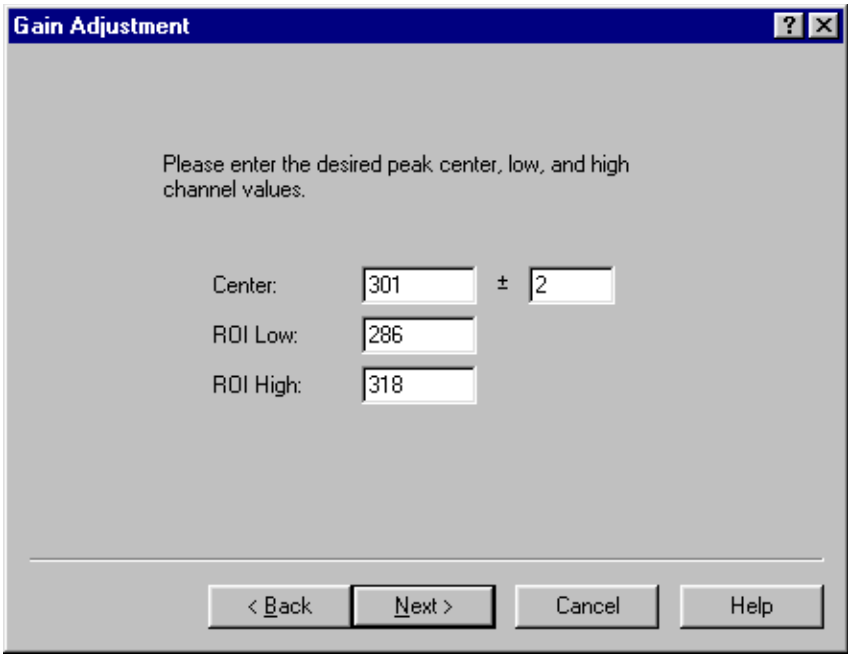

Figure 12. Enter the Center Channel , Tolerance, and ROI Limits.

Figure 13 shows the next wizard dialog. This screen displays the list of Detectors to be adjusted. The current fine gain for each Detector is displayed. Now click the **Adjust Gain** button; a dialog will remind you to position the source(s) and click **OK**. Renaissance Operator will acquire data and periodically attempt a peak fit.

While the new spectrum is being acquired and the gain adjusted, the **Status** for this operation will be listed as **Acquiring**. Note that this process can take several minutes.

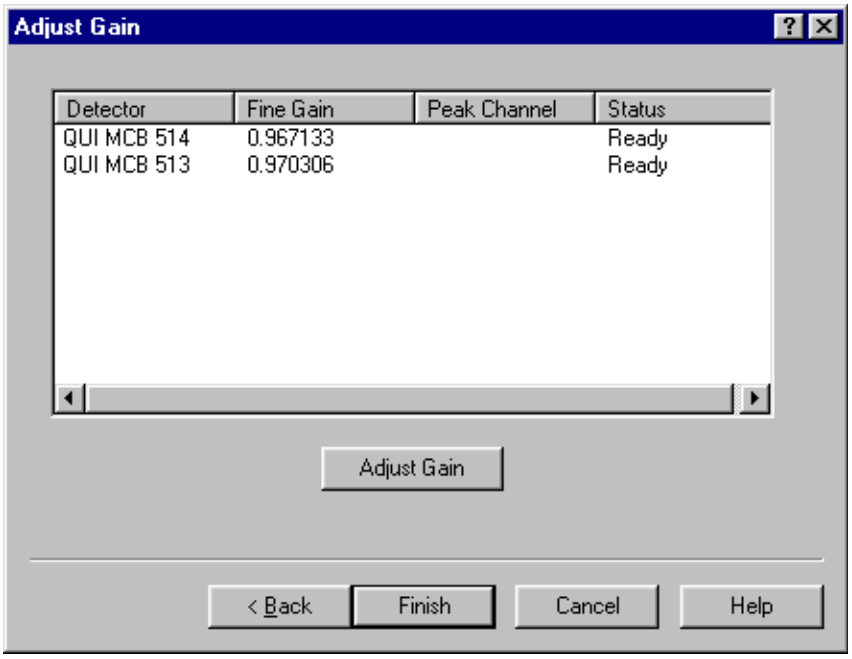

Figure 13. Detectors to be Adjusted.

When the adjustment is finished, the **Status** will return to **Ready** and the new fine gain will be displayed, as shown in Fig. 14.

Click **Finish** to complete the process.

If the gain adjustment does not succeed, (1) check the ROI to make sure the peak falls within it, then (2) check the FWHM calibration. To view the spectrum and ROI, go to the Current Scans area and double-click the entry for the Detector being adjusted. This will open the corresponding spectrum window.

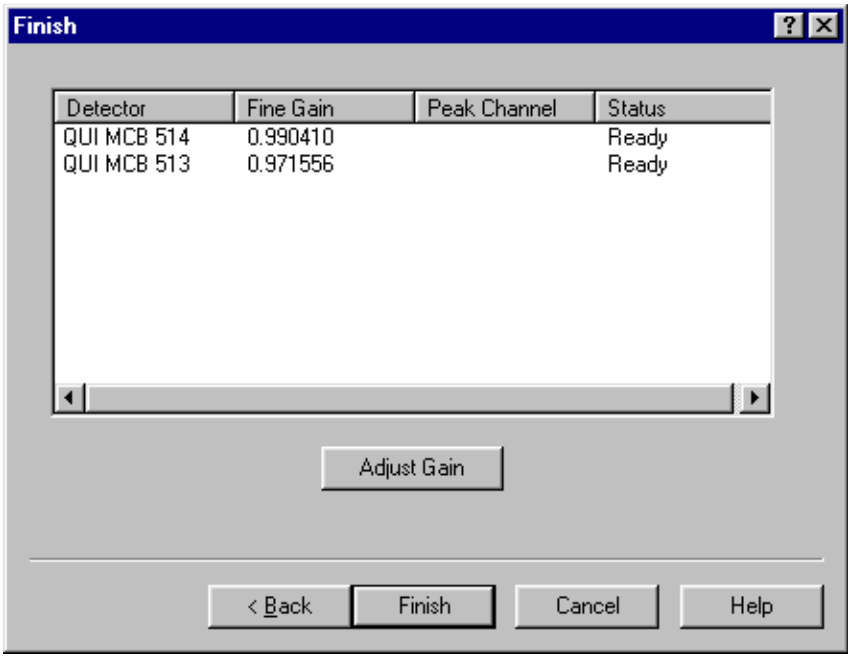

Figure 14. Gain Adjust Complete (note the new fine gain values).

At the end of this process, the Startup Wizard dialog will be displayed again with the **Status** changed to **Complete**. Click **Continue** to perform the next task. Click **Cancel** to stop the startup at this point; the remaining steps will not be performed.

2.3.3. Energy Recalibration

This command lets you simultaneously recalibrate all Detectors in the currently selected **Scan Type**.

You can also recalibrate at any time during the worksession using the **Services/Recalibrate Energy...** command.

NOTE This operation generates and applies a new energy calibration to each MCB in the group. However, the new calibration will only be used for the analysis if the analysis options (.SDF/.SVD) file(s) for the

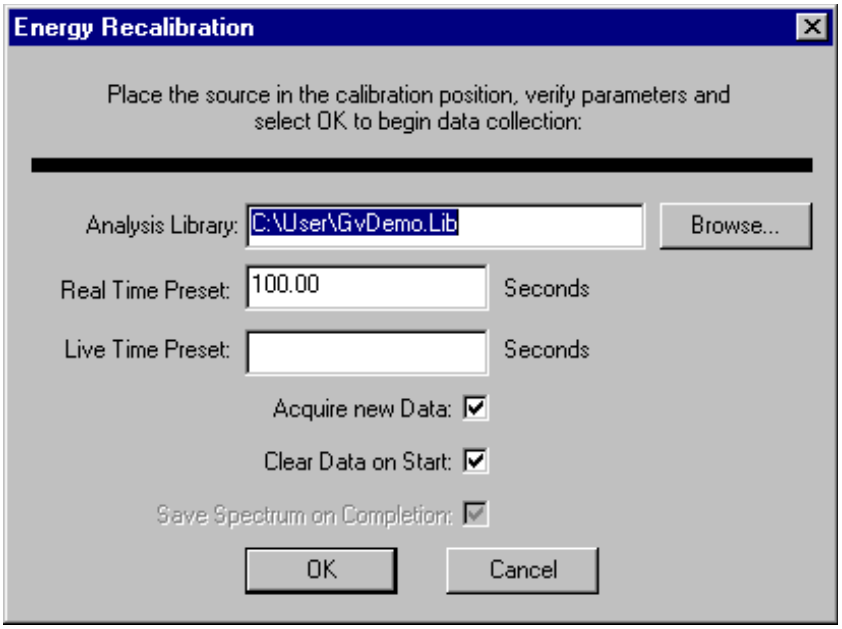

Figure 15. Start the Energy Recalibration.

current **Scan Type** is set to use a Detector's **Internal** calibration.[1] If the analysis options file(s) instead calls for a specific calibration file, that calibration will always be used. Use the **Adjust Gain** feature if QA indicates a poor energy alignment or as a preventive measure to ensure a successful QA measurement.

The recalibration procedure modifies the internal energy calibration coefficients for each detector, based on the **Analysis Library** specified in the dialog (Fig. 15). If you do not specify an **Analysis Library**, the current internal library (the library most recently loaded within the Supervisor program) will be used.

- Note that the library used for sample analysis might contain too many gamma rays for the recalibration feature to work properly.

- For NaI detectors, the calibration library should contain all of the peaks in the calibration source and nothing else. You will have to collect a calibration spectrum; the background does not generate enough clean peaks.

- For Ge detectors, the calibration library should contain all of the peaks in the calibration source and nothing else. You can use the background isotopes as a calibration source if they are strong enough. It is important that you use enough peaks; if you try to recalibrate with 3 or 4 peaks, the operation will likely fail.

If the counting uncertainties on the peaks are adequate for proper peak identification, it might not be necessary to collect new data.

Set the **Real Time** or **Live Time Preset** to count for a period long enough to have about 10000 counts in the peak areas.[2] For best results, the dead time should not exceed 15%, so either preset can be used.

If the spectrum in the Detector is valid for this source, it can be used as is; otherwise, you can add more counts to it. To keep the existing data, unmark the **Clear Data on Start** box. To add data to it (that is, to count for more time), unmark the **Clear Data on Start** box and mark **Acquire new Data**.

[1]As noted in the Supervisor manual, **Internal** calibration should only be enabled when a single geometry is used for all detectors for QA and subject measurements and the **Analyze Sum of Spectra** method is not employed. This is because the internal calibration is overwritten when using a calibration override file for analysis.

[2]The presets in the scan type files (or their component analysis options files) are not used.

The **Save Spectrum on Completion** option is marked an disabled to ensure that the calibration spectrum is always saved. The file format is:

CAL [File Prefix] [Sequence Number].SPC

where **File Prefix** has been established in the Supervisor program (**Acquire/ Acquisition Settings...**) and where **Sequence Number** is a unique, 8-digit sequence number associated with the detector. Note that this sequence number is also shared with spectra generated during subject counts.

When the entries are complete, click **OK**. Recalibration will proceed according to the entries made here, and the results will be stored with each Detector in the group. If the operation is successful, no status message will be displayed. If recalibration fails, a warning message will be displayed.

When recalibration is completed, the Startup Wizard dialog will be displayed again with the **Status** changed to **Complete**. Click **Continue** to perform the next task. Click **Cancel** to stop the startup at this point; the remaining steps will not be performed.

2.3.4. Sample QA Measurement

This command performs a QA sample measurement simultaneously for all Detectors in the currently selected **Scan Type** to verify that the system is operating properly. This data acquisition requires a QA source. For a multi-detector system, multiple sources are required or the detectors must be arranged so that they all “see” the QA source during the spectrum collection.

The analysis options (.SVD/.SDF) file for each Detector in the **Scan Type** determines the acquisition presets and spectrum analysis.

The results are stored in the QA database according to the Quality Assurance Settings for each Detector. Spectrum filenames use the format:

[QA File Prefix] [Detector Description] [QA File Sequence]

where the QA File Prefix and QA File Sequence number are established in each Detector’s Quality Assurance Settings dialog and the Detector Description is the description created in the MCB Configuration program.

Before beginning this test, select the **Scan Type** for QA measurements (created by the supervisor) from the droplist.

Figure 16 shows the Sample Measurements dialog.

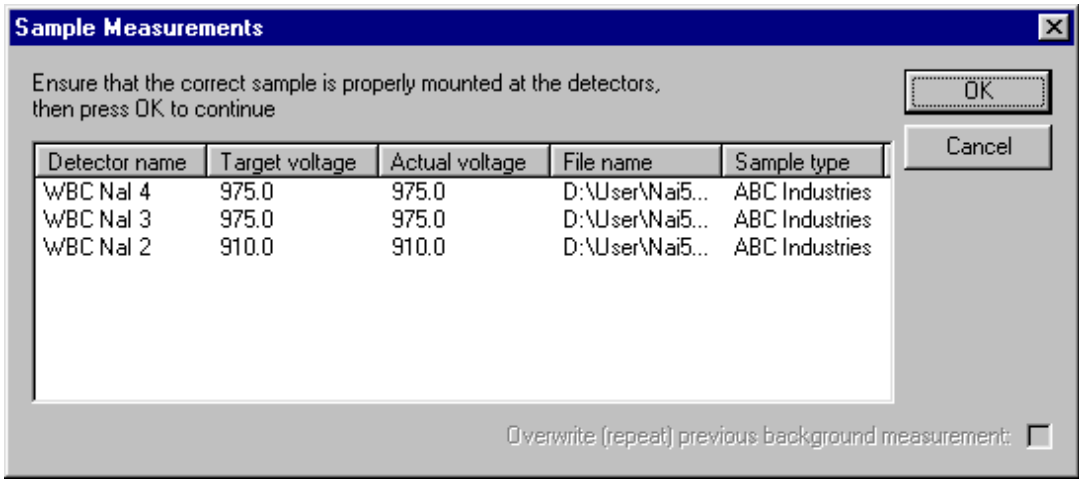

Figure 16. Starting Sample QA Measurement.

If the previous measurement was "bad" and can be corrected easily, you can replace the bad data point by clicking on the **Overwrite (repeat) previous background measurement** box, then repeating the measurement.

Click **OK** to begin the measurement. If Motor Control is enabled, the motor will move during the measurement.

When the acquisition and analysis are complete, the results will be displayed as shown in Fig. 17.

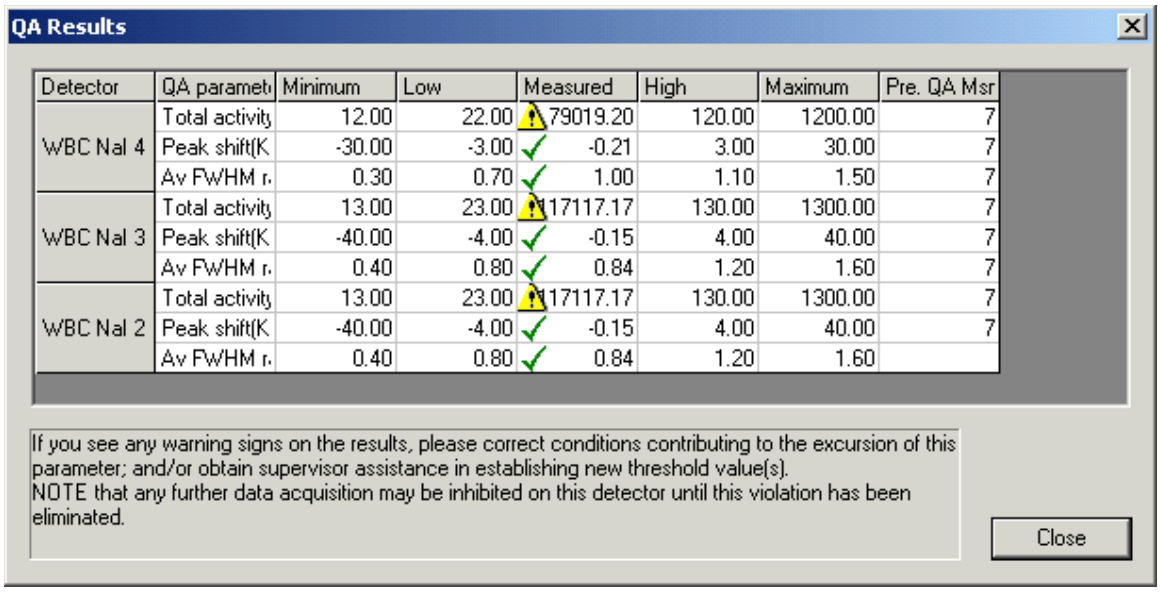

Figure 17. Sample QA Results.

Results within limits will be marked with a green checkmark (✓); those outside the warning or alarm limits will be marked with a caution flag (⚠). If any measurements are outside the warning or alarm limits, you can cancel the remainder of the Startup Wizard, correct the problem, then re-run **Startup** to complete this and any remaining tasks.

Click **Close**. The Startup Wizard dialog will be displayed again with the Status updated to show the completion. Click **Continue** to perform the next test. Click **Cancel** to stop the startup at this point; the remaining steps will not be performed.

2.3.5. Background QA Measurement

This command performs the background QA measurement simultaneously for all Detectors in the currently selected **Scan Type**. (This is not the PBC background described in Section 2.3.6.) The results are stored in the QA database. Spectrum filenames use the format

[QA File Prefix] [Detector Description] [QA File Sequence]

where the QA File Prefix and QA File Sequence number are established in each Detector's Quality Assurance Settings dialog and the Detector Description is the description created in the MCB Configuration program.

Figure 18 shows the Background Measurements dialog. The count presets are determined by the background QA **Real Time** or **Live Time** entries in each detector's Quality Assurance Settings dialog (**QA/Settings...**). Any presets in the scan type file (or its component analysis options file[s]) are ignored.

Before beginning this test, select the **Scan Type** for QA background (created by the supervisor) from the droplist. If a "bad" measurement has been made and can be corrected easily, you can replace the bad data point by clicking on the **Overwrite (repeat) previous background measurement** box, then repeating the measurement. If a sample QA has been run since the background QA, the previous background run cannot be overwritten.

Make sure all sources have been removed from all Detector(s), then click **OK**. If Motor Control is enabled, the motor will move during the measurement.

When the acquisition and analysis are complete, the results will be displayed as shown in Fig. 19. Results within limits will be marked with a green checkmark (✓); those outside the warning or alarm limits will be marked with a caution flag (⚠). If any measurements are outside the warning or alarm limits, you can cancel the remainder of the Startup Wizard, correct the problem, then re-run the startup to complete this and any remaining tasks.

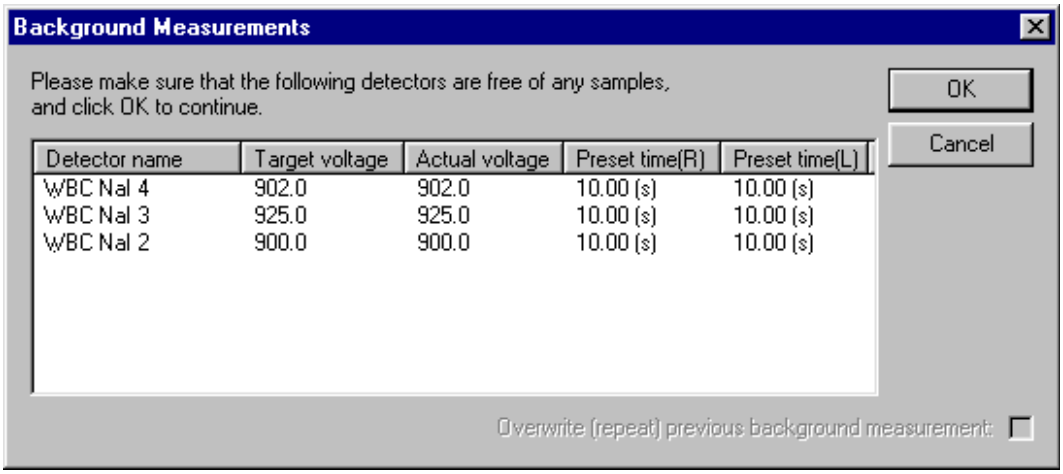

Figure 18. Begin Count for Background QA.

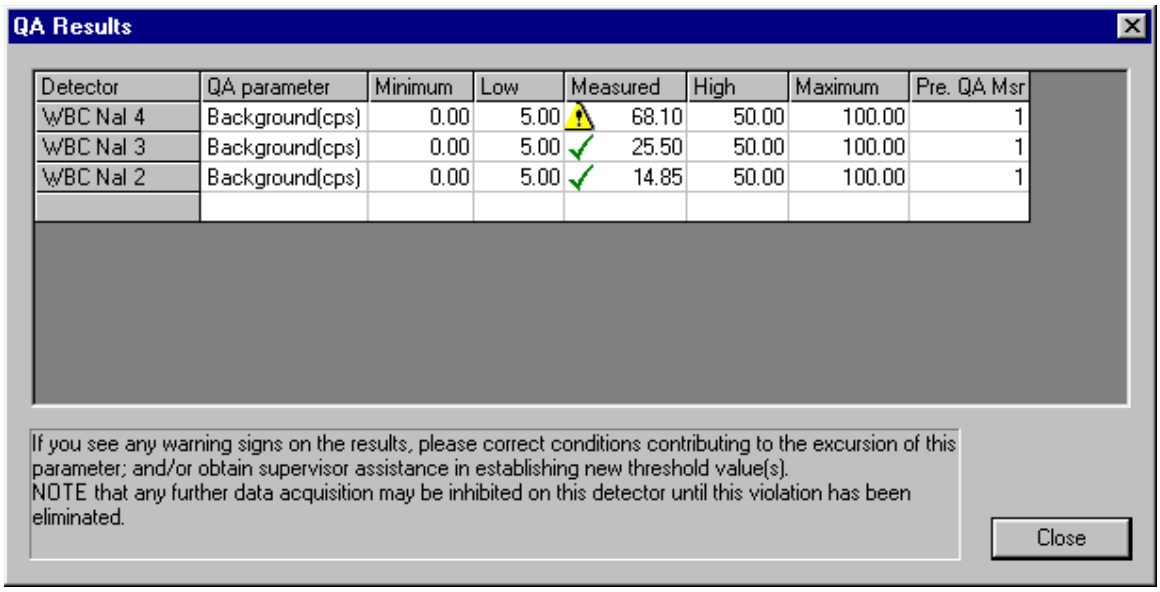

Figure 19. Background Measurement Results (showing two measurements within limits and one warning).

Click **Close**. The Startup Wizard dialog will be displayed again with the Status updated to show the completion. Click **Continue** to perform the next test. Click **Cancel** to stop the startup at this point; the remaining steps will not be performed.

2.3.6. Update Background Files

This starts the background (PBC) wizard, which simultaneously collects the background spectrum for each Detector in the currently selected **Scan Type**, analyzes each spectrum, and creates the corresponding .PBC file. The .PBC files are created from the count rate for library peaks stored in the .UFO file after an analysis is performed, and the peaks stored in the .UFO file are

peak background corrected if the background correction feature is turned on in the analysis options file.

NOTE *Be sure to use a **Scan Type** for which the PBC correction in the analysis options file is **off.***

While the updated background file will be stored with its respective Detector, it will only be used in the analysis if the analysis options (.SDF/.SVD) file(s) for the current **Scan Type** is set to use a Detector's **Internal** background file. If the analysis options file(s) calls instead for a specific .PBC file, the PBC table in that file will always be used.

When this function begins, the dialog shown in Fig. 20 will ask whether you wish to **Recall** an existing .PBC file or **Create** a new one.

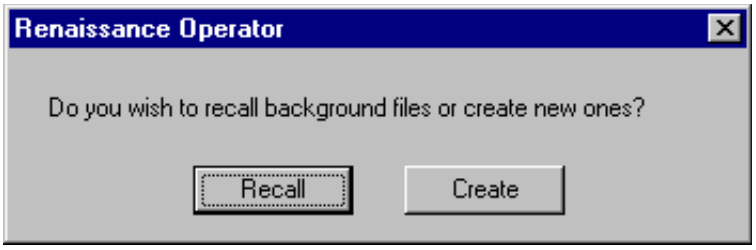

Figure 20. Create PBC Files.

If you choose **Recall**, a standard file-open dialog will allow you to select the desired file. The dialog will be labeled with the detector description or detector group name to indicate the association with the PBC file being selected. This will complete the update procedure and Renaissance will return you to the Startup Wizard dialog. Go to Section 2.3.7.

If you choose **Create**, the Create PBC Files dialog (Fig. 21), will open.

Enter the library to be used for spectrum analysis. This will normally be a library of background nuclides.

If you do not specify an **Analysis Library**, the current internal library (the library most recently loaded within the Supervisor program) will be used.

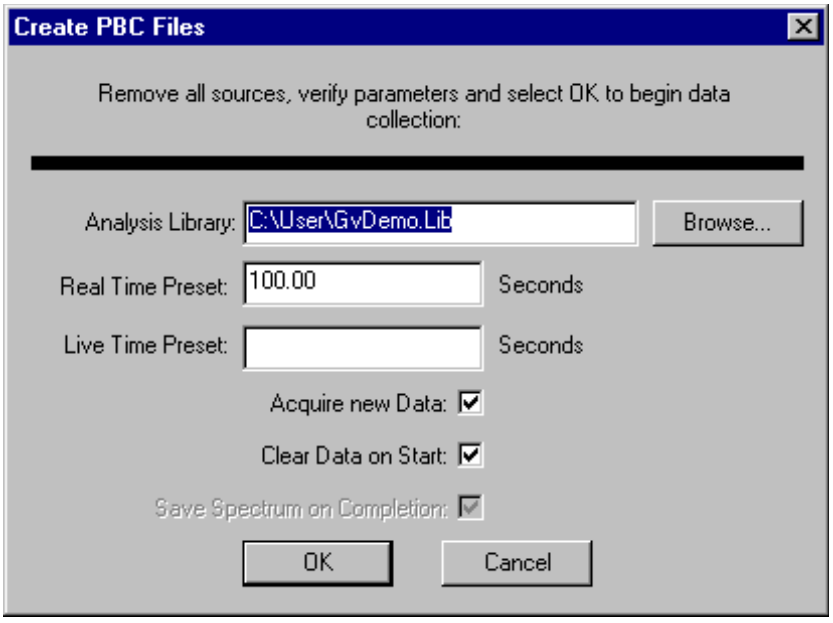

Figure 21. Create PBC Files.

Enter the **Real** or **Live Time Preset**.[3] The count rate in background situations is normally low, so either preset can be used. Note that the real-time and live-time preset fields reflect *the total data collection time, not just the additional time*. If the presets you enter here are less than or equal to the actual count time for existing data, no new data will be added to the spectrum.

The **Acquire new Data** and **Clear Data on Start** checkboxes are used to control the data acquisition in the MCB. If the MCB contains a good spectrum and no more data are needed, unmark both boxes. This will inactivate the counting presets and use the current spectrum in the MCB instead of newly collected data.

NOTE If you will be creating .PBC files for a detector group that uses a motor, note that the motor does not move during data acquisitions for .PBC file creation. We recommend that you collect the spectra by selecting the **Scan Type** for background QA measurements for the desired detector group. Afterward, return here, choose to **Create** new background files, and unmark both the **Acquire new Data** and **Clear Data on Start** checkboxes.

To keep the existing spectrum and add more data to it before creating the PBC table, mark the **Acquire new Data** checkbox and unmark **Clear Data on Start**. The counting presets entered here will be used for the additional data collection.

To clear the MCB and collect a new spectrum for the preset time, mark both **Acquire new Data** and **Clear Data on Start**.

The **Save Spectrum on Completion** option is marked and disabled to ensure that the calibration spectrum is always saved. The filename will use the format:

[Detector Description] PBC [Sequence Number].Spc

where **Detector Description** is the one defined with the MCB Configuration program and **Sequence Number** is a unique, 8-digit sequence number associated with the detector. Note that this sequence number is also shared with spectra generated during subject counts.

If the **Scan Type** calls for analyzing the sum of spectra, one spectrum for the group and its corresponding .PBC file will be saved using the filename format:

PBC [Detector Group] [File Prefix] [Sequence Number]

[3]The presets in the scan type files (or their component analysis options files) are not used for this operation.

where the **Detector Group** name is defined in the Supervisor Scan Type Wizard, **File Prefix** is defined in the Supervisor Acquisition Settings, **Sequence Number** is a unique, 8-digit sequence number for files generated in buffer windows.

Prepare the detector, remove all sources, and click **OK** to start acquisition.

The Current Scans area will show an entry for **Background files...** while the count is underway. After the spectra are acquired, the `.PBC` files will be created and a message box will indicate that the operation is complete.

At the end of the procedure, the Startup Wizard dialog will be displayed again with the Status updated to show the completion. Click **Continue** to perform the next test. Click **Cancel** to stop the startup at this point; the remaining step will not be performed.

2.3.7. Finishing Startup

After the Preset setup is completed, the Start up Wizard dialog will be displayed for the final time (Fig. 22) with the status for each step changed to **Completed** or **Skipped**. Click on **Continue** to end startup.

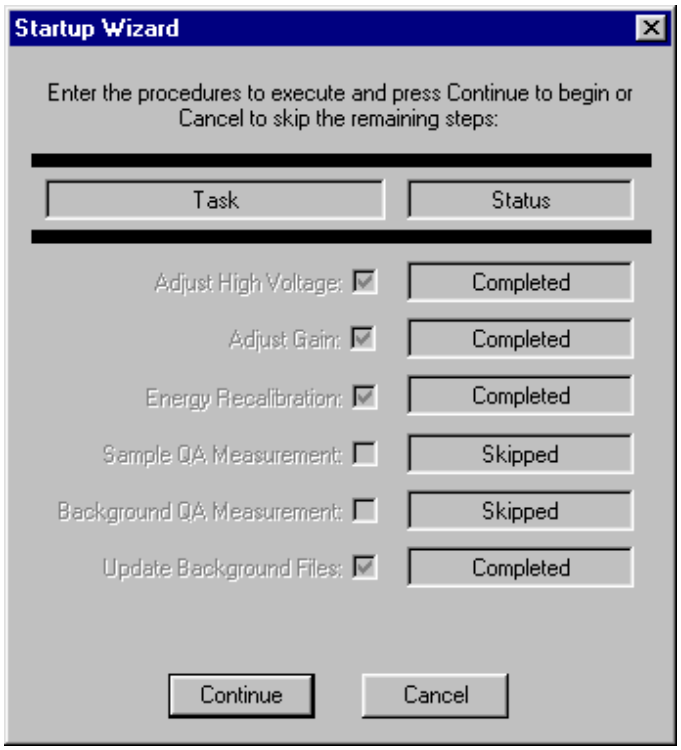

Figure 22. Startup Completed (note tasks that have been completed or skipped).

2.4. If Analysis Is Interrupted Before Completion

If a power failure or other unexpected program termination occurs *after data acquisition is started but before analysis is completed*, you might be able to recover the scan and analyze it. If the Detectors in the group still contain the spectra for the subject whose count was interrupted, restart Operator, go to the Scan Control Area, select the **Scan Type** and the subject whose scan was being analyzed when the interruption occurred, and re-enter the appropriate information for the scan. Now select **Analyze/Configuration in Memory...**. Analysis and reporting will take place as specified for the scan type.

If data acquisition was interrupted, you will need to re-count the subject.

2.5. Warning Messages During the Count

On MCBs with state-of-health monitoring, such as the digiDART, a warning message similar to Fig. 23 may be displayed when the system is first operated. This is a normal condition when the power has been off. Click **Yes** to ignore the message. (To view the state-of-health status for the Detector, select **Acquire/ MCB Properties...** and click the Status tab.)

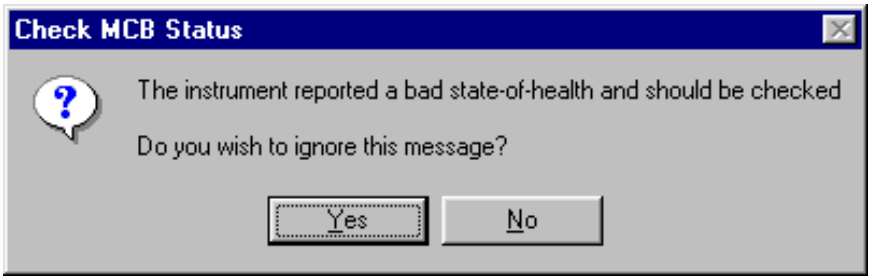

Figure 23. State-of-Health Warning from digiDART.

If the analysis parameters have not been set in the Supervisor program, the message in Fig. 24 will be displayed. Close the Operator program and run the Supervisor program to set up the analysis parameters correctly.

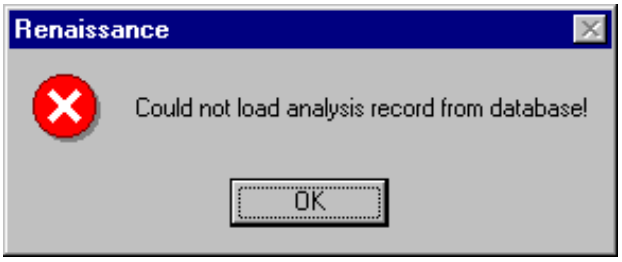

Figure 24. Analysis Parameters Have Not Been Set Properly in Renaissance Supervisor.

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3. DISPLAY FEATURES

This chapter discusses the Renaissance display features, the role of the mouse and keyboard, and the use of the Toolbar and sidebars; and shows how to change to different disk drives and folders.

Figure 25 shows the principal screen features of Renaissance Operator.

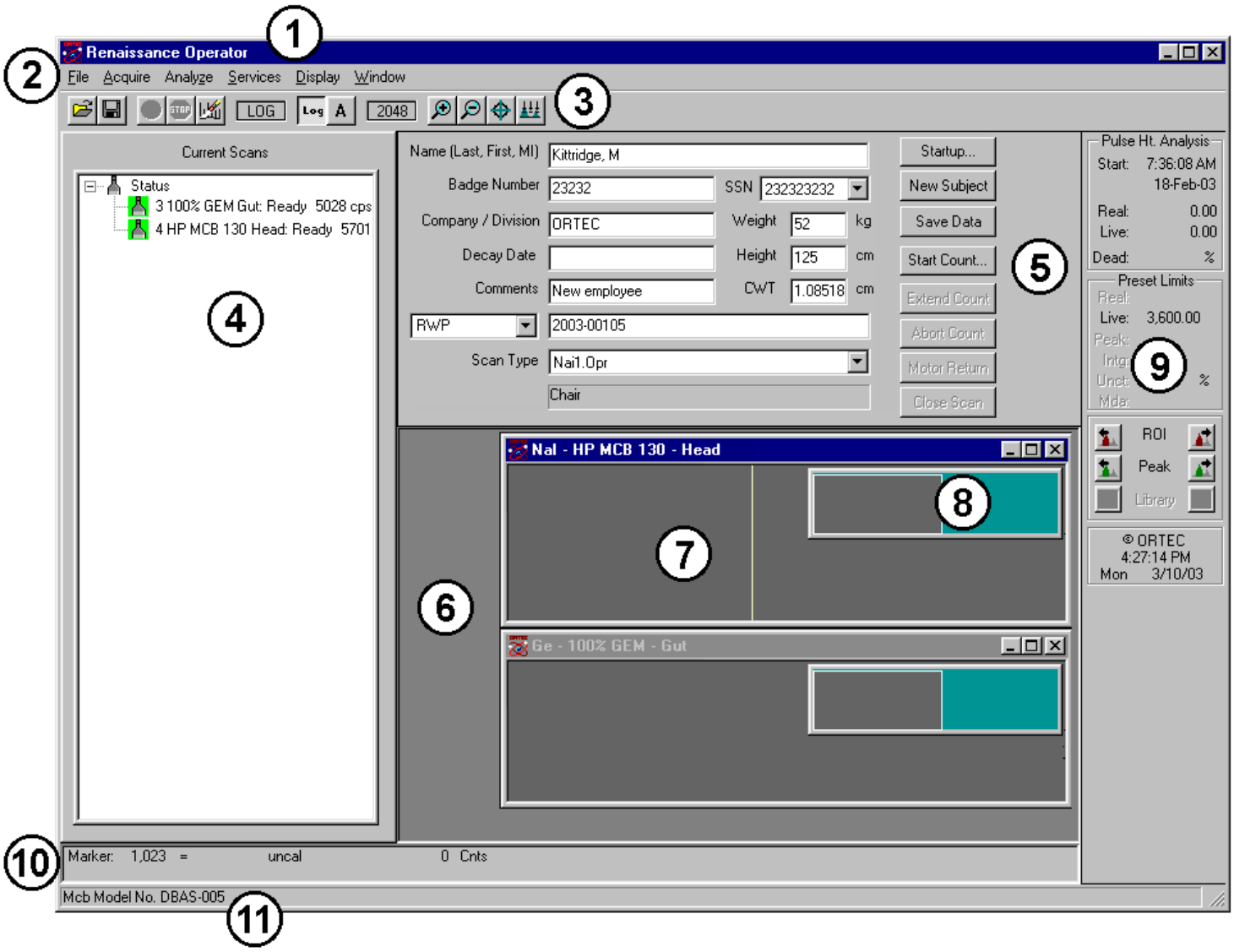


Figure 25. Renaissance Operator Screen Features.

1) **Title Bar** displays the program name. On the far right are the Minimize, Maximize, and Close buttons. There is also a title bar on each of the spectrum windows showing the detector type (Ge or NaI) and data source (either the Detector name or the word “buffer” and the spectrum name). The title bar on the active spectrum window will normally be a brighter color than those on the inactive windows (the color scheme will depend on the desktop colors you have selected in Windows Control Panel).

2) **Menu Bar** shows the available menu commands (which can be selected with either the mouse or keyboard); these functions are discussed in detail in Chapter 5.

3) **Toolbar**, beneath the menu bar, contains icons for recalling scans, saving them to disk, starting and stopping data acquisition, and adjusting the vertical and horizontal scales for the active spectrum.

4) **Current Scans Area** displays the list of Detectors and their status (e.g., ready, busy, no high voltage). To open the spectrum window for a Detector on this list, double-click the Detector name. The spectra for recalled scan data sets are also displayed in this pane; double-click the Detector name to open the corresponding individual or summed spectrum into a buffer window.

5) **Scan Control Area** displays the subject entries for the current or upcoming scan. The data collection is defined by these entries and the scan is started and controlled here.

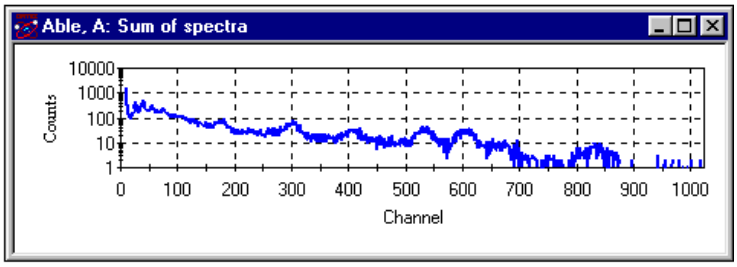
6) **Spectrum Area** can displays one spectrum window for each Detector associated with the currently selected **Scan Type**, to a limit of 64 Detector windows and 64 buffer windows. These windows can be moved, sized, minimized, maximized, and closed with the mouse, as well as tiled horizontally or vertically from the **Window** menu. The title bar for each window displays the Detector type and name. When more than one window is open, only one is active at a time. The Status Sidebar shows the values for the active window. To switch windows, click the window that you wish to activate, use the **Window** menu (see Section 5.6), or cycle between windows by pressing **<Ctrl + Tab>**.

Each spectrum window contains a **Full Spectrum View** and an **Expanded Spectrum View** (see items 7 and 8 below, and the discussion in Section 3.1).

If you are summing spectra from a multi-detector counting station, a summed spectrum window and multichannel scaler window open during the count (see Fig. 26). These look different than the individual spectrum windows discussed in items 7 and 8. The MCS window gives you an “at-a-glance” display of the input count rates for all detectors in the group. Note that the MCS window’s x-axis legend names each detector in the group (which are assigned to position 0.0, 1.0, 2.0, etc.).

7) The **Expanded Spectrum View** shows all or part of the full histogram from the Detector memory; this allows you to zoom in on a particular part of the spectrum and see it in more detail. You can change the expanded view vertical and horizontal scaling and perform

Summed spectrum window for multi-detector groups



MCS window for multi-detector groups

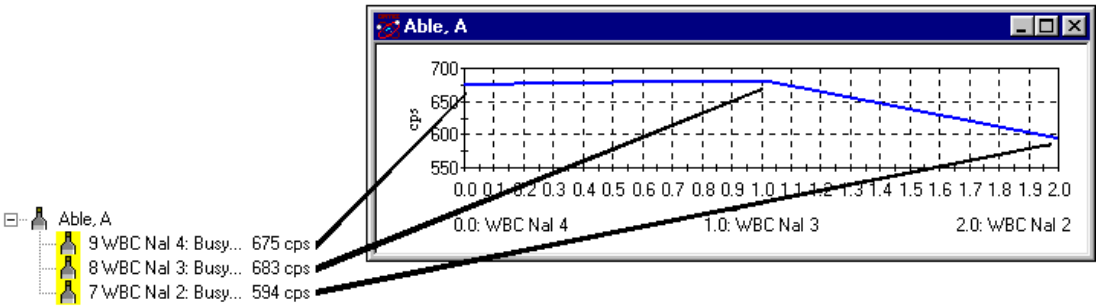


Figure 26. Summed Spectrum and MCS Windows for Multi-Detector Groups. Note the "At-a-Glance" Display of Input Count Rates for the Detectors in the Group.

operations such as displaying peak information and input count rate. This window contains a vertical line called a *marker* that highlights a particular position in the spectrum.

Information about that position is displayed on the Marker Information Line (see item 10 below). Right-click in the expanded view to open the right-mouse-button menu (Section 5.7).

8) The **Full Spectrum View** shows the full histogram from the Detector memory. The vertical scale is always logarithmic, and the window can be moved and sized (see Section 3.5.4). The Full Spectrum View contains a rectangular window that marks the portion of spectrum now displayed in the Expanded Spectrum View. To quickly move to different part of the spectrum, just click that area in the Full Spectrum View and the expanded display will update immediately at the new position.

9) **Status Sidebar**, on the right side of the screen, provides displays the Detector presets and counting times for the active window, the time and date, and a set of buttons to enable moving easily between peaks, ROIs, and library entries (see Section 3.6).

10) **Marker Information Line**, beneath the spectrum, shows the marker channel, marker energy, channel contents.

11) Supplementary Information Line, below the Marker Information Line, is used to display warning messages or instructions.

3.1. Spectrum Display, Scaling, and Zooming

The Full and Expanded Spectrum Views show, respectively, a complete histogram of the active spectrum and an expanded view of all or part of the spectrum. The Full Spectrum View shows the entire data memory of the Detector as defined in the configuration. In addition, it has a marker box showing which portion of the spectrum is displayed in the Expanded Spectrum View.

The Expanded Spectrum View contains a reverse-color marker line at the horizontal position of the pixel representing the marker channel. This marker can be moved with the mouse pointer, as described in Section 3.5.1, and with the <←>/<→> and <**PgUp**>/<**PgDn**> keys, the peak buttons or by selections in other lists, such as the library energy list.

The spectrum display can be expanded to show more detail or contracted to show more data using the **Zoom In** and **Zoom Out** features. Zooming in and out can be performed using the Toolbar buttons, the **Display** menu commands, or the rubber rectangle (see Section 3.5.3). The rubber rectangle allows the spectrum to be expanded to any horizontal or vertical scale. The baseline or "zero level" at the bottom of the display can also be offset with this tool, allowing the greatest possible flexibility in showing the spectrum in any detail.

The Toolbar and **Display** menu zoom commands offer a quick way to change the display. These change both the horizontal and vertical scales at the same time. For **Zoom In,** the horizontal width is reduced by about 6% of full width (ADC conversion gain) and the vertical scale is halved. The **Zoom In** button and menu item zoom to a minimum horizontal scale of 6% of the ADC conversion gain. For **Zoom Out,** the horizontal width is increased by about 6% of full width (ADC conversion gain) and the vertical scale is doubled.

The **Keypad**<+> and **Keypad**<−> accelerator keys respectively contract the x-axis (making peaks look broader) and expand it (making peaks look narrower) by a factor of two without affecting the vertical scale or switching between logarithmic and linear scaling. The <**F5**>/<**F6**> and <↓>/<↑> keys change the vertical scale by a factor of two without changing the horizontal scale. The <**F7**>/<**F8**> and *keyboard* <−>/<+> keys change the horizontal scale by a factor of two without changing the vertical scale. The <**Alt + F7**> key displays the whole spectrum in the expanded view.

Depending on the expansion or overall size of the spectrum, all or part of the selected spectrum can be shown in the expanded view. Therefore, the number of channels might be larger than the horizontal size of the window, as measured in pixels. In this case, where the number of channels

shown exceeds the window size, all of the channels cannot be represented by exactly one pixel dot. Instead, the channels are grouped together, and the vertical displacement corresponding to the maximum channel in each group is displayed. This maintains a meaningful representation of the relative peak heights in the spectrum. For a more precise representation of the peak shapes displaying all available data (i.e., where each pixel corresponds to exactly one channel), the scale should be expanded until the number of channels is less than or equal to the size of the window.

Note that the marker can be moved by no less than one pixel or one channel (whichever is greater) at a time. In the scenario described above, where there are many more memory channels being represented on the display than there are pixels horizontally in the window, the marker will move by more than one memory channel at a time, even with the smallest possible change as performed with the <→> and <←> keys. If true single-channel motions are required, the display must be expanded as described above.

3.2. The Toolbar

The row of buttons below the Menu Bar provides convenient shortcuts to some of the most common Renaissance menu functions.

The **Recall** button retrieves a scan data set. This is the equivalent of selecting **File/Recall Scan Data Set...** from the menu.

Save copies the currently displayed spectrum to disk. It duplicates the menu function **File/Save As...**.

Start Acquisition starts data collection in one or all Detectors in the group as described in Section 5.2.5. This duplicates **Acquire/Start** and **<Alt + 1>**.

Stop Acquisition stops data collection in one or all Detectors in the group as described in Section 5.2.6. This duplicates **Acquire/Stop** and **<Alt + 2>**.

Clear Spectrum erases the spectral data and the descriptors in one or all Detectors in the group as described in Section 5.2.7. This duplicates **Acquire/Clear** and **<Alt + 3>**.

The next section of the Toolbar (Fig. 27) contains the buttons that control the spectrum vertical scale. These commands are also on the **Display** menu. In addition, vertical scale can be adjusted by zooming in with the mouse (see Fig. 37).

Figure 27. Vertical Scaling Section of Toolbar.

Vertical Log/Lin Scale switches between logarithmic and

linear scaling. When switching from logarithmic to linear, it uses the previous linear scale setting. The keyboard equivalent is **Keypad</>**.

Vertical Auto Scale turns on the *autoscale* mode, a linear scale that automatically adjusts until the largest peak shown is at its maximum height without overflowing the display. The keyboard equivalent is **Keypad<*>**.

The field to the left of these two buttons displays **LOG** if the scale is logarithmic, or indicates the current vertical full-scale linear value.

The horizontal scaling section (Fig. 28) follows next. It includes a field that shows the current window width in channels, and the **Zoom In**, **Zoom Out**, **Center**, and **Baseline Zero** buttons. These commands are also on the **Display** menu. In addition, horizontal scale can be adjusted by zooming in with the mouse (see Fig. 37).

Figure 28. Horizontal Scaling Section of Toolbar.

Zoom In decreases the horizontal full scale of the Expanded Spectrum View according to the discussion in Section 3.1, so the peaks appear "magnified." This duplicates **Display/Zoom In**.

Zoom Out increases the horizontal full scale of the Expanded Spectrum View according to the discussion in Section 3.1, so the peaks appear reduced in size. This duplicates **Display/Zoom Out**.

Center moves the marker to the center of the screen by shifting the spectrum without moving the marker from its current channel. This duplicates **Display/Center** and **Keypad<5>**.

Baseline Zero switches to autoscale mode and sets the baseline of the Expanded Spectrum View to zero. Autoscale is then switched off.

NOTE In addition to the preceding commands, see the **Full View** command on the **Display** menu (duplicated by **<Alt + F7>**). This function adjusts the horizontal and vertical scaling to display the entire spectrum in the Expanded Spectrum View.

Finally, when the mouse pointer is paused over the center of a Toolbar button, a pop-up *tool tip* (also called a *mouse over*) box opens, describing the button's function (Fig. 29).

Figure 29.

3.3. The Scan Control Area

Figure 30 shows the Scan Control Area in the upper section of the screen.

Figure 30. The Scan Control Area Showing Social Security Number, SSN, as the Key Field (note the droplist button on the right of the field).

The fields in this section create the record for the next person to be counted. These fields are:

Name (Last, First, MI) The name of the next person to be counted.

Badge Number That person's ID badge number.

SSN The person's Social Security Number.

Company/Division The person's company and division name.

Decay Date Enter this field only if you wish to override the decay correction settings for this **Scan Type**.

Weight The person's weight (in kilograms or pounds, as set in Renaissance Supervisor).

Height The subject's height (in cm or inches, as set in Renaissance Supervisor).

CWT Chest wall thickness value, entered here or calculated from height and weight values (see Section 2.2.5).

Comments Any other important information that should be stored in the database and printed on the reports.

Optional Comments This pair of fields, located below the **Comments** field, allows you to enter up to four categories of additional comments (e.g.,"After shower," "Radiation work permit," "Sample description") which are saved in the database and printed on the report. The categories in the droplist are defined in Operator with the **Services/Option List** command (Section 5.4.6). To enter an optional comment, choose a comment category from the list, then enter the corresponding comment. To enter another type of comment, choose again from the list and enter the appropriate comment for that category, and so on.

Scan Type Select the scan type for this measurement from the droplist. The entries on this list correspond to the scan type (.OPR) files created in the Supervisor program. The scan description from the scan type file is displayed in the gray field immediately below **Scan Type**.

All of the subject information is printed on the report and stored in the database for easy tracking of the data.

3.3.1. Scan Control Buttons

These buttons are displayed on the right side of Scan Control Area.

This opens the wizard described in Section 2.3, which allows you to perform a number of setup steps and performance checks at the beginning of each series of measurements.

Click this button if the subject has not previously been entered into the target database designated by the **Scan Type**. Depending on the key field selected in the Supervisor program, a dialog will open requesting the new subject's name, badge number, or social security number. This key entry must be unique in the database. If you attempt to create a duplicate record for an existing subject, a message box will notify you that the entry already exists in the current database.

If you are counting a series of subjects, Operator allows you to set up one or more new subject records in the database ahead of time. After all fields have been entered, click this button to save the data. When ready to count a new subject, just click the key field droplist, choose the subject, and begin counting.

Start Count...

Click this button to begin the measurement using the Detector group governed by the current **Scan Type**. Before starting the count, be sure that all subject fields have been filled in and the subject is ready to be counted. If you are using the Motor Control feature, this will start both the data acquisition and the motor. The preset time specified in the **Scan Type** will be displayed in the Status Sidebar on the right side of the screen, the detectors will be cleared, and the count will begin. Detector spectrum windows can be displayed by double-clicking on the detectors in the Current Scans Area. The right-hand Status Sidebar will show the counting presets for the currently active Detector window.

Extend Count

If the subject requires an extended count time to obtain better data, and this button is active (i.e., its label is black, indicating that the **Extend** time has been set up in Renaissance Supervisor), you can click **Extend Count** as often as needed to prolong the count until you have obtained the desired result. This button starts the extended count for the Detector group governed by the current **Scan Type**. If you are using Motor Control, the motor will return to its home position before the extended count begins. The preset time in the right-hand Status Sidebar will reflect *the current preset time plus the **Extend** time*, and the data *will not be cleared* before the acquisition starts.

Abort Count

This button becomes active once the count has begun. Clicking on it opens the dialog shown in Fig. 31. Open the droplist and choose the acquisition to be aborted, then click **Yes** to stop the count and close all detector windows or **No** to continue the count and analysis. If you are using the Motor Control feature, the motor will return to its home position when the acquisition stops.

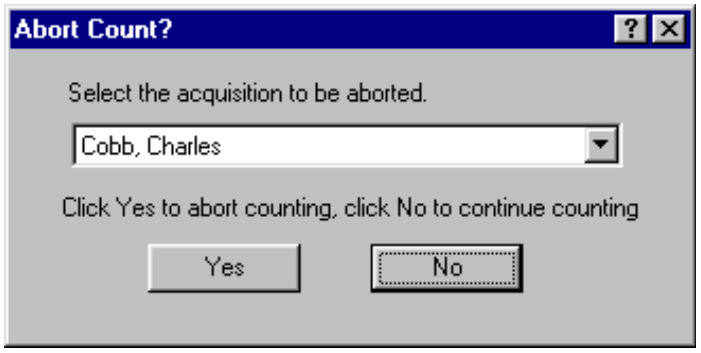


Figure 31. Abort Count.

Motor Return

Click this button to return the motor to the home position defined in the Motor Setup program, which is discussed in the Supervisor user manual.

Close Scan

This button closes a scan data set that has been recalled for editing and returns the Operator program to the normal subject-counting mode.

3.4. The Current Scans Area

Figure 32 shows the Current Scans area, located on the left side of the Operator screen. This pane shows each subject currently being counted and the status of the Detector group being used for the measurement. Each Detector in the group is represented by an entry that shows the unit's input count rate in cps; and indicates whether the device is ready to count (stopped), is busy (counting), or has a hardware problem (e.g., high voltage off). Examples of these Detector entries are shown in Fig. 33.

The **Status** icon at the top of the pane reflects the condition of the detectors for the currently selected **Scan Type**. If any measurements or analyses are in progress, the corresponding subject name and Detector list for each measurement are displayed below the **Status** entries. If you select a **Scan Type** that calls Detectors which are not communicating with the system (no longer connected, host PC turned off, no longer on the Master Detector List), the **Status** icon will appear as shown in Fig. 34. Choose another **Scan Type** or close Operator and use the Supervisor program to make the necessary changes to Detector lists, Detector groups, and scan types.

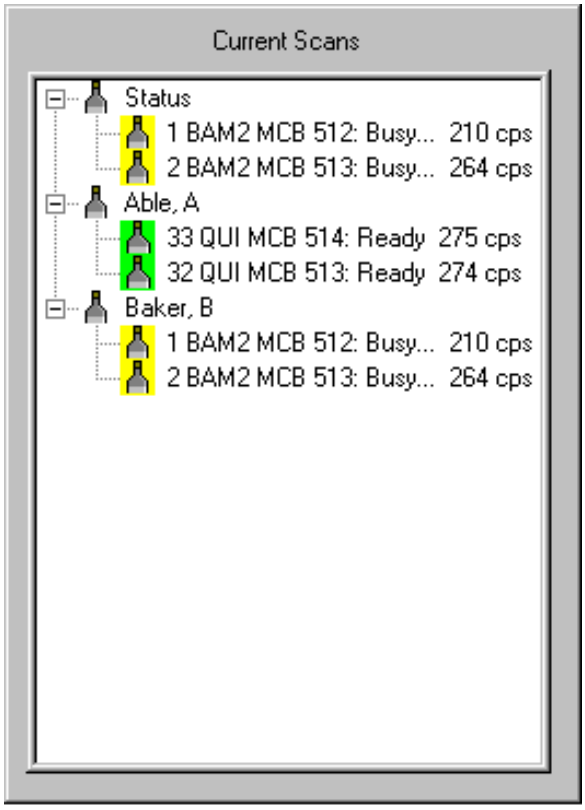


Figure 32. Current Scans Area (showing a completed scan for subject Able and a scan in progress for subject Baker, each performed with a 2-detector group).

To display the spectrum window for a Detector in the Current Scans pane, double-click its Detector entry. The spectrum window will open and the presets and current count information will be loaded into the Status Sidebar on the right of the screen. You can now use the commands on the toolbar and right-mouse-button menu to perform such operations as adjusting the presets, high voltage, and other hardware settings (Section 5.2); loading the ROIs from an .ROI file (Section 5.4.4); comparing a spectrum file on disk to the spectrum in the spectrum window (Section 5.1.4); and reviewing spectrum peak parameters with the **Peak Info** command (Section 5.4.2). To close the spectrum window, click its Close (×) box.

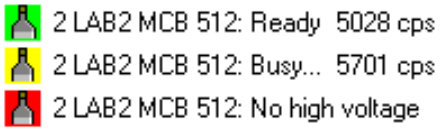


Figure 33 . Detector Status Icons (Ready, Busy, Hardware Not Ready).

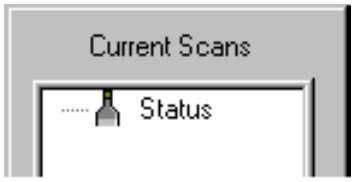


Figure 34. Invalid Detector.

The Current Scans pane functions as follows:

1) The **Status** indicators for the detectors in the currently selected **Scan Type** are displayed at the top of the pane. If a Detector's high voltage is off, its icon will be red. To turn on the high voltage, either run the **Startup** procedure (Section 2.3) for all Detectors in this group; or double-click the specific Detector's entry to open the corresponding spectrum window, then turn on the high voltage via **MCB Properties...** (Section 5.2.3). Note that some MCBs have only hardware-controlled HV; these instruments will show no HV within the software.

2) When you start a new measurement, the corresponding subject name and Detector list will be added to the bottom of the list. Use the ⊞ and ⊟ boxes to expand and condense the list entries.

3) After a subject scan is completed, the scan will remain on the Current Scans list until a new count is started.

3.5. Using the Mouse

The mouse can be used to perform every function in Renaissance except text entry. The following sections describe specialized mouse functions.

3.5.1. Moving the Marker with the Mouse

To position the marker with the mouse, move the pointer to the desired channel in the Expanded Spectrum View and click the left mouse button once. This will move the marker to the mouse position. Click in the Full Spectrum View to move the expanded view to that place. This is generally a much easier way to move the marker around in the spectrum than using the arrow keys and keyboard shortcuts, although mouse and keyboard commands can be mixed.

3.5.2. The Right-Mouse-Button Menu

Figure 35 shows the right-mouse-button menu. To open it, position the mouse pointer in the spectrum display, click the right mouse button, then use the left mouse button to select from the list of commands. Not all of the commands are available at all times, depending on the spectrum

displayed and whether the rubber rectangle is active. Except for **Undo Zoom In**, all of these functions are on the Toolbar or in one of the Menu items. See Section 5.7 for more information on the commands.

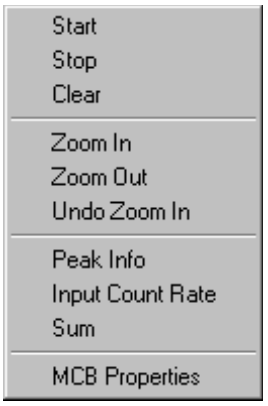


Figure 35. Right-Mouse-Button Menu for Spectra.

3.5.3. Using the "Rubber Rectangle"

The rubber rectangle is used for selecting a particular area of interest within a spectrum. It can be used in conjunction with the right-mouse-button menu (see Fig. 35) for many functions. To draw a rubber rectangle:

1) Click and hold the left mouse button; this anchors the starting corner of the rectangle.

2) Drag the mouse diagonally across the area of interest. A reverse-color rectangle bisected by the marker line is drawn. Note that when drawing a rubber rectangle, the marker line combines with a horizontal line inside the rectangle to form crosshairs (Fig. 36). They make it easy to select the center channel in the area of interest — this might be the center of an ROI, a portion of the spectrum to be summed, or a peak for the **Peak Info** function.

3) Release the mouse button; this anchors the ending corner of the rectangle.

4) Click the right mouse button to open the popup menu and select one of the available commands. Once an area is selected, the commands can also be issued from the Toolbar, Menu Bar, Status Sidebar, or keyboard.

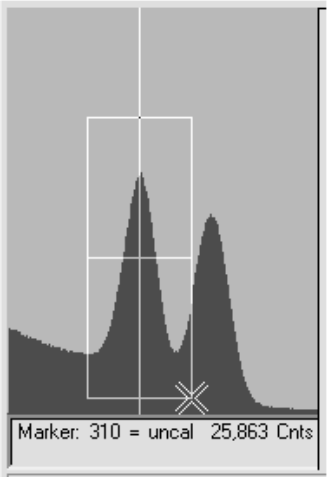


Figure 36. The Rubber Rectangles Crosshairs.

As an example, Fig. 37 illustrates the process of marking a region with a rubber rectangle and zooming in using the right-mouse-button menu.

3.5.4. Sizing and Moving the Full Spectrum View

To change the horizontal and vertical size of the Full Spectrum View, move the mouse pointer onto the side edge, bottom edge, or corner of the window until the pointer changes to a double-sided arrow (see Fig. 38). Click and hold the left mouse button, drag the edge of the window until it is the desired size, then release the mouse button.

To move the Full Spectrum View to a different part of the screen, move the mouse pointer onto the top edge of the window until the pointer changes to a four-sided arrow (see Fig. 38). Click

and hold the left mouse button, drag the window to its new location, and release the mouse button.

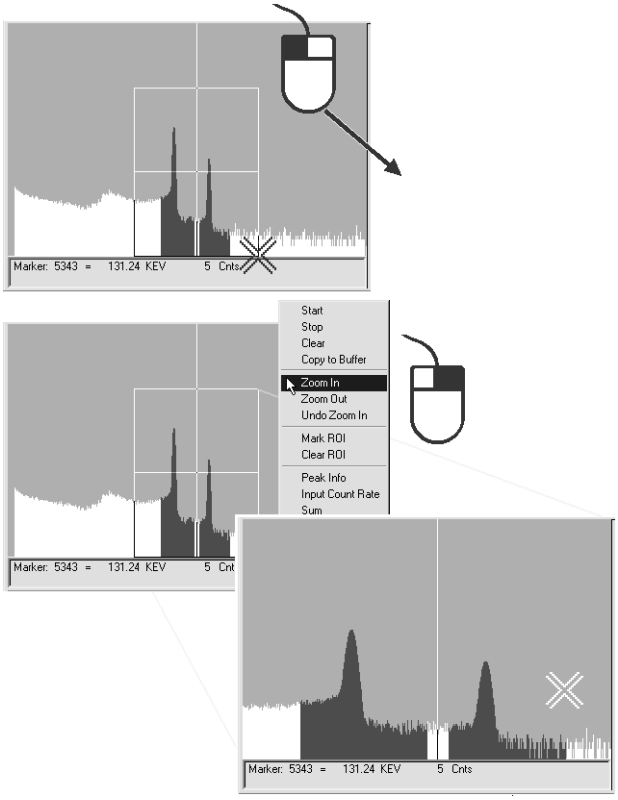


Figure 37. Zooming In Using the Rubber Rectangle and Right-Mouse-Button Menu.

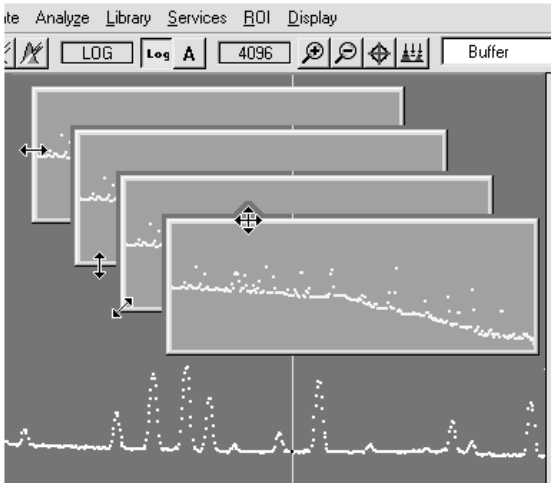


Figure 38. Two-Sided Pointer for Sizing Full Spectrum View, and Four-Sided Pointer for Moving Window.

3.6. Buttons and Boxes

This section describes the Renaissance radio buttons, indexing buttons, and checkboxes. To activate a button or box, just click it.

Radio buttons (Fig. 39) appear on many Renaissance dialogs, and allow the selection of only one of the choices. **Checkboxes** (Fig. 40) are another common feature, allowing the selection of one or more of the options at the same time.

The **ROI**, **Peak**, and **Library** indexing buttons on the Status Sidebar (Fig. 41) are useful for rapidly locating ROIs or peaks, and for advancing between entries in the library. When the last item in either direction is reached, the computer beeps and Renaissance posts a “no more” message on the Supplementary Information Line. If a library file has not been loaded or the Detector is not calibrated, the **Library** buttons are disabled.

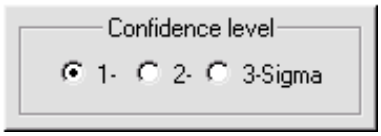


Figure 39. Radio Buttons.

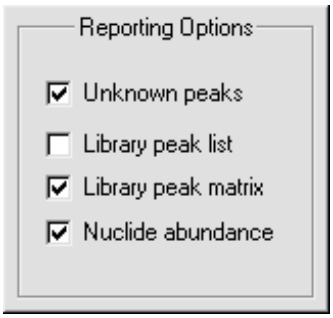


Figure 40. Checkboxes.

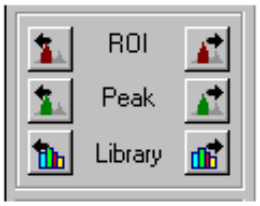


Figure 41. Indexing Buttons.

The **ROI**, **Peak**, and **Library** buttons function the same for both Detector and buffer. For buffers, the additional features are the ability to insert or delete an ROI with the **Ins** and **Del** buttons, respectively (located between the **ROI** indexing buttons); and to display the peak information for an ROI with the **Info** button (located between the **Peak** indexing arrows).

The **Library** buttons are useful after a peak has been located to advance forward or backward through the library to the next closest library entry. Each button click advances to the next library entry and moves the marker to the corresponding energy.

Instead of using the **Peak** buttons to index from a previously identified peak, position the marker anywhere in the spectrum and click the **Library** buttons to locate the entries closest in energy to that point. If a warning beep sounds, it means that all library entries have been exhausted in that direction, or that the spectrum is not calibrated. In any case, if an appropriate peak is available at the location of the marker, data on the peak activity are displayed on the Marker Information Line at the bottom of the screen.

The **ROI** and **Peak** indexing buttons are duplicated by **<Shift** + ←>/ **<Shift** + →> and **<Ctrl** + ←>/**<Ctrl** + →>, respectively. The **Library** buttons are duplicated by **<Alt** + ←>/ **<Alt** + →>.

4. OPERATOR REPORTS

Renaissance Operator can generate two types of reports:

- A routine count report generated after a measurement and analysis are completed (Fig. 42). This report contains the acquisition information, the spectrum filename or the list of individual and combined spectra generated for this analysis, a peak analysis section, and a summary report listing **Nuclide** names, nuclide **Activity** in the selected units (e.g., nCi per kg or lb), and **% Error** for the subject. If the **Scan Type** specifies that the report(s) for a measurement should be saved, the report(s) will also be saved as an ASCII text `.RPT` file on disk in a location determined in the Supervisor program with the **File/Settings** command.

- A count report formatted with SAP® BusinessObjects Crystal Reports™ and generated with the **File/ Recall Report** command (Figs. 43 through 45). This report opens in a special window in the spectrum area and contains the same information as the routine count report discussed above. The report will be displayed after each measurement if the supervisor has marked the **Report Writer** checkbox in the `.SDF` or `.SVD` file associated with the current **Scan Type**, and will be printed if the **Print** checkbox was also activated. See Section 5.1.2 for details on using the report window controls and export functions.

Display and printing of the routine Operator report are controlled by the setup options in Renaissance Supervisor. The format of the routine report is fixed and is not affected by the report options in the `.SVD` or `.SDF` file associated with the **Scan Type**.

The Crystal Reports template can be cloned and modified, if you wish, to extract additional data from the database, perform additional calculations, etc.

4.1. Report Contents

4.1.1. Alarm and Warning Limits

Alarm and warning limits are defined in the Supervisor program in units of Bq. These limits are converted to the activity units specified for the Operator analysis and compared to the reported nuclide and peak activities, which might be scaled by the subject weight, depending on the analysis parameters. If **Divide activity by weight** is turned on for the associated **Scan Type**, the reported limits will be converted to specific activity units, as is done for subject activity. Alarm and warning limits displayed on the Operator report are converted from the total Bq per nuclide entered in Supervisor to the units displayed on the analysis report. This correction takes into account conversion of activity units and any weight corrections. For example, if your report is configured to report specific activity in μCi/lb, Renaissance will divide the total Bq per nuclide limit by 37000, then divide the result by the subject weight displayed on the analysis report.

ORTEC Routine Count Report Operator:Robinson, S.

Subject
Name: Baker, B SSN: 222222222
Badge: 22222 Height: 22.00 cm
Date: Weight: 22.00 kg
Company: CWT: 1.65 cm
Comments: New employee baseline; summed
Analysis
Library: E:\User\GvDemo.Lib
Start Chan: 10 (1.850 keV)
End Chan: 8000 (1583.110 keV)
Detectors
Live Time: 25
Acq Date: 7/1/03 1:31:00 PM

Detector	Spectrum	Weight
Sum of spectra	D:\User\Baker, B Sum Ren00099.Anl	1.00
	D:\User\Baker, B WBC NaI 4 Ren00002.Anl	1.00
	D:\User\Baker, B WBC NaI 3 Ren00002.Anl	1.00
	D:\User\Baker, B WBC NaI 2 Ren00002.Anl	1.00

Detector	Cal File	Energy Eff
Sum of spectra	E:\User\GvDemo.Lib	8/23/01 8/23/01

Peak Analysis

Nuclide	Actual Energy (keV)	Library Energy (keV)	Area	Activity (Bq/Kg)	% Uncert. 1 Sigma	MDA (Bq/Kg)
CO-57	136.61	136.43	45	0.00e+000	25.71	2.47e+001
HG-203	72.50	72.87	70	0.00e+000	33.73	4.87e+001
HG-203	70.91	70.83	21	0.00e+000	104.17	5.42e+001
Unknown	5.02		1328		5.77	
Unknown	7.79		1412		6.55	
Unknown	21.44		83		70.78	
Unknown	119.39		30		100.95	
Unknown	161.94		28		47.72	
Unknown	173.62		1		797.68	

Summary Report

Nuclide	Activity Bq/Kg	% Uncert 2 Sigma	Alarm Limit	Warning Limit	MDA Bq/Kg	Comments
CO-57	0.00e+000	0.00	1.00e+003	5.00e+002	6.36e+001	
CO-60	0.00e+000	0.00			0.00e+000	
Y-88	0.00e+000	0.00			0.00e+000	
CD-109	0.00e+000	0.00	1.00e+003	5.00e+002	5.12e+001	
SN-113	0.00e+000	0.00			0.00e+000	
CS-137	0.00e+000	0.00			0.00e+000	
CE-139	0.00e+000	0.00	1.00e+003	5.00e+002	3.59e+001	
HG-203	0.00e+000	33.73	1.00e+003	5.00e+002	4.87e+001	
AM-241	0.00e+000	0.00	1.00e+003	5.00e+002	1.03e+002	

Total Activity: 0.000000e+000 Bq/Kg

Performed by: _____
Robinson, S. Date

Verified by: _____
Date

Figure 42. Routine Operator Count Report from Windows Notepad.

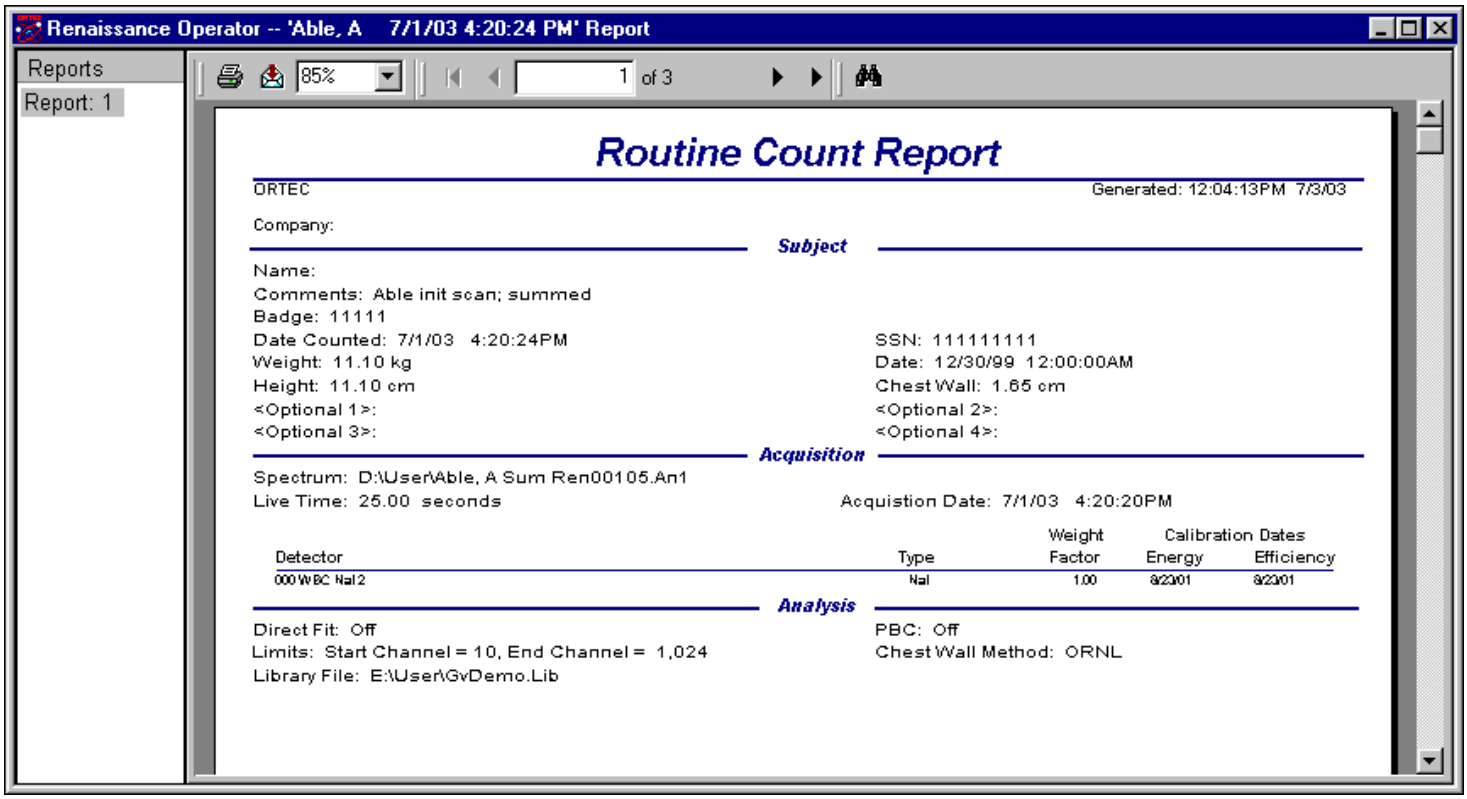


Figure 43. Crystal Reports Routine Count Report, Page 1.

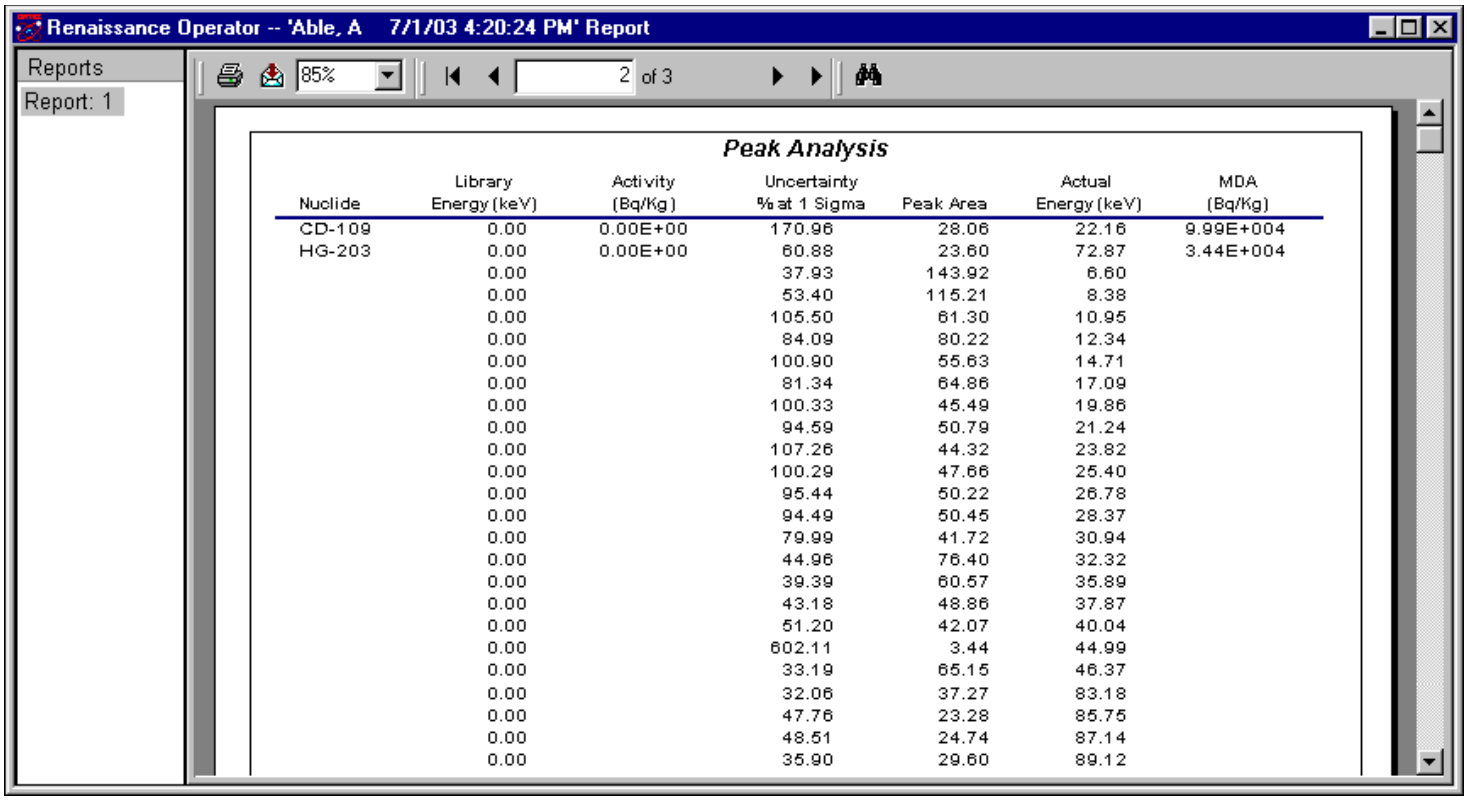


Figure 44. Crystal Reports Routine Count Report, Page 2.

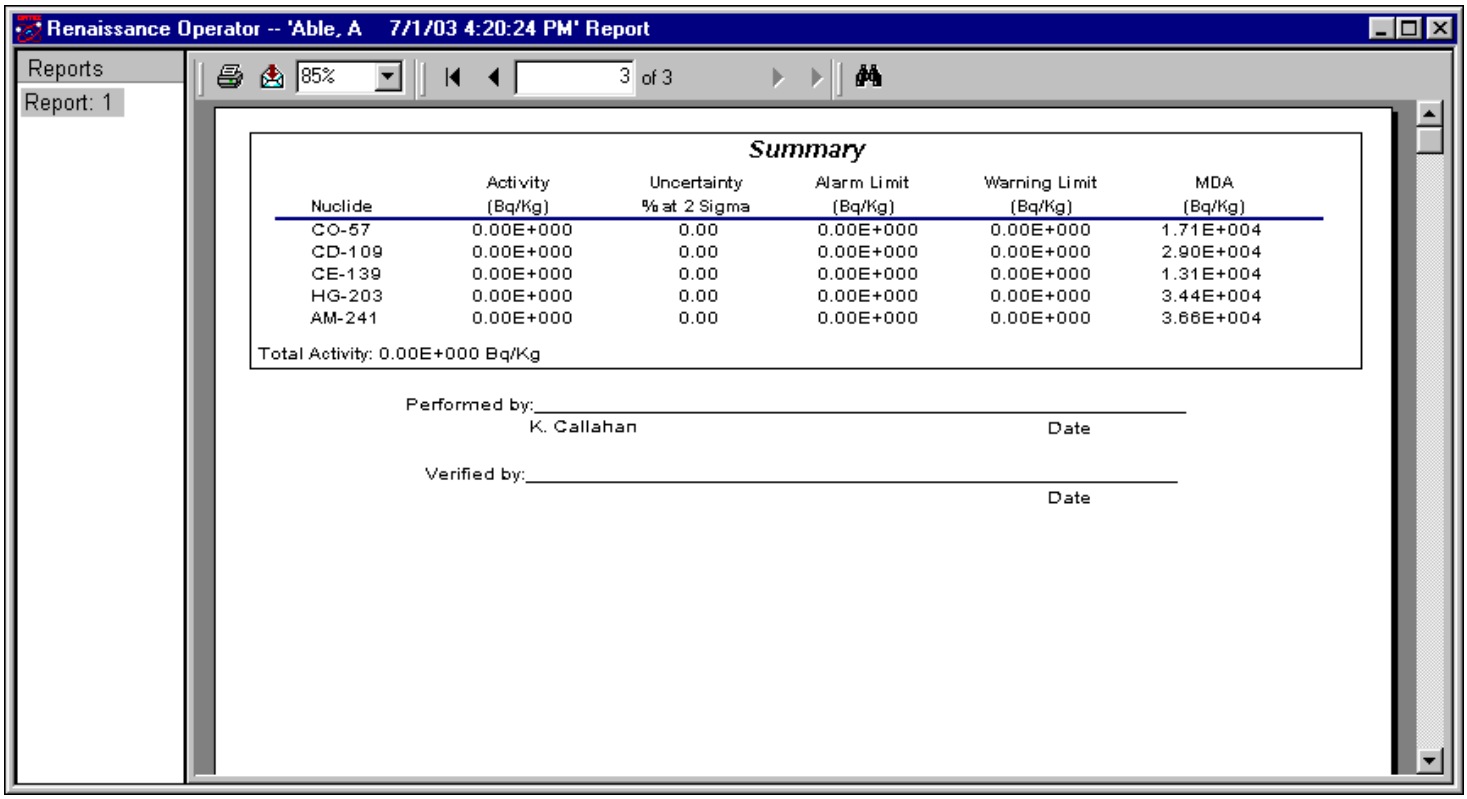


Figure 45. Crystal Reports Routine Count Report, Page 3.

4.1.2. Differences in Operator (Report Writer) Crystal Reports Output and the ASCII Text Reports

- The Crystal Report always displays **Weight** and **Height** in metric units, appropriately converted if applicable, but the activity units always match those specified for the standard ASCII text report.

- The nuclide activity on the Crystal Report is decay-corrected if the operator enters a decay correction date for the scan. Unlike the ASCII text report, this report does not display both the decayed and time-of-count activity at the same time.

- The Scan Type options **Report Zero Area Peaks** and **Report Zero Activity Nuclides** are available only on the ASCII text report, not the Crystal Reports output.

- The **Weighted Average** and **Concatenated** reports are available only in ASCII text format, not the Crystal Reports output. The respective `.RPT` files use the name of the first detector in the group and have the letter “A” or “C” appended. Note that the **Concatenated** report has the same analysis results as the individual reports, but the subject information is displayed only in the header at the beginning of the report.

4.1.3. Weighted Average Report Specifications

- The **Weighted Average** report displays information for each detector in the report header such as spectrum, calibration, PBC, and spectrum-stripping filenames, as well as the weighting assigned to each detector. This information is consistent with that displayed on the individual analysis reports.

- The library specified in the header information is taken from the first detector in the group.

- The peak activity, peak area, peak MDA, nuclide activity, and nuclide MDA results are determined by multiplying each individual detector parameter by its associated weight value, summing the weighted results, then dividing the total by the sum of the weights.

- The peak or final nuclide uncertainty is determined as follows:

  (a) Each detector peak area (or final nuclide activity) is multiplied by its uncertainty. The result is squared and then multiplied by the weighting factor. The results for each detector are then summed.

  (b) Each detector peak area (or final nuclide activity) is multiplied by its weighting factor. The results are summed for each detector.

  (c) The square root of the result in Step 1 is divided by the result in Step 2 to obtain the weighted average uncertainty.

[Intentionally blank]

5. MENU COMMANDS

This chapter describes all of the Renaissance Operator menu commands and their associated dialogs. As is customary for Windows menus, the shortcut key(s) (if any) are shown to the right of the menu function they duplicate. Also, the underlined letter in the menu item indicates a key that can be used together with the **<Alt>** key for quick access in the menu. (So, for example, the **Recall Scan Data Set...** dialog on the **File** menu can be reached by entering the following key sequence: **<Alt + F>**, **<Alt + S>**.) The ellipsis (**...**) following a menu selection indicates that a dialog is displayed to complete the function. Finally, a small arrow ("▸") following a menu selection means a submenu with more selections will be displayed. The menus and commands are:

File (page 47)

- Recall Scan Data Set...
- Recall Reports...
- Save As...
- Compare...
- Exit
- About Renaissance...

Acquire (page 54)

- High Voltage...
- Presets...
- MCB Properties...
- Gain Adjust
- Start Alt + 1
- Stop Alt + 2
- Clear Alt + 3
- QA ▸
  - Measure Background
  - Measure Sample
  - Status
  - Control Charts

Analyze (page 56)

- Create Background File...
- Select Background File...
- Configuration in Memory...

Services (page 57)
- Recalibrate Energy...
- Peak Info
- Clear All ROIs
- Recall ROI File...
- Subject History
- Options Text...

Display (page 61)

Logarithmic	Keypad (/)
Automatic	Keypad (*)
Baseline Zoom	
Zoom In	Keypad (+)
Zoom Out	Keypad (-)
Center	Keypad (5)
Full View	Alt + F7

Window (page 62)
- Cascade
- Tile Horizontally
- Tile Vertically
- Arrange Icons
- Close
- Close All
- [numbered list of open windows]

Right-Mouse-Button Menu (page 63)
- Start
- Stop
- Clear
- Zoom In
- Zoom Out
- Undo Zoom In
- Peak Info
- Input Count Rate
- Sum
- MCB Properties

5.1. File

The **File** menu commands (Fig. 46) allow you to open scan data sets and reports, save a spectrum file, compare spectra, and close Renaissance Operator.

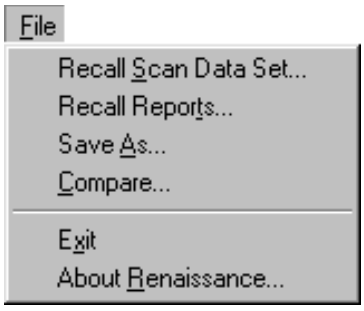


Figure 46. File Menu.

5.1.1. Recall Scan Data Set...

Use this command to recall the spectra and subject information for a previously collected measurement, based on subject **Name**. The database specified in the currently selected **Scan Type** determines the subject records on the droplist at the top of the dialog (Fig. 47). The **Database** path is displayed at the bottom of the dialog.

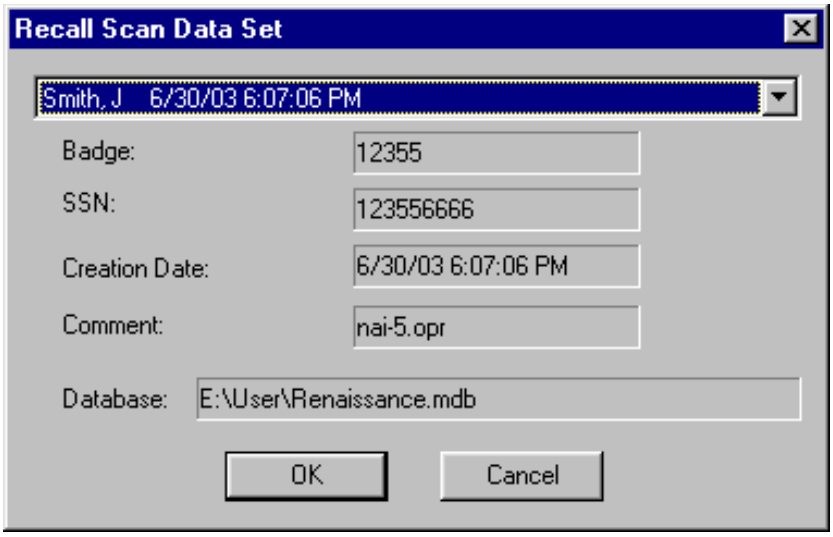


Figure 47. Recall a Scan Data Set.

A scan data set cannot be recalled while subject scans are in progress, and subject scanning is disabled when recalling a scan data set.

When you choose a scan from the list, all of the subject fields are populated with information from that scan, the MCS spectra are displayed if **Analyze sum of spectra** or Motor Control was used, and an indicator for each spectrum is displayed in the Current Scans area. You can then double-click any or all of the entries in the Current Scans area to open the corresponding spectrum file in a buffer window. The active buffer window's count presets will be displayed in the Status Sidebar on the right side of the Operator screen, and you can view (read-only) the MCB settings for any Detector by right-clicking in its spectrum window and selecting **MCB Properties** from the right-mouse-button menu.

The number of spectra retrieved will depend on the number of detectors used for the data acquisition, and on the **Scan Type** settings for the measurement. If the **Analyze Summed Spectra** flag was turned on in the **Scan Type** file, the recalled scan data set will contain *only one summed spectrum*, no matter how many Detectors were in the detector group (see Fig. 48). If **Analyze Summed Spectra** was turned off, the recalled scan data set will include one spectrum for each Detector in the group (Fig. 49).

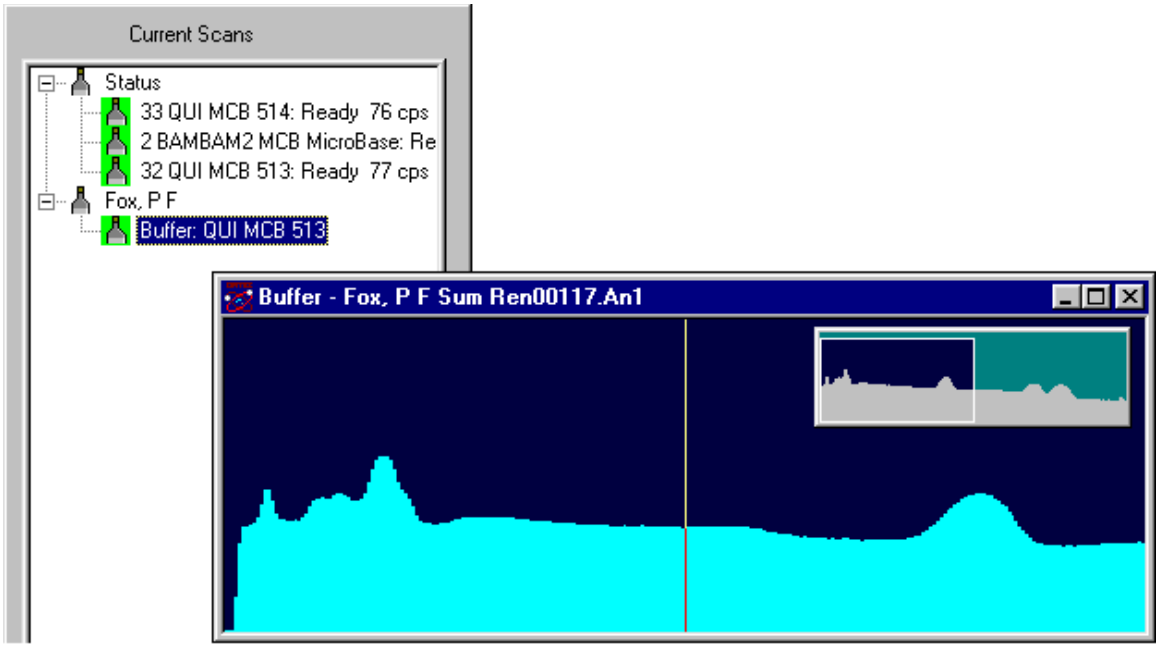


Figure 48. Recalling a Summed Spectrum.

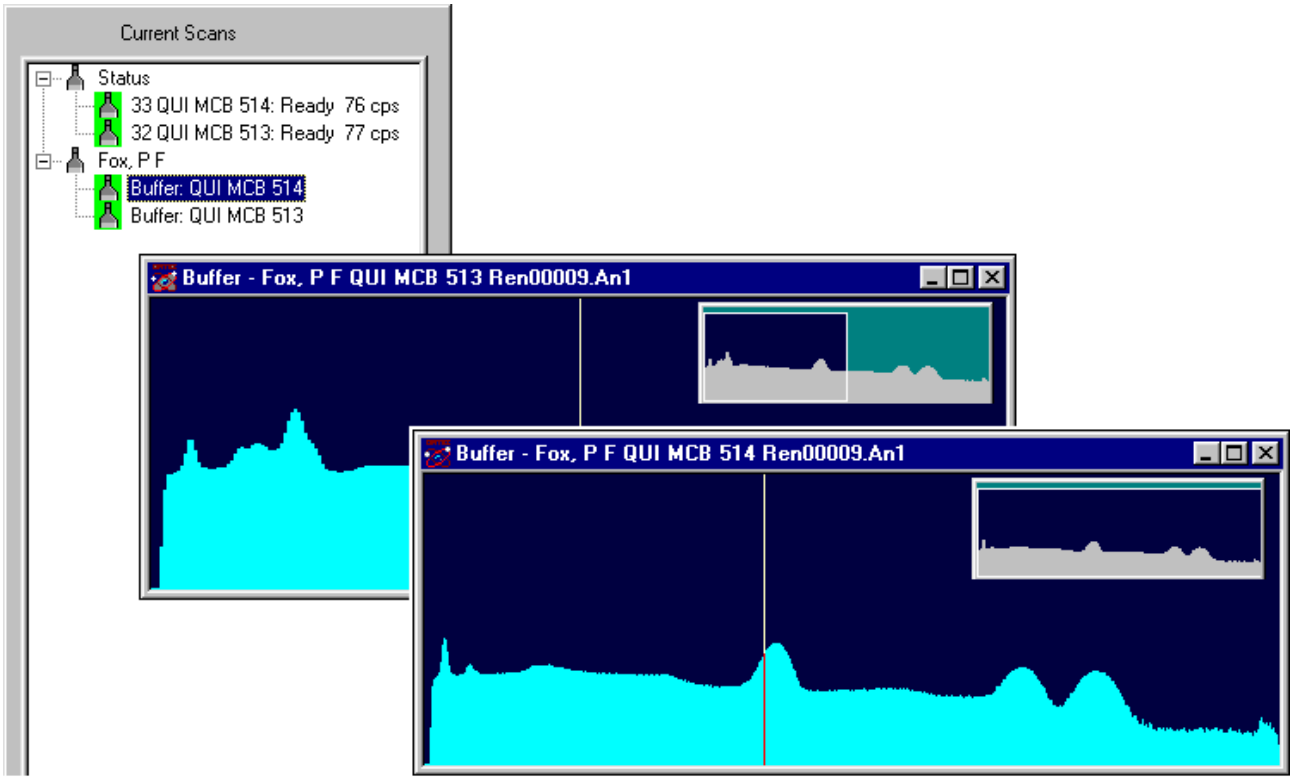


Figure 49. Recalling Individual Spectra from a Multi-Detector Scan.

The only parameters that can be changed in Operator are the subject fields on the main Operator interface, including the **Key** field. *The **Scan Type** cannot be changed*. Changes to analysis options, such as the calibration, library, peak-fitting options, and `.PBC` file, must be made in the Supervisor program. After saving changes to the spectrum analysis (`.An1`) files, the scan data set can be recalled and re-analyzed in the Operator program with the new settings applied.

To re-analyze a scan data set, use **Analyze/Configuration in Memory...** (Section 5.3.3). The analysis will use the options from the **Scan Type** used to originally count the subject. (These options cannot be changed without manually editing fields in the analysis database.)New analysis records are entered in the database each time a scan data set is re-analyzed; that is, existing scan data sets, including previous re-analyses, are not overwritten.

To close the data set and return to normal counting mode, click the **Close Scan** button.

5.1.2. Recall Reports...

This command lets you retrieve the individual Operator count report(s) for a particular measurement, based on subject **Name**. They are displayed in a report window, from which you can view, print, or export the report data. Recalled reports are formatted according to the supervisor-selected Crystal Reports template. The report templates can be modified with Crystal Reports to meet site-specific needs.

The average-activity and concatenated reports are not available in the report window. They are avail-able only in the standard ASCII text (`.RPT`) file format.

The database specified in the currently selected **Scan Type** determines the subject records on the droplist at the top of the dialog (Fig. 50). The **Database** path is displayed at the bottom of the dialog.

When you choose a scan from the list, all of the subject fields are populated with information from that scan. Click **OK** to regenerate the report from the database contents in the form that was specified for the original analysis.

NOTE You can also access an individual report by opening its standard text report (.RPT) file in Notepad. Note that the **Weighted Average** and **Concatenated** reports are available only in ASCII text format, not the Crystal Reports output. The respective .RPT files use the name of the first detector in the group and have the letter "A" or "C" appended.

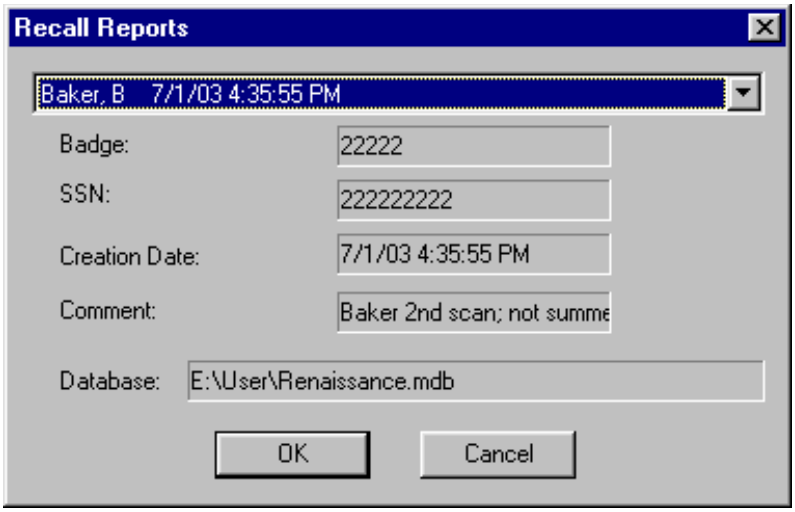


Figure 50. Recall the Report for this Scan.

Figure 51 shows the Recall Report window.

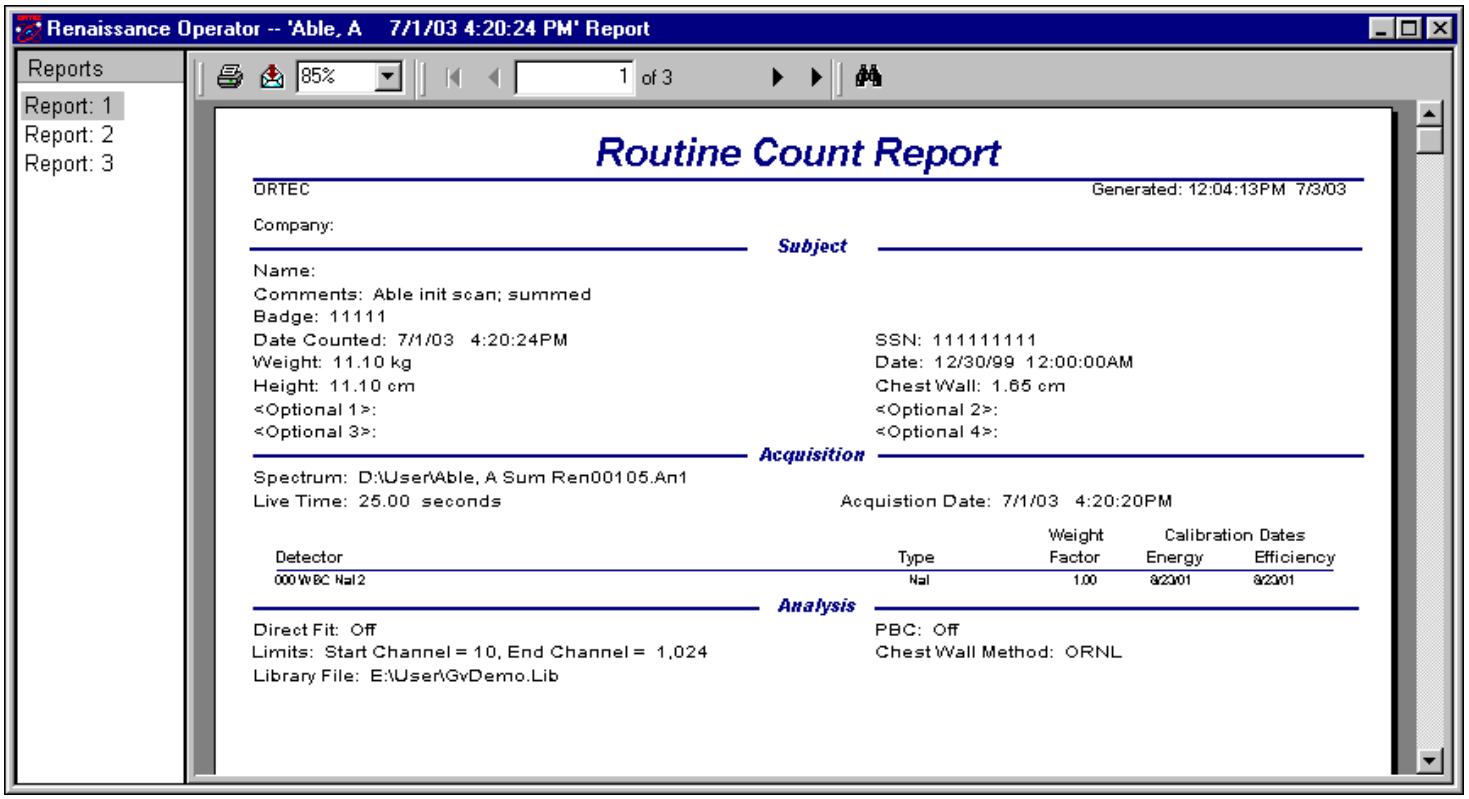
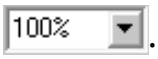


Figure 51. Recalled Report (showing Report 1 for a group of three Detectors).

The **Reports** sidebar on the left side of the report window (Fig. 52) allows you to move between several recalled reports. Click an entry to display the corresponding report.

The icons on the window toolbar allow you to:

- Select the report window's zoom factor from the zoom droplist 

. You can also click in the zoom field and enter a value other than those on the list, then press <Enter> or <Tab> to update the screen.
- Search for a particular string of alphanumeric characters within the report  .
- Print the report  .
- Export the analysis data, including selecting the data format and delimiters  .

Note the page number bar beside the zoom field at the top of the report window (Fig. 53). This tells how many pages are in the report and the page currently displayed. The arrow buttons allow you to advance to the first, previous, next, or last page.

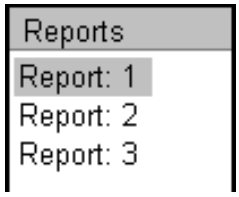


Figure 52. Switch Between Reports.

Figure 53. Page Number Bar.

5.1.2.1. Export Formats

The export button () lets you export analysis results to disk and to Microsoft MAPI (email) in the following formats:

- Character-separated values (.CHR)
- Comma-separated values (.CSV)
- Crystal Reports (.RPT)
- Data Interchange Format (.DIF)
- Excel® 5.0 (.XLS)
- Excel 5.0 (.XLS) (Extended)
- Excel 7.0 (.XLS)
- Lotus® 1-2-3 (.WK1)
- Lotus 1-2-3 (.WK3)
- Lotus 1-2-3 (.WKS)
- Paginated text (.TXT)
- Record style (columns of values; .REC)
- Rich text format (.RTF)
- Tab-separated text (.TTX)

- Excel 7.0 (.XLS) (Extended)
- Excel 8.0 (.XLS)
- Excel 8.0 (.XLS) (Extended)
- Tab-separated values (.TSV)
- Text (.TXT)
- Word for Windows document (.DOC)

Choose the **Format** and **Destination** from the Export dialog (Fig. 54) and click **OK**.

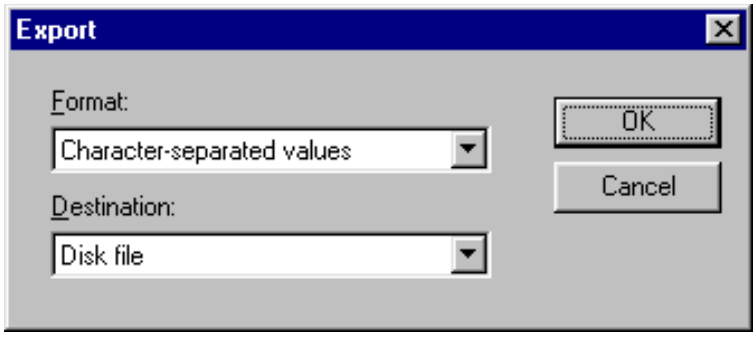


Figure 54. Export Analysis Data.

5.1.3. Save As...

This command opens a standard file-save dialog so you can save the spectrum in the active spectrum window to disk. This saves only the active spectrum. If the configuration has more than one detector, you must save the spectrum for each detector individually. (The scan data set, which includes all the spectra for a scan, is automatically saved with each scan.) For hardware with multiple spectra (such as the DSPEC Plus in ZDT mode), both spectra are automatically saved in the file.

Enter any valid filename (consisting of an optional drive and directory, a filename, and an optional extension) in the **File name** field and click **Save**. The recommended and default extension are shown in the dialog according to the format chosen. If that file already exists, a message box will ask if you want to overwrite the existing file or cancel the save. Clicking on **OK** will completely overwrite the existing file. After the disk file has been saved, its filename will be displayed on the spectrum window title bar.

5.1.4. Compare...

This function displays a spectrum from disk along with the active spectrum so the two can be visually compared. When **Compare Spectra...** is selected, a standard file-recall dialog opens so you can choose a spectrum file for comparison. Once the desired spectrum file is selected, the active spectrum window shows both spectra, as illustrated in Fig. 55. Note that the Compare spectrum ROIs (if any were saved with the file) are not marked in this mode.

The Compare spectrum is offset from the starting spectrum and can be moved up and down incrementally with the <**Shift** + ↑> and <**Shift** + ↓> accelerators. In addition, the vertical scale of both spectra can be changed with <↑> and <↓>.

For digital spectrometers that support ZDT mode, both spectra (live-time-corrected [LTC] or uncertainty [ERR] and ZDT) are compared. **Normal** refers to LTC or ERR; **Corrected** refers to ZDT. Use **<F3>** to switch between **Normal** and **Corrected** for both spectra, that is, to show **Normal/Normal** or **Corrected/Corrected**. To switch only the compare between **Normal** and **Corrected**, use **<Shift + F3>**, that is, to show **Normal/Corrected** use **<Shift + F3>**.

Press **<Esc>** to leave Compare mode.

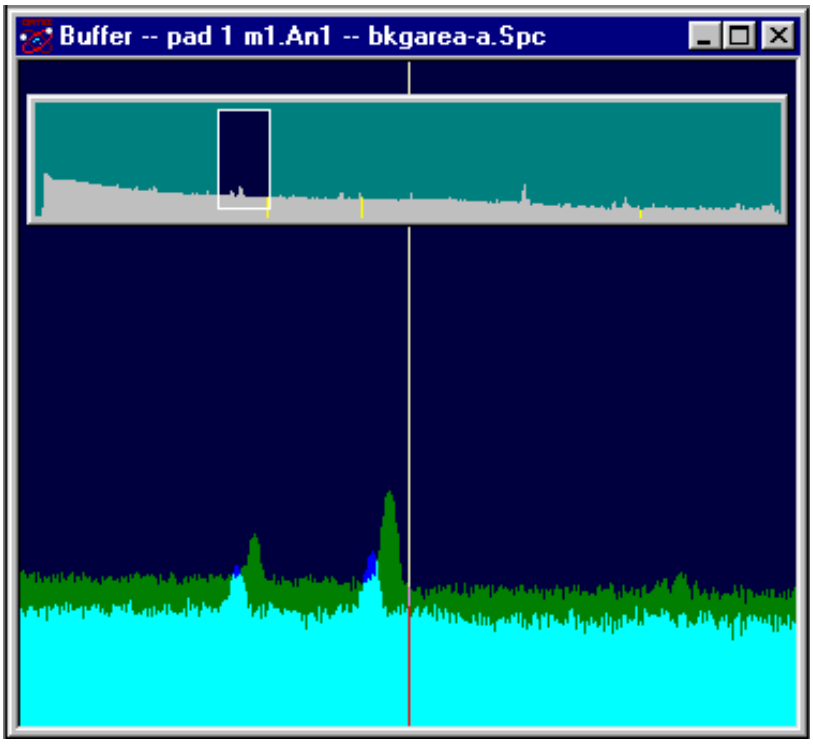


Figure 55. Compare Mode Screen.

5.1.5. Exit

This exits Renaissance Operator and returns to Windows. If the buffer contains a spectrum that has not been saved, a warning message is displayed. All MCBs continue to acquire data until the presets are met, but the analyses are not performed. Section 2.4 tells how to proceed when an Operator analysis is not completed.

5.1.6. About Renaissance...

Figure 56 shows the **About** box for Renaissance. It provides software version information that will be useful should you need customer support.

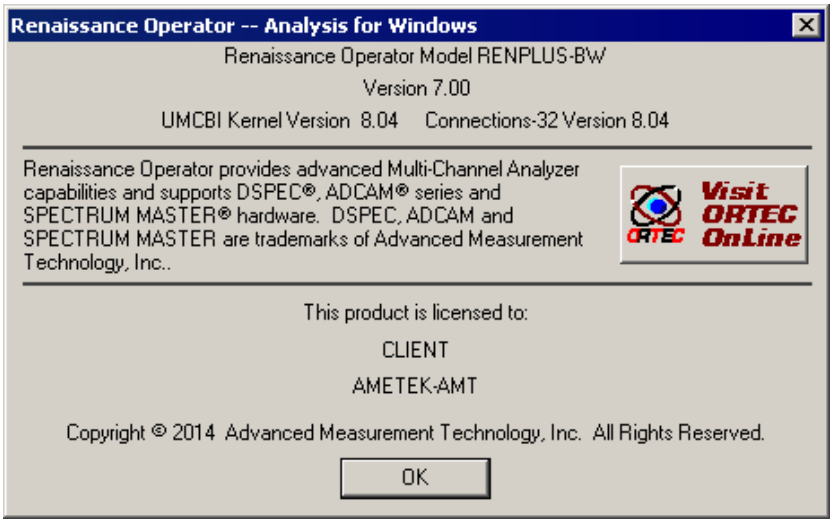


Figure 56. About Renaissance.

5.2. Acquire

The **Acquire** menu is shown in Fig. 57. Access to the various commands depends on the state of the currently selected Detector.

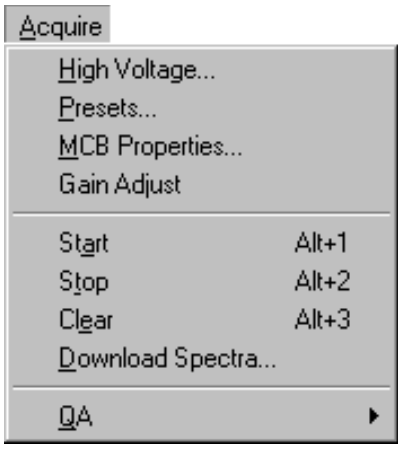


Figure 57. Full Acquire Menu.

NOTE In some cases, a Detector option may be disabled because it is not supported in the current Detector (while it might still be valid for some other Detector in the system, or for this Detector under different conditions).

5.2.1. High Voltage...

This command displays the high voltage properties page for the active Detector. This dialog can be displayed even if **Allow MCB Settings Modifications** has not been enabled in the Supervisor program. The details of the dialog depend on the Detector type and are explained in Section 2.3.1.

5.2.2. Presets...

This command opens the preset property page for the active Detector. The details of the dialog depend on the Detector type and are explained in the “MCB Properties...” section in the Supervisor manual and in the MCB Properties Manual.

NOTE *Do not use this dialog to set or adjust the presets for a routine count, because the presets are determined by settings in the **Scan Type** when you click the **Start Count** button.*

5.2.3. MCB Properties...

This command opens the Properties dialog which, depending on the currently selected MCB, displays several tabs of hardware controls including ADC setup parameters, acquisition presets, high-voltage controls, amplifier gain adjustments, gain and zero stabilizers, pole-zero and other shaping controls, and access to the InSight™ Virtual Oscilloscope. In addition, the Status tab for certain MCBs monitors conditions such as alpha chamber pressure, detector status, charge remaining on batteries, and the number of spectra collected in remote mode. See the Supervisor manual for details.

If the Detector is locked (this is done in the Supervisor program), you must know the password before you can modify its MCB properties. To view a locked Detector’s properties in read-only mode, click **Cancel** when the Unlock Password dialog opens.

5.2.4. Gain Adjust

The **Gain Adjust** wizard is available for NaI detectors only. This function adjusts the Detector amplifier fine gain to center the peak in the defined ROI at the selected center point. The change is made by acquiring spectra for a source that has the desired peak energy. You can adjust all of the Detectors in a group at one time or adjust the currently active Detector. See Section 2.3.2 for instructions on using this feature.

5.2.5. Start

Start simultaneously begins acquisition in all Detectors for the current scan type (**Group of Detectors**) or the active Detector window (**Single Detector**), as shown in Fig. 58. Before issuing this command, you must double-click a detector entry in the Current Scans area to open the corresponding spectrum window. See Section 3.4 for information on using the Current Scans area.

Figure 58. Start One or All Detectors in the Group?

Any hardware warnings will be displayed in a message box or on the Supplemental Information Line at the bottom of the Operator screen. Detectors can also be started with the **<Alt + 1>** accelerator, the **Start Acquisition** button on the Toolbar, or the **Start** command on the right-mouse-button menu. *These four commands are not the same as the **Start Count** command.*

5.2.6. Stop

Stop (Fig. 59) allows you to simultaneously halt acquisition in all Detectors for the current scan type (**Group of Detectors**) or the active Detector window (**Single Detector**). Before issuing this command, you must double-click a detector entry in the Current Scans area to open the corresponding spectrum window.

Figure 59. Stop One or All Detectors in the Group?

See Section 3.4 for information on using the Current Scans area. Detectors can also be stopped with **<Alt + 2>**, **Stop Acquisition** on the Toolbar, or the **Stop** command on the right-mouse-button menu. *These stop commands are not the same as the **Abort Count** command.*

5.2.7. Clear

Figure 60. Clear One or All Detectors in the Group?

Clear (Fig. 60) erases the spectral data and the descriptors (e.g., real time, live time, start time) for all Detectors for the current scan type (**Group of Detectors**) or erases only the active Detector window contents (**Single Detector**). This command might not operate on some types of Detectors during data collection. Before issuing this command, you must double-click a detector entry in the Current Scans area to open the corresponding spectrum window. See Section 3.4 for information on using the Current Scans area.

The data can also be cleared with **<Alt+ 3>**, the **Clear Spectrum** button on the Toolbar, or the **Clear** command on the right-mouse-button menu.

5.2.8. QA

This is explained in Chapter 6, “Quality Assurance.”

5.3. Analyze

Figure 61 shows the **Analyze** menu, which contains commands for analysis setup and peak background correction (PBC).

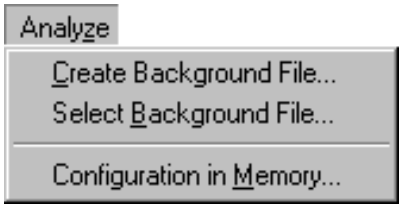


Figure 61. Analyze Menu.

5.3.1. Create Background File...

This starts the PBC wizard, which automatically collects background spectra for the Detectors associated with the current **Scan Type**, analyzes the spectra, creates a .PBC file for each, and loads it as the current internal (working) background file for the corresponding Detector. For instructions on this wizard, see the discussion for the **Create** button in Section 2.3.6.

To use an existing .PBC file as the internal (working) background file, use **Select Background File...**.

5.3.2. Select Background File...

This command opens a file-recall dialog (Fig. 62) that allows you to load a new working .PBC file for the selected Detector. Click the desired file then **Open**.

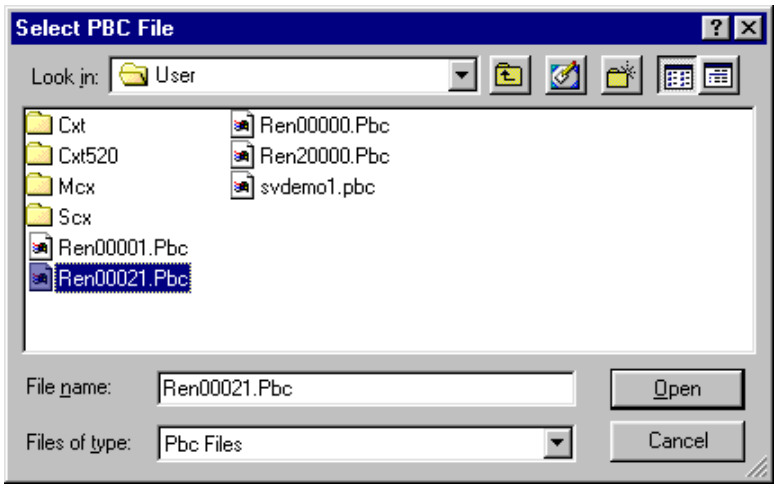


Figure 62. Select PBC File.

5.3.3. Configuration in Memory...

This analyzes the scan data set currently in memory. This is either a newly collected data set, or a data set recalled using **File/Recall Scan Data Set...**. A new entry for the results will be made in the database (i.e., existing results will not be overwritten). When the analysis is complete, the results will be displayed as selected in the **Reports** dialog. If using Motor Control, note that because data acquisition does not occur, the motor will not move.

5.4. Services

The **Services** menu (Fig. 63) contains general utilities.

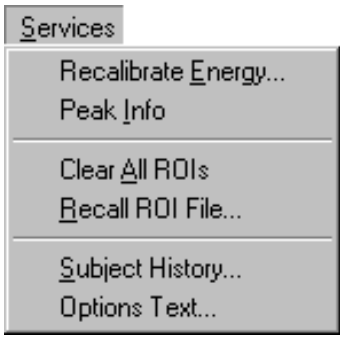


Figure 63. The Services Menu.

5.4.1. Recalibrate Energy...

Use this command to correct the energy calibration in case it has changed. You can recalibrate at any time during the worksession. For instructions on this operation, see Section 2.3.3.

5.4.2. Peak Info

This command displays peak information in a pop-up box at the top of the peak (Fig. 64). You can also display peak information by double-clicking the mouse on the peak or by selecting the **Peak Info** command from the right-mouse-button menu. If the Detector is acquiring data, the values displayed are continuously updated with new values based on the new data.

If the marker is in an ROI, this displays one of the following:

1) If the spectrum is not calibrated, the channel centroid, FWHM, and FW(1/x)M, in channels, are displayed.

2) If calibrated, the channel centroid, FWHM, and FW(1/x)M, in channels and energy, the gross and net area, gross and net peak count rates, activity of isotope (if efficiency calibrated), and the library "best match" are displayed.

If the marker is not in an ROI, the peak limits used are the same as the limits for the **ROI Ins**ert button on the Status Sidebar in the Supervisor program, and the popup information is generated according to items 1 and 2 above.

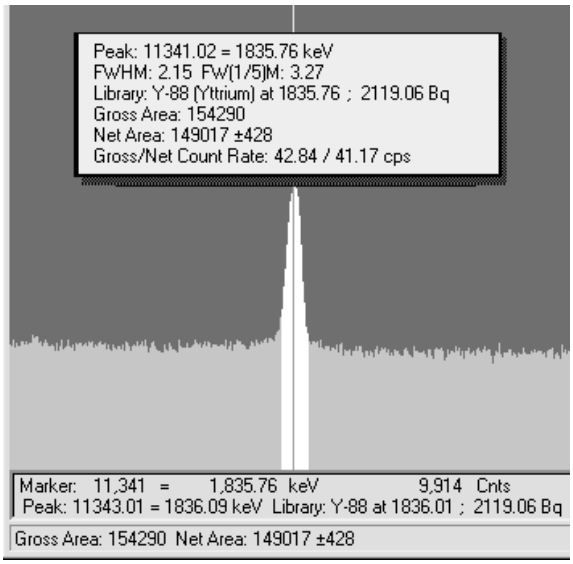


Figure 64. Peak Info Displayed at Top of Peak.

The **Next Peak** and **Previous Peak** buttons on the Status Sidebar move the Peak Info box up and down in the spectrum.

The x-factor is determined in **Calculate/Settings...** in the Supervisor program. To close the box, left-click on it or press **<Esc>**.

See the Supervisor manual for peak calculation details.

5.4.3. Clear All ROIs

This resets all the ROI bits in the displayed spectrum (i.e., removes all ROI markings from the spectrum).

5.4.4. Recall ROI File...

Recall File... sets the ROIs in the buffer or active Detector to the table in the disk file created by the **ROI/Save File...** command in Supervisor, from the table stored in an .SPC file, from the analysis limits in a .UFO file, or from the energies in a library.

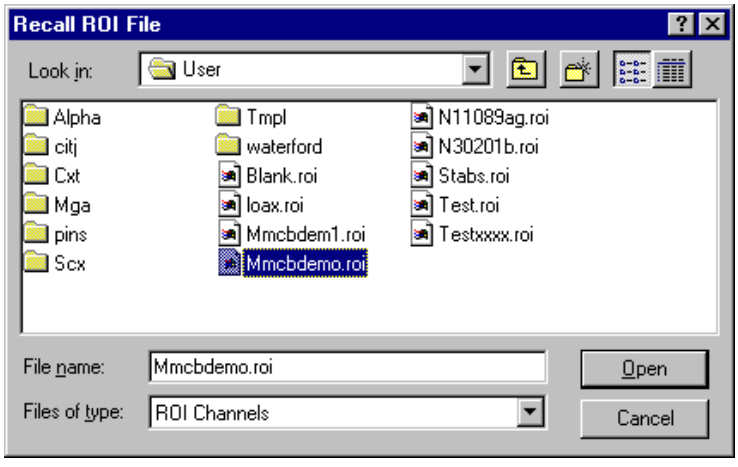


Figure 65. Recall an .ROI File.

This command opens a standard file-open dialog (Fig. 65), prompting for a filename. When a file is selected, the ROIs in the buffer or active Detector are set to conform to the table in the file. Any previous ROIs are cleared. The data contents of the buffer or Detector are not altered by this operation, only the ROI bits.

In .ROI, spectrum, and .UFO files, the ROIs are saved by channel number. Therefore, if the spectrum peaks have shifted in position, the ROIs in the file will not correspond exactly to the spectrum data. For library files, the ROIs are generated using the library energies, and the energy and FWHM calibrations.

5.4.5. Subject History...

This command opens the dialog shown in Fig. 66, which displays all scans in the target database for the person currently displayed in the Scan Control area. The target database is determined by the **Scan Type** selected. To view the list of records for a particular subject, select the desired **Scan Type** on the Operator screen, choose the subject's **Name**, **Badge**, or **SSN** (depending on the key field) from the droplist; then select **Subject History**.

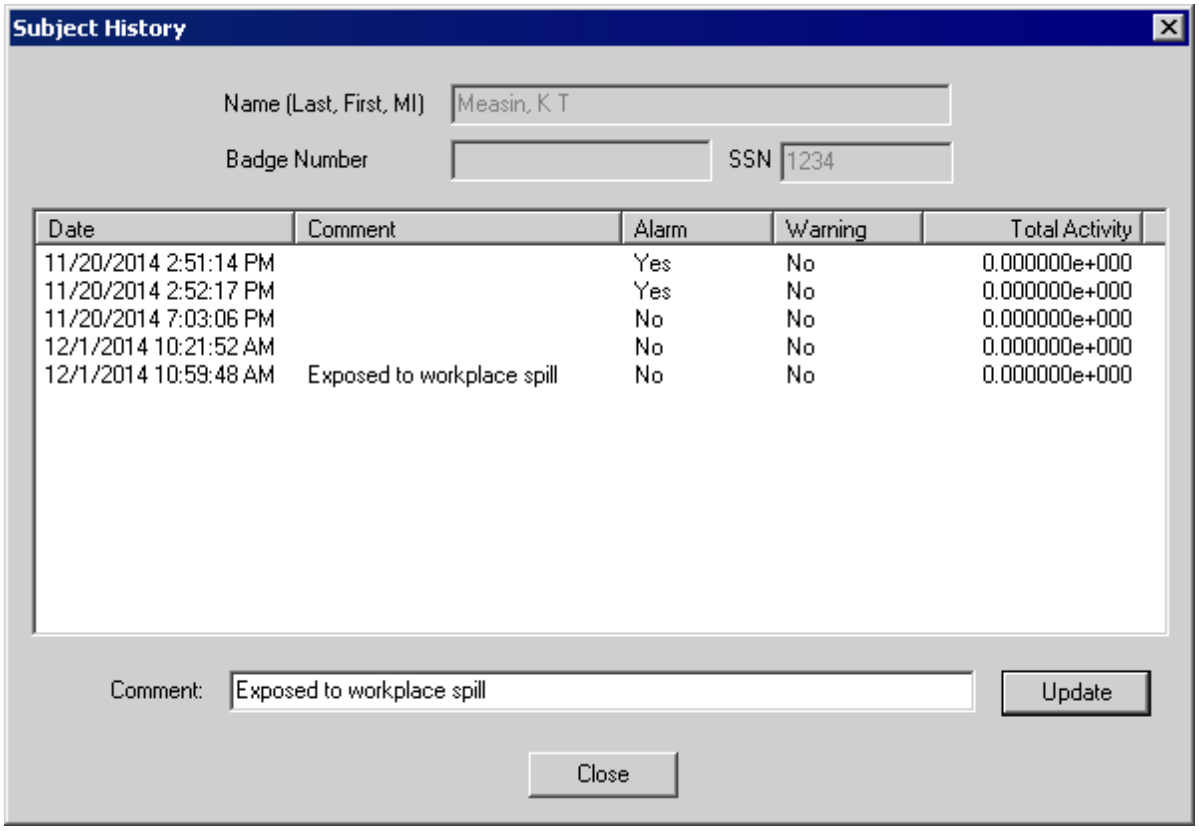


Figure 66. Subject History Dialog Showing All Records for This Subject in the Current Database.

The **Alarm** and **Warning** fields reflect the limits entered under **Services/Alarm Limits...** in the Supervisor program.

To edit the **Comment** for the most recent acquisition or add a comment, click the most recent record to highlight it. The associated comment will now be echoed at the bottom of the dialog. Edit it as necessary, then click **Update**. Click **Close** to return to Operator.

5.4.6. Options Text

Use this command to define up to four additional text fields that will be displayed in the optional comments listbox immediately below the **Comment** field label in the Scan Control Area at the top of the Operator screen. The entries in these fields will be saved in the database as part of the scan data set and included on the report. These options are database-specific.

To set up the optional fields:

- Assign a name for as many of the **Option**s as you wish (see Fig. 67). As you name a field, it is enabled loaded into the optional comments droplist on the Operator screen, as shown in Fig. 68. For best results, once you have named an **Option** field and used it to capture subject information, the option field name should not be edited.

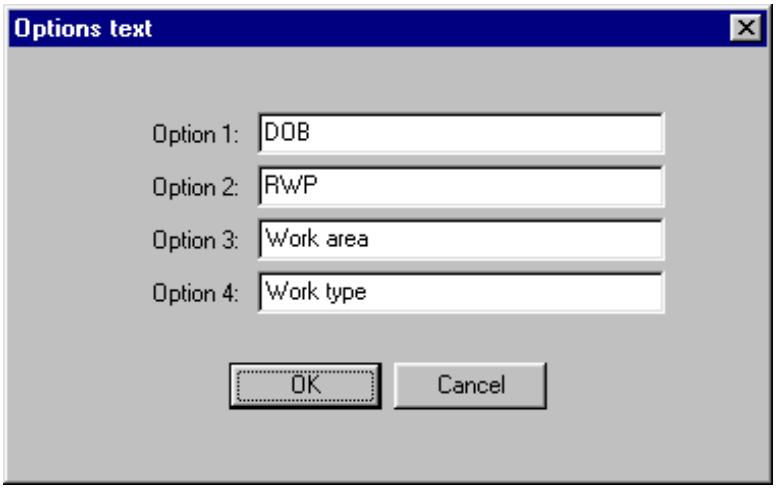


Figure 67. Set Up Optional Text Fields.

- *To store this new setting in the current database, **you must run a test scan**.*

To enter an optional comment, choose a comment category from the list, then enter the corresponding comment in the field to the right. To enter another type of comment, choose again from the list and enter the appropriate comment for that category, and so on.

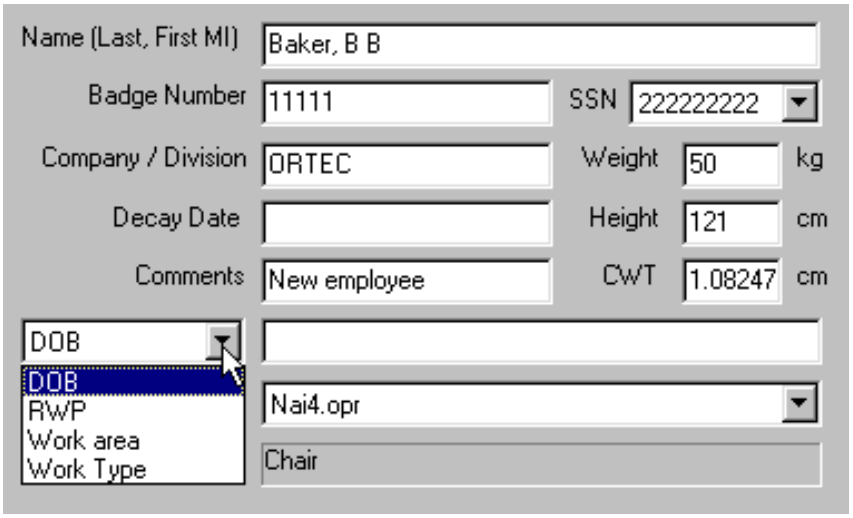


Figure 68. Droplist of Optional Comments Categories.

5.5. Display

The commands on the **Display** menu (Fig. 69) act on the active spectrum window. Most of these functions are duplicated by accelerator keys, and some are also available on the toolbar and the right-mouse-button menu (see Section 5.7). Note that the color and fill characteristics of the spectrum windows are controlled by the display preferences in the Supervisor program.

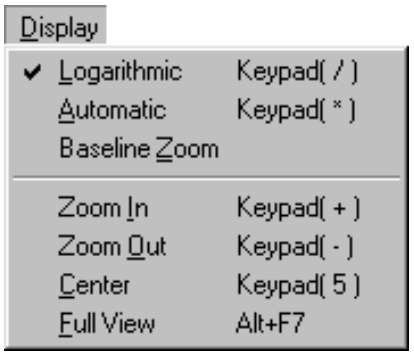


Figure 69. The Display Menu.

5.5.1. Logarithmic

Logarithmic toggles the vertical scale of the Expanded Spectrum View between the logarithmic and linear modes. This function is duplicated by **Keypad</>** and the **Log/Linear Display** button on the Toolbar.

5.5.2. Automatic

Automatic switches the Expanded Spectrum View to a linear scale that is automatically adjusted until the largest peak displayed is at its maximum height without overflowing the display. It also toggles the vertical scale of the spectrum display between the automatic and manual modes. If the logarithmic scale was enabled, the display is switched to linear. This function is duplicated by **Keypad<*>** and the **Vertical Auto Scale** Toolbar button.

5.5.3. Baseline Zoom

Baseline Zero switches to autoscale mode, then sets and keeps the baseline of the expanded display at zero counts. Autoscale is then switched off. This function is duplicated by the **Baseline Zoom** Toolbar button.

5.5.4. Zoom In

Zoom In adjusts the horizontal and vertical scales in the Expanded Spectrum View to view a smaller portion of the spectrum. The vertical scale is divided by two and the horizontal scale is reduced by about 6% of the full horizontal scale. The current horizontal and vertical full-scale values are displayed on the Toolbar (see Fig. 70).

Figure 70. Vertical and Horizontal Full-Scale Setting on the Toolbar.

This command is duplicated by the Toolbar **Zoom In** button, and **Zoom In** on the right-mouse-button menu.

5.5.5. Zoom Out

Zoom Out adjusts the horizontal and vertical scales in the Expanded Spectrum View to view a larger portion of the spectrum. The vertical scale is doubled and the horizontal scale is increased by about 6% of the full horizontal scale.

This command is duplicated by the Toolbar's **Zoom Out** button, and **Zoom Out** on the right-mouse-button menu.

5.5.6. Center

This function forces the marker to the center of the screen by shifting the spectrum without moving the marker from its current channel. This function is only required when moving the marker with the mouse; the keyboard functions for moving the marker automatically shift the spectrum to center the marker when the marker travels past the end of the current expanded display. **Center** is duplicated by **Keypad<5>** and the **Center** button on the Toolbar.

5.5.7. Full View

Full View adjusts the horizontal and vertical scaling to display the entire spectrum in the Expanded Spectrum View. This command is duplicated by **<Alt + F7>**.

5.6. Window

This menu contains standard Windows commands for controlling the display of the spectrum windows (Fig. 71). In addition to the spectrum window display mode (e.g., **Cascade**, **Tile Horizontal**), the list of currently open buffer and Detector windows is displayed. The currently active spectrum is checkmarked. To make a different window the active window, click its entry in the list (you can also cycle through the windows with **<Ctrl + Tab>** or click on a window).

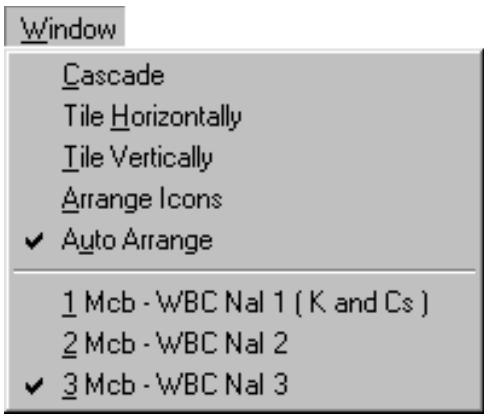


Figure 71. The Windows Menu.

5.7. Right-Mouse-Button Menu

Figure 72 shows the right-mouse-button menu. To open it, position the mouse pointer in the spectrum display, click the right mouse button, then use the left mouse button to select from its list of commands.

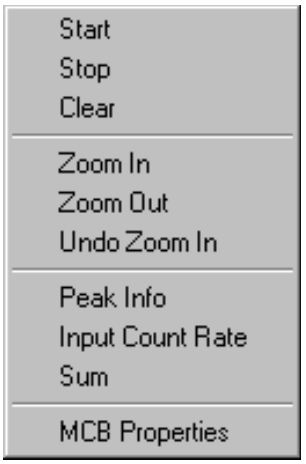


Figure 72. The Right-Mouse-Button Menu.

5.7.1. Start

This initiates data collection in one or all Detectors in the group as described in Section 5.2.5.

5.7.2. Stop

Stop terminates data collection in one or all Detectors in the group as described in Section 5.2.6.

5.7.3. Clear

Clear erases the spectral data and the descriptors (e.g., real time, live time, start time) in one or all Detectors in the group as described in Section 5.2.7.

5.7.4. Zoom In

Zoom In adjusts the horizontal and vertical scales in the Expanded Spectrum View to view a smaller portion of the spectrum. If the rubber rectangle is not being used, the vertical scale is divided by two and the horizontal scale is reduced by about 6% of the full horizontal scale. If the rubber rectangle is being used, the display shows only the contents of the rectangle. The minimum display is 6% of the horizontal full scale. The current horizontal and vertical full-scale values are displayed on the Toolbar. This command (not using the rubber rectangle) is duplicated by the Toolbar's **Zoom In** button and **Zoom In** on the **Display** menu.

5.7.5. Zoom Out

Zoom Out adjusts the horizontal and vertical scales in the Expanded Spectrum View to view a larger portion of the spectrum. The vertical scale is doubled and the horizontal scale is increased by about 6% of the full horizontal scale. This command is duplicated by the Toolbar's **Zoom Out** button and **Zoom Out** on the **Display** menu.

5.7.6. Undo Zoom In

This will undo or reverse the last **Zoom In** operation performed with the rubber rectangle. It restores the display to the horizontal and vertical expansion before the **Zoom In**. It is not the same as **Zoom Out**.

5.7.7. Peak Info

This displays the peak information box described in Section 5.4.2.

5.7.8. Input Count Rate

The input count rate feature is supported by most ORTEC digital spectrometers, and is displayed in the upper left corner of the spectrum window. This is input count rate and not the number of processed pulses. The buffer shows the input count rate when the spectrum was (1) transferred to the buffer from the MCB or (2) saved to disk. If the MCB is stopped, the value displayed is the current input count rate value and not the value when the MCB was stopped.

5.7.9. Sum

The **Sum** function performs its calculation in one of three ways, depending on the position of the marker:

1) If the marker is not in an ROI and a box is not defined, the sum of the data channels of the Detector is displayed. The complete channel width (e.g., 1 to 16384) is summed.

2) If the marker is not in an ROI and a box is defined, the sum of the data channels in the box is displayed.

3) If the marker is in an ROI, the sum of the data channels in the ROI is displayed. This is the same as the gross counts in the **Peak Info** display, but can be used on wider ROIs.

5.7.10. MCB Properties...

This command accesses the MCB setup dialogs discussed in the Supervisor manual (see also Section 5.2.3).

6. QUALITY ASSURANCE

The accuracy and reproducibility of results of a data acquisition system should be verified on a periodic basis. Quality Assurance (QA) in Renaissance supplies a means for doing this in accordance with ANSI N13.30 and N42.14. The detector-shield background, detector efficiency, peak shape, and peak drift can be tracked with warning and acceptance limits. The latter use a check source. These results are stored in a database and can be displayed and charted. The database can be accessed with commercially available database products, including Microsoft Access. The information stored in the database for each detector includes:

- **Total Background** count rate (counts/sec), which is taken without a source.
- **Total Activity** of all nuclide(s) for a given calibration source (decay corrected).
- **Average FWHM ratio** ($FWHM_{Spectrum}/FWHM_{Calibration}$) for a list of peaks present on a calibration source.
- **Average FWTM** (full width at tenth maximum) **ratio** ($FWTM_{Spectrum}/FWTM_{Calibration}$) for a list of peaks present on a calibration source (for Ge spectra only).
- **Average peak shift** average of the deviation of actual peak centroids from expected library energies within a specified range.
- (Optionally) the **Actual centroid energies** of all the library peaks.

The background should be monitored to verify that the detector and shield have not been contaminated by radioactive materials. The value stored is the total count rate which is independent of the count time and any specific Renaissance contamination. A background analysis report is printed after the analysis completes.

The total activity of a calibration or check source will check the efficiency calibration currently in use and the general operating parameters of the system, including source positioning, contamination, library values, and energy calibration. This activity calculation uses the general analysis program to ensure that the total system is checked.

The FWHM and FWTM values check the electronic noise and pole-zero adjustment of the amplifier. The peak shift checks to verify that the system gain and zero offset have not changed.

Figure 73 shows the **QA** submenu under the **Acquire** menu.

Figure 73. The Renaissance QA Menu.

6.1. Measure Background

This command allows you to perform a background QA measurement simultaneously for all Detectors in the currently selected **Scan Type**. For details on performing this measurement, see Section 2.3.5.

6.2. Measure Sample

This command allows you to performs a QA sample measurement simultaneously for all Detectors in the currently selected **Scan Type** to verify that the system is operating properly. For details on performing this measurement, see Section 2.3.4.

6.3. Status...

The QA status for the currently selected Detector is displayed as shown in Fig. 74. Click **OK** to close the dialog.

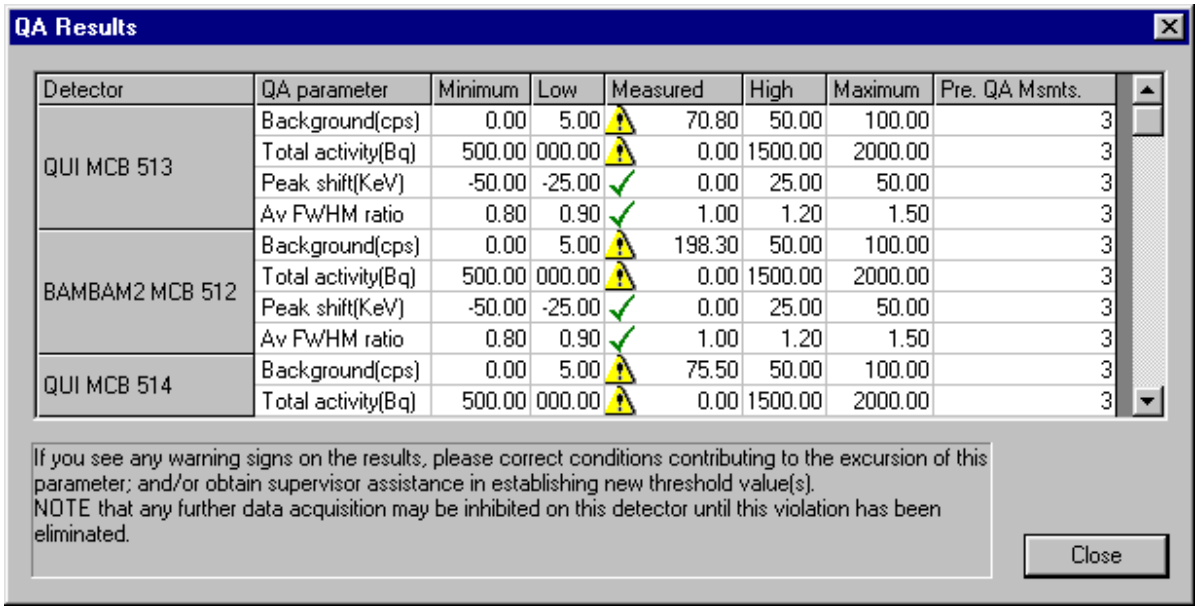


Figure 74. Showing the QA Status of Operator Detectors.

6.4. Control Charts...

The **Control Chart...** functions display the data stored in the QA database as a control chart. The displayed data can be scrolled backward or forward across the screen so that all collected data can be viewed. A typical chart is shown in Fig. 75. The short dashed lines represent the warning limits and the long dashed lines represent the acceptance threshold limits.

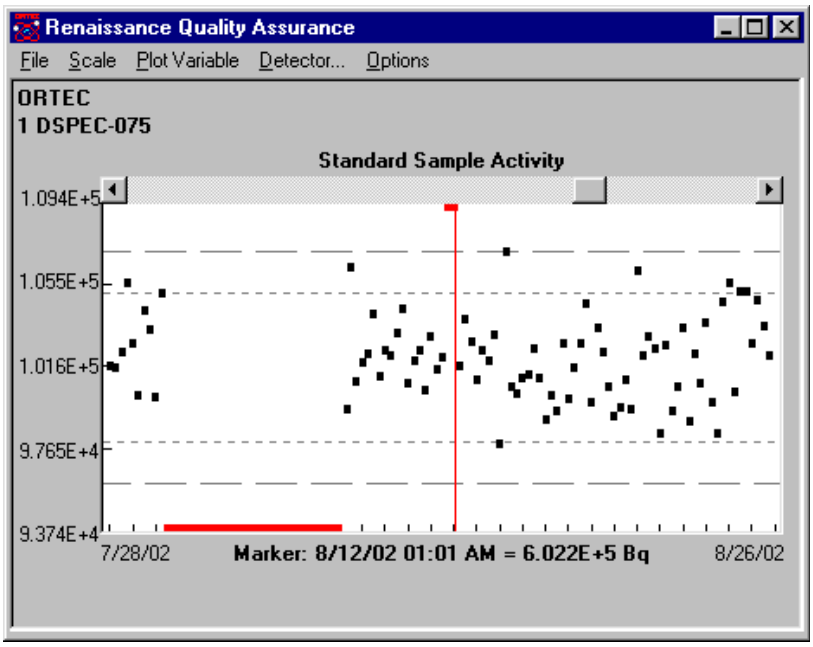


Figure 75. Control Chart Example.

Figure 76 shows the control chart **File** menu, which contains the **Print Graph** command for printing the current graph on the current printer; a standard Windows **Print Setup...** command for selecting the printer and its setup features, such as landscape vs. portrait layout, paper size, number of copies, and device control options; the **Exit** command for closing the QA Chart Program (this duplicates the dialog upper-right Close box); and an **About** box providing version information about the chart program.

Choose the chart time period (**Week**, **Month**, or **Quarter**) from the **Scale** menu (Fig. 77).

The **Plot Variable** menu (Fig. 78) contains functions for selecting **Activity**, **Peak Energy**, **Peak Width @ Half Max**, **Peak Width @ Tenth Max**, or **Background**.

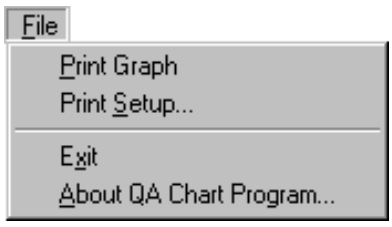


Figure 76. QA Chart File Menu.

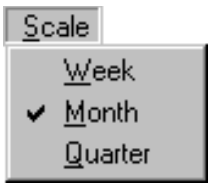


Figure 77. Scale Menu.

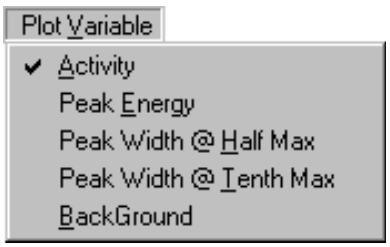


Figure 78. Plot Variable Menu.

The **Detector** menu item opens the list of Detectors for which background and sample measurements have been made (Fig. 79). Select a Detector for this control chart and click on **OK**.

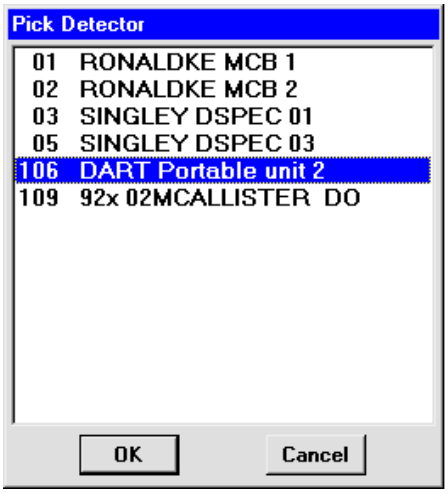


Figure 79. Detector Pick List.

Off-line processing of the QA data-base (including detailed trend analyses) can be done outside of Renaissance. The database format used is well-documented and compatible with a number of popular software products including Microsoft Access.

NOTE ***We strongly recommend that you back up any Renaissance database files before performing manipulations on them outside of Renaissance.***

The **Options** menu (Fig. 80) includes an **Always On Top** command, which keeps the QA window on top of all other windows, no matter which window (in Renaissance or any other program) might be active.

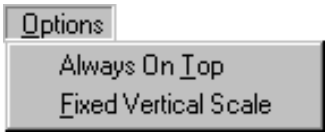


Figure 80. QA Chart File Menu.

The **Fixed Vertical Scale** command adds flexibility in displaying control charts both on-screen and on printouts, for comparison with other charts.

- **Fixed Vertical Scale Off** (no check mark) — In this mode, the vertical scale of the graph is adjusted so that all points are shown to scale. All points are black. If one or more data points are substantially out of range, the graph could be quite compressed vertically.

- **Fixed Vertical Scale On** (check mark) — In this mode, the vertical scale of the graph is set to show the upper and lower alarm limits as full scale. The data points within the alarm limits are colored black. Out-of-range points are displayed in red at the lower or upper limits of the graph, at the proper horizontal coordinate. The out-of-range points are printed as a question mark (**?**).

To switch between the two display modes, click the menu item to mark it with a checkmark or unmark it.

Figures 81 through 84 show the screen and printout for a QA data set with **Fixed Vertical Scale** on, then off. Compare the location of the points that exceed alarm limits in Figs. 81 and 82 to the location of the question marks in Figs. 83 and 84.

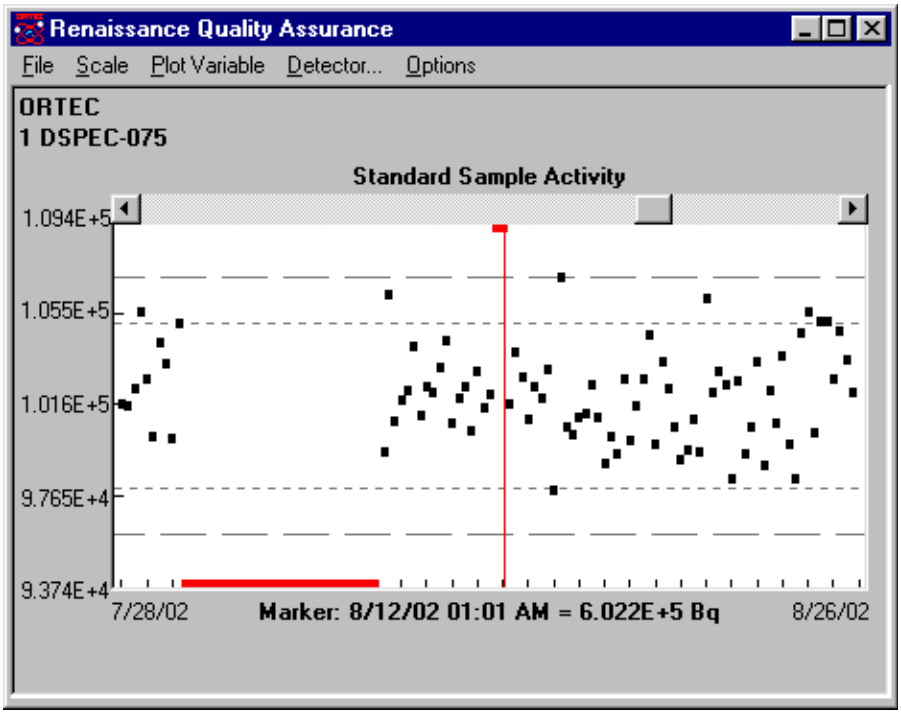


Figure 81. Control Chart On Screen with Fixed Vertical Scale On.

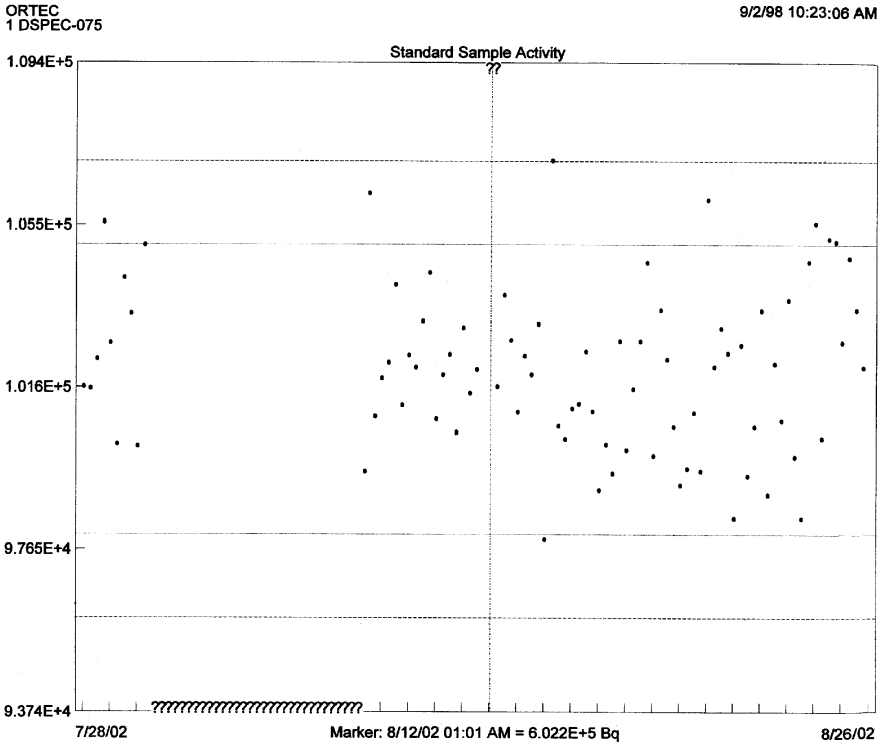


Figure 82. Printout of Control Chart with Fixed Vertical Scale On.

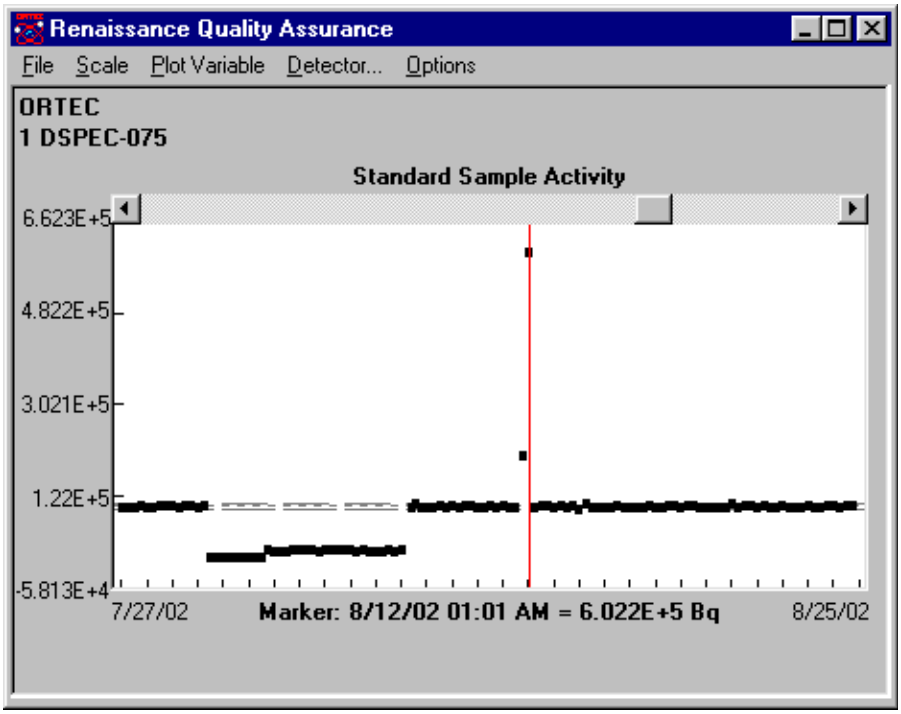


Figure 83. Control Chart On Screen with Fixed Vertical Scale Off.

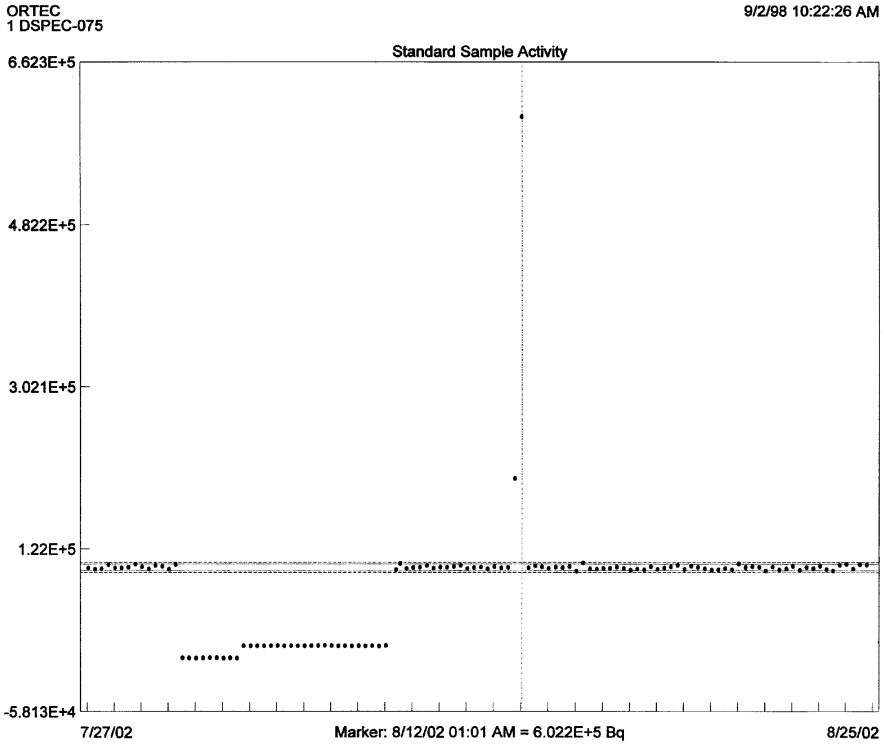


Figure 84. Printout of Control Chart with Fixed Vertical Scale Off.

7. KEYBOARD ACCELERATORS

This chapter describes the Renaissance accelerator keys. The keys described in this section are grouped primarily according to location on the keyboard and secondarily by related function.

7.1. Introduction

Table 1 provides a quick reference to all of the Renaissance keyboard and keypad functions. These accelerators are also illustrated in Fig. 85, and discussed in more detail in the remainder of the chapter.

The accelerators operate only in the active window. The Title Bar must be highlighted with the active title bar color (as set up in Windows Control Panel). In addition, the cursor must be in the active spectrum window. Similar to other Windows applications, the focus can be switched between Renaissance and other applications by clicking on the Windows Taskbar, pressing **<Alt + Tab>**, or, if the inactive window is visible, pointing with the mouse at some spot in the inactive window and clicking.

The multi-key functions, such as **<Alt + 1>** or **<Shift + →>**, are executed by holding down the first key (e.g., **<Alt>**, **<Shift>**, or **<Ctrl>**) while pressing the key that follows the "+" sign in the brackets, then releasing both keys simultaneously. Functions that use the keypad keys begin with the word **Keypad**, e.g., **Keypad<5>**.

As usual for any Windows application, the menus are accessed by clicking on them with the mouse, or by using the **Alt** key plus the key that matches the underlined letter in the menu item name. For example, the multi-key combination to activate the **File** menu is **<Alt + F>**.

Note that the Renaissance accelerator keys do not interfere with Windows menu operations or task switching. For example, when a menu is active (i.e., pulled down), the <←>/<→> and <↑>/<↓> keys revert to their normal Windows functions of moving across the menu bar and scrolling up/down within a menu, respectively. As soon as the menu is closed, they behave as Renaissance accelerators again.

7.2. Marker and Display Function Keys

7.2.1. Next Channel **<→>/<←>**

When not in rubber-rectangle mode, the right and left arrow keys move the marker by one displayed pixel in the corresponding direction. This could represent a jump of more than one spectral data memory channel, especially if the horizontal scale in channels is larger than the width in pixels of the window (see the discussion in Section 3.1).

Table 1. Quick Reference to Renaissance Operator Accelerator Keys.

Key	Function
<↓> or <F5>	Change vertical scale so spectrum peaks are smaller.
<↑> or <F6>	Change vertical scale so spectrum peaks are larger.
<→>	Move marker to higher channel.
<←>	Move marker to lower channel.
<–> or <F7>	Narrow the horizontal scale.
<+> or <F8>	Widen the horizontal scale.
<Ctrl + →>	Jump to next higher peak.
<Ctrl + ←>	Jump to next lower peak.
<Shift + →>	Jump to next higher ROI.
<Shift + ←>	Jump to next lower ROI.
<Alt + →>	Move to next (higher-energy) library entry.
<Alt + ←>	Move to preceding (lower-energy) library entry.
<PageUp>	Jump to higher channel number in 1/16th-screen-width increments.
<PageDown>	Jump to lower channel number in 1/16th-screen-width increments.
<Home>	Jump to first channel of the full spectrum.
<End>	Jump to last channel of the full spectrum.
<F3>	In digital spectrometers that support ZDT mode, switch between the two spectra stored in ZDT mode.
<Shift + F3>	In digital spectrometers that support ZDT mode, switch the disk spectrum to compare normal to disk ZDT spectrum or ZDT spectrum to disk normal spectrum.
<F5> or <↓>	Change vertical scale so that spectrum peaks are smaller.
<F6> or <↑>	Change vertical scale so that spectrum peaks are larger.
<F7> or <–>	Narrow the horizontal scale.
<F8> or <+>	Widen the horizontal scale.
<Alt + F7>	Reset both horizontal and vertical scaling to view complete spectrum.
Keypad<–>	Expand the x-axis by a factor of two (making peaks look narrower) without changing the vertical scaling.
Keypad<+>	Contract the x-axis by a factor of two (making peaks look broader) without changing the vertical scaling.
Keypad<5>	Center expanded display on cursor.
Keypad</>	Switch to logarithmic vertical scale.
Keypad<*>	Switch to auto vertical scale.
<Shift + ↑>	Shift the compare spectrum upwards.
<Shift + ↓>	Shift the compare spectrum downwards.
<Alt + 1>	Start acquisition in selected Detector.
<Alt + 2>	Stop acquisition in selected Detector.
<Alt + 3>	Clear data in selected Detector.
<Alt + –>	Decrease amplifier fine gain by smallest increment (where supported).
<Shift + Alt + –>	Decrease amplifier fine gain by several increments.
<Alt + +>	Increase amplifier fine gain by smallest increment.
<Shift + Alt + +>	Increase amplifier fine gain by several increments.
<PrintScreen>	Capture screen to Windows Clipboard.

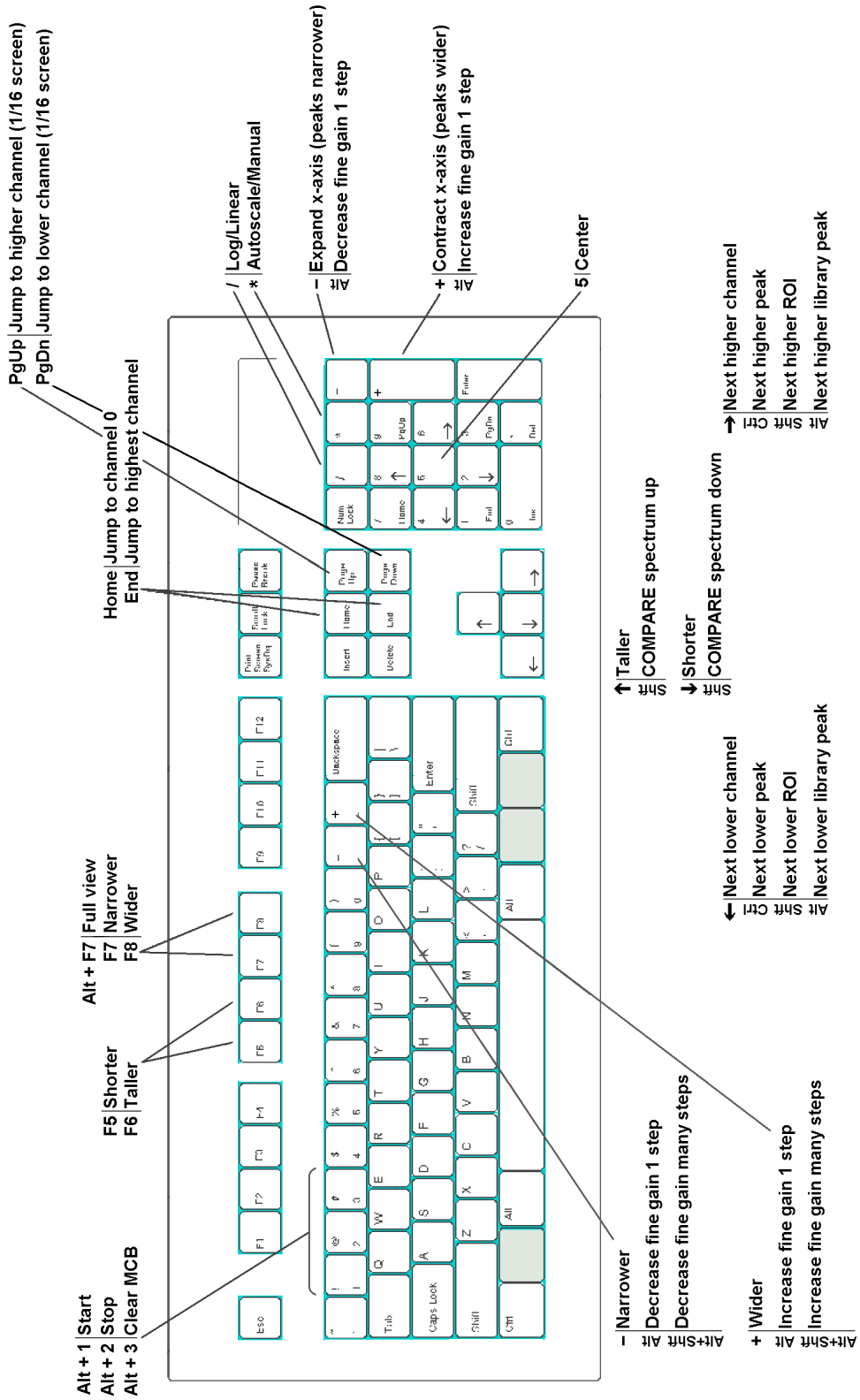


Figure 85. Renaissance Keyboard and Keypad Accelerators.

If the horizontal scale is expanded, when the marker reaches the edge of the spectrum window, the next key press past the edge shifts the window to the next block of channels in that direction such that the marker is now in the center of the display.

When the ROI mode is set to **Mark**, the <→>/<←> keys cause the channels to be marked as the marker moves. Similarly, they clear the ROI bits while the ROI mode is **UnMark** (see the Supervisor user manual).

7.2.2. Next ROI <Shift + →>/<Shift + ←>

The <**Shift** + →> or <**Shift** + ←> move the marker to the beginning of the next higher channel ROI, or the end of the preceding ROI, respectively, of the displayed spectrum. These functions are duplicated by the **ROI** indexing buttons on the Status Sidebar.

7.2.3. Next Peak <Ctrl + →>/<Ctrl + ←>

The <**Ctrl** + →> and <**Ctrl** + ←> keys perform a peak search on the spectrum in the higher or lower channel direction, respectively, and move the marker to the first peak found. If no peak is found, the program displays the "**No More Peaks**" message and the marker does not move. If the spectrum is energy-calibrated and the library loaded, the system displays the best match from the library within two FWHMs of the peak centroid. If there is no match within this range, the "**No Close Library Match**" message is displayed. These functions are duplicated by the **Peak** indexing buttons on the Status Sidebar.

7.2.4. Next Library Entry <Alt + →>/<Alt + ←>

These keys move forward or backward through the nuclide library to the next closest library entry. Each button press advances to the next library entry and moves the marker to the corresponding energy. Also, instead of indexing from a previously identified peak, the marker can be positioned anywhere in the spectrum and these keys used to locate the entries closest in energy to that point. If a warning beep sounds, it means that all library entries have been exhausted in that direction, or that the spectrum is not properly calibrated for reaching the energy with the marker. In any case, if an appropriate peak is available at the location of the marker, data on the peak activity are displayed on the Marker Information Line. These functions are duplicated by the **Library** indexing buttons on the Status Sidebar.

7.2.5. First/Last Channel <Home>/<End>

These keys move the marker to the first or last channel of the spectrum.

7.2.6. Jump (Sixteenth Screen Width) <PageDown>/<PageUp>

<**PageDown**> and <**PageUp**> jump the marker position to the left (to lower channel numbers) or right (to higher channel numbers), respectively, 1/16 of the window width, regardless of the horizontal scale. The marker channel contents and Marker Information Line are continuously updated as the marker jumps, so when the jump is complete, the marker information is up-to-date for the current channel.

7.2.7. Taller/Shorter <↑>/<↓>

When not in rubber-rectangle mode, the <↑> and <↓> keys decrease or increase the vertical full scale of the displayed spectrum so the peaks appear taller or shorter, respectively. The minimum is 16 counts-full-scale; the maximum is 1024 million counts. Each successive key press doubles or halves the full scale until the maximum or minimum is reached. Whenever the maximum full-scale value is reached, the next <↑> key press switches to logarithmic scale. If the display is already in logarithmic scale, the display switches to linear scale. In either case, the vertical full-scale value is always displayed on the Toolbar. These keys duplicate the function of the <**F6**>/<**F5**> keys.

Note that if the number of counts exceeds the full-scale value, the data points will be displayed at the full-scale value.

7.2.8. Shift Compare Spectrum Up/Down <Shift+↑>/<Shift+↓>

In Compare mode, the <**Shift** + ↑> or <**Shift** + ↓> keys decrease or increase the vertical separation between the two spectra. Each successive key press will increase or decrease the separation by moving the spectrum read from disk. The spectrum from disk can be moved below the first spectrum if it has fewer counts.

7.2.9. Zoom In/Zoom Out With No Change in Log/Lin Scale Keypad<+>/<–>

Keypad<+> and **Keypad**<–> respectively contract the x-axis (making peaks look broader) and expand it (making peaks look narrower) by a factor of two without affecting the vertical scale or switching between logarithmic and linear scaling. The scale value for both axes is always displayed on the Toolbar.

7.3. Keyboard Number Combinations

NOTE Only the key*board* numbers will function in the following combinations. The key*pad* number keys will *not* perform these functions.

7.3.1. Start <Alt + 1>

<**Alt + 1**> starts the acquisition in the selected Detector(s). Any presets desired must be entered before starting acquisition. This accelerator duplicates the **Start** toolbar button.

7.3.2. Stop <Alt + 2>

<**Alt + 2**> stops acquisition in the selected Detector(s). This duplicates the **Stop** toolbar button.

7.3.3. Clear <Alt + 3>

<**Alt + 3**> clears the histogram data and its descriptors (e.g., real time, live time) in the selected Detector(s). This accelerator duplicates the **Clear Spectrum** Toolbar button.

7.3.4. Narrower/Wider <+>/<–>

The <+> key increases the horizontal scale of the Expanded Spectrum View so the peaks appear wider, while the <–> key decreases the horizontal scale, making the peaks look narrower. The horizontal and vertical scale values are displayed on the Toolbar. These functions are duplicated by <**F7**>/<**F8**>.

7.4. Function Keys

7.4.1. Taller/Shorter <F5>/<F6>

These keys decrease or increase the vertical full scale of the displayed spectrum so the peaks appear taller or shorter, respectively. They duplicate the function of the <↑> and <↓> keys. The vertical scale value is always displayed on the Toolbar.

7.4.2. Narrower/Wider <F7>/<F8>

These keys increase or decrease the horizontal scale of the data display so the peaks appear narrower or wider, respectively. They duplicate the function of <–> and <+> keys. The horizontal scale value is always displayed on the Toolbar.

7.4.3. Full View <Alt + F7>

This adjusts the horizontal and vertical scaling of the expanded spectrum view to the full spectrum height and width. This is duplicated by **Display/Full View**.

7.5. Keypad Keys

7.5.1. Log/Linear Keypad</>

Keypad</> toggles the active spectrum window between logarithmic and linear vertical display. This is duplicated by the **Log** Toolbar button. The vertical scale can be controlled with the **Zoom In**/**Zoom Out** Toolbar buttons, the <↑> and <↓> keys, and <**F7**/**F8**>.

7.5.2. Auto/Manual Keypad<*>

Keypad<*> switches the spectrum window between automatic and manual vertical full scale (see the discussion in Section 5.5.2). This is duplicated by the **Vertical Auto Scale** button on the Toolbar.

7.5.3. Center Keypad<5>

Keypad<5> forces the marker to the center of the screen by shifting the spectrum without moving the marker from its current channel. This is duplicated by the **Center** button on the Toolbar. For more information, see Section 5.5.6.

7.5.4. Zoom In/Zoom Out With No Change in Log/Lin Scale Keypad<+>/<–>

Keypad<+> and **Keypad**<–> respectively contract the x-axis (making peaks look broader) and expand it (making peaks look narrower) by a factor of two without affecting the vertical scale or switching between logarithmic and linear scaling. The scale value for both axes is always displayed on the Toolbar.

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