

Apex-Alpha™ Alpha Spectroscopy Software Suite

9238047E V1.4

User's Manual



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Mirion Technologies (Canberra), Inc., 800 Research Parkway, Meriden, CT 06450 Tel: 203-238-2351 FAX: 203-235-1347
www.mirion.com

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For technical assistance, call our Customer Service Hotline at 1-800-255-6370 or email techsupport@mirion.com.

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1. Introduction to Apex-Alpha

Welcome to Apex-Alpha™ Alpha Spectroscopy Software Suite for alpha spectroscopy sample counting facilities. Apex-Alpha has been designed to enhance your lab operation – providing you with new levels of efficiency and productivity. Within the Apex-Alpha software you will find numerous features never before seen in commercial alpha spectroscopy software – features designed to assist with many of the ancillary tasks associated with running the lab.

Using a state-of-the-art database architecture, Apex-Alpha gives you unsurpassed facilities to manage count room data – from anywhere in or around the lab. Apex-Alpha generates operational documents you need for quality assurance, regulatory requirements, and chain-of-custody. It provides a straightforward multi-chamber user interface that makes it easy to see the state of the entire system at a glance. It provides unique facilities to enforce QA and calibration schedules, ensure QA corrective action, perform data review and log all activities. A comprehensive security system ensures that work can be performed only by those authorized to do so.

Most important, Apex-Alpha lets you run your lab your way. Extensive flexibility is built into the system with numerous setup options. You provide the nomenclature for the structures the operators use every day – detectors, geometries, procedures, and more. Thanks you for joining the ranks of Apex-Alpha users – we know you'll be satisfied and we look forward to serving you in the future.

About this Manual

The Apex-Alpha Alpha Spectroscopy Software User's Manual is organized to lead both the System Administrator through all the steps required to set up the system and the daily Operator through all the Apex-Alpha functions.

Chapters

Chapter 2, **Plan Before You Begin**, this chapter is paramount in understanding the planning that's required of the System Administrator before an Apex-Alpha system can be set up.

Chapter 3, **Overview of Apex-Alpha Interface**, this chapter introduces you to the features and layout of the Apex-Alpha System and its user interface

Chapter 4, **System Setup**, this chapter explains each of the Setup View's functions. Information that will be used by the System Administrator in setting up the system using the planning worksheets filled out in the appendix, *Planning Forms* on page 248.

Chapters 5-11, **Apex-Alpha's "Views"**, groups of Apex-Alpha operations, are covered in detail in the remaining chapters.

Appendices

Appendix A, **Software Installation**, provides complete information on installing the SQL Servers and installing and maintaining the desktop system.

Appendix B, **Hardware Setup**, provides information on how to set up the hardware after the software is installed.

Appendix C, **Algorithms**, this appendix describes the algorithms used by Apex-Alpha.

Appendix D, **Installing the Null Printer**, provides instruction on how to install a Null printer.

Appendix E, **LIMS Integration**, describes the setup and use of Apex-Alpha LIMS Integration.

Appendix F, **Planning Forms**, provides the planning worksheets to help setup your system.

2. Plan Before You Begin

Apex-Alpha provides extraordinary flexibility for the user to tailor the software to match plant or lab operating practices. It is designed to adapt to your operation - rather than to require you to adapt your operation to it. However, along with this flexibility comes the necessity to plan the Apex-Alpha installation by first considering your current operation.

This chapter is intended to guide you through the planning process - a key step towards successfully configuring Apex-Alpha to your environment. We'll introduce key Apex-Alpha terminology and data structures here, describe their use and give examples of how they may be used in specific counting facility scenarios.

Worksheets

A set of worksheets, found in the appendix *Planning Forms* on page 248, will help you plan your facility. You'll want to make copies of these worksheets, found in the manual's PDF file, supplied on the Apex-Alpha CD-ROM.

One copy will be sufficient for most worksheets, but some worksheets, such as Procedures, will probably require many copies.

Workstations and Devices

Apex-Alpha requires you to assign specific devices to specific workstations known as the controlling workstation. This allows a specific workstation to be used to perform all hardware-oriented operations such as starting and stopping counts. All workstations will have the ability to monitor counts on any chamber, but only one is designated the controlling workstation. You will need to determine which workstations control which devices as part of setting up this system. Note, however, that you can change the controlling workstation at a later time if desired.

Detectors

Within the Genie™ 2000 environment that underlies Apex-Alpha, Device inputs can be defined in any host computer or computers with access to the physical device. For example, a networked device, such as the Alpha-Analyst, can be configured from any physical CPU host on the network. These definitions are done via the MCA Input Definition (MID) process described in the *MCA Input Definition* chapter of the *Genie 2000 Operations Manual*.

However, the Genie 2000 software provides a unique capability: any host CPU on a network can access devices on any other networked CPU via the CPU for which that device has been defined. This way, an MCA designed for single computer hosting can be accessed from anywhere within a networked system. In a multi-CPU / multi-user / multi-detector environment such as Apex-Alpha, this capability is heavily used for management and organizational purposes - to maintain a single set of detector related information while still ensuring multi-user access to those resources.

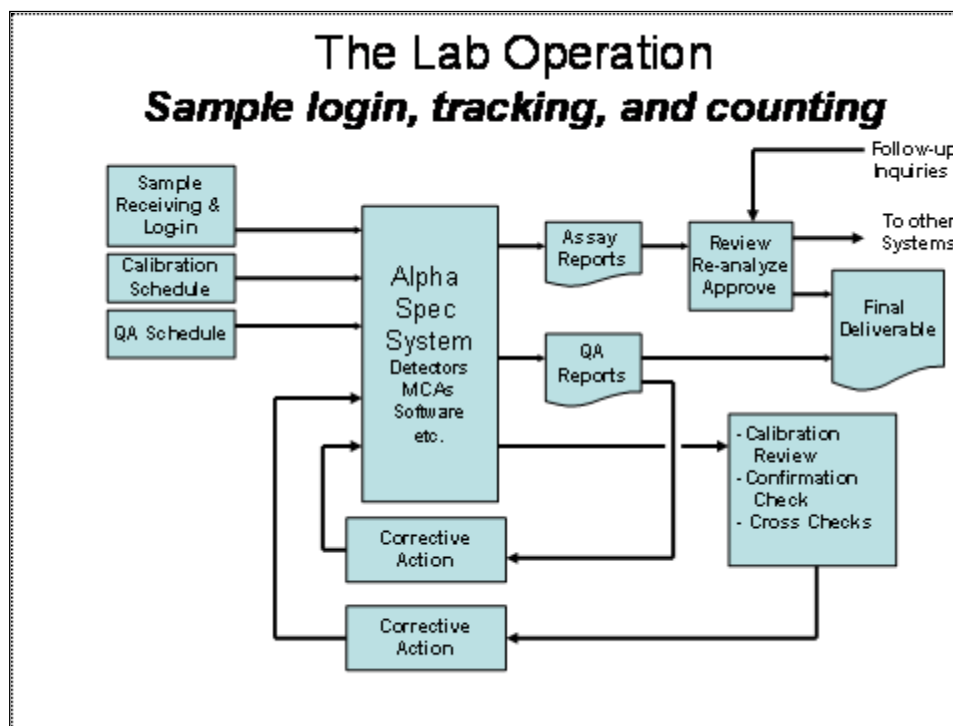


Figure 1: Alpha Spectroscopy System

To accomplish this, detector setup in Apex-Alpha is done in two steps - first a local definition of the MCA to define its physical host, second its assignment to Apex-Alpha. In planning the installation, you will need to decide which devices to assign to which physical (local) host. Some users prefer to assign all devices to a single host to centralize management of the devices. Others may choose to distribute the local assignments across multiple hosts for purposes of fault tolerance (for example, to prevent the failure of a single host from affecting access to all detectors). Some may compromise by implementing a combination of these approaches.

Once the local definition of the devices is completed, the next step is to assign them to Apex-Alpha. Within Apex-Alpha, they are assigned names that will be used throughout the Apex-Alpha environment. Detector names can be up to 32 characters in length and the remote computer name must be eight or fewer characters in length. Use this information to fill in the Devices worksheet.

Counting Geometries

There are numerous types of efficiency calibrations that must be set up and tracked for each detector. Associated with these calibrations may be different counting geometries, sources, and related certificate files. The multiple shelf positions in each spectrometer and the Geometry List let you count samples in different geometries. In the most common case, each shelf position (which is the distance between the source and the face of the detector) can be thought of as a different geometry. However, geometries include other characteristics of the samples, such as the physical form or preparation of the sample or the operating mode. You need to appreciate that a separate calibration must be performed for each geometry (shelf position, sample preparation, recoil suppression vs. low vacuum mode) that will be used in a spectrometer. If there are any other characteristics that would appreciably affect the observed spectrum, you probably should perform additional calibrations.

As a result, your calibration screen uses selections from the Geometry List and Sample ID for inclusion of these different geometries such as Shelf 1-Filter Paper or Shelf 1-Recoil, and so forth. Once a spectrometer is calibrated, Apex-Alpha uses the calibration information attached to a particular calibration sample to ensure that the correct Efficiency information is applied to the acquisition and analysis of each sample spectrum.

Create a geometry name for each that is easy to identify for later use. When defining procedures and counting samples in the Apex-Alpha system, this name will be used in the user interface to keep track of the efficiency calibrations associated with each counting geometry and detector. Descriptions of the geometry can be up to 64 characters in length.

General Parameters

Sample Units

Develop a list of all the units of sample size that are to be used in the laboratory. Typically units are units of volume (cc, ml, L), mass (g, kg, lb), area (cm², ft²), and even non-standard units such as “items”.

Libraries

Gather all the nuclide library names and file names. These libraries can be transferred from Genie-AMS systems, Alpha Analyst, or other Genie 2000 systems if needed. These library names will be used when setting up Apex-Alpha Procedures. Develop names that are easily identified during procedure development.

ROI/Sum Direct Parameters and Analysis Sequences

The use of Region of Interest (ROI)/Sum Directed Parameters is the primary mechanism used to quantify typical alpha emitters by APEX-Alpha. This tool allows the user to specify the start and ending energy, type of ROI, and identifies the tracer peak for processing the alpha spectrum. Additional parameters are selected that are associated with the processing of the specified ROI such as Peak Search Tolerance, Peak Area Parameters, Activity Calculations with and without tracer, Decay Correct during the Count, Background Subtraction, reagent blank subtraction, MDA Calculation and any associated Post-Processing Script.

The Genie 2000 analysis sequence file (ASF) is another mechanism used to define the analysis parameters for the Apex-Alpha system. An ASF file can be created for each set of analysis parameters you will be using. Genie 2000 analysis facilities are described in detail in the Genie 2000 User documentation.

Note that Genie 2000's Analysis Sequence function lets the user specify parameters that are specified separately in Apex-Alpha. For example, the function lets you define acquisition time, reports, QA transfer steps, and nuclide libraries. In Apex-Alpha, these are defined at the time a "procedure" is created (see below) - therefore, *any such information you define in the ASF file will be ignored at run time*. All the possible analysis sequences must be detailed to cover the possible types of analyses the laboratory requires to complete all required tasks. Develop descriptive names of these analysis sequences to help identify them later. An analysis list is available in the analysis sequence editor.

Fill in this information to be referred to when creating Apex-Alpha Procedures.

Report Profiles

The Genie Spectroscopy Software Template Report System is used for Apex-Alpha reports. It is designed for complete flexibility in report outputs, an approach that has several advantages:

- Establish different report types for different applications.
- Define 'detail' and 'summary' formats for various users, reviewers, permanent records, and so forth.
- Output data to file in a format defined by you. This allows data to be transferred to other programs that can accept ASCII input data, such as spreadsheets, databases and user written programs.

To accomplish this, the Template Report System's output is controlled by an ASCII template file, which contains all report format information, such as Column and Row Headings, Text Messages, and Numerical and Alphanumeric Formats. Arithmetic Manipulation, Logic Tests and Variable Processing can also be handled within reports. Report templates can be divided into sections for those times when you want to print less than a complete report. The *Genie 2000 Customization Tools Manual* describes the definition, setup, and modification of a template file.

Apex-Alpha Procedures

Apex-Alpha Procedures bring together all the parts from the previous sheets. Consider that each counting geometry will need to have at least one procedure. If different nuclide libraries are to be used, a procedure will have to be created for each geometry/nuclide library combination. This will also have to be done with the analysis sequences, report profiles, and other items listed on the Apex-Alpha Procedure sheet. Each combination will require a unique procedure with the possible exception of different preset live times. The procedure also incorporates count time, destination of data and other aspects that delineate a specific kind of sample.

Procedure Groups

To help group the different types of procedures into smaller groups, a series of names should be developed to help to categorize the Apex-Alpha Procedures. These groups may be something as simple as Liquid, Gas and Filters or High level and Low level for a power plant or Soil, Water, Filters and Vegetation for an environmental lab. Other possible groups may be those related to Analyte Regions of Interest such as Americium, Neptunium, Plutonium, Thorium, and Uranium. These groups will then help to organize available procedures for easy selection when creating a sample. This list may best be developed after all the Apex-Alpha Procedures have been considered and a natural "division" becomes apparent. Too many procedure groups will serve little purpose if there are too few Apex-Alpha Procedures in each group. However, too many Apex-Alpha procedures in a group can be as much of a problem. A group containing 3-8 Apex-Alpha procedures would typically be a good division, though there may be exceptions to this guideline.

Worksheets

A set of worksheets, found in the appendix *Planning Forms* on page 248, will help you plan your facility. You'll want to make copies of these worksheets, found in the manual's PDF file, supplied on the Apex-Alpha CD-ROM.

One copy will be sufficient for most worksheets, but some worksheets, such as Procedures, will probably require many copies.

3. Overview of Apex-Alpha Interface

This Introduction describes general Apex-Alpha operations, such as:

- The logon procedure
- The Apex-Alpha Menu commands
- Apex-Alpha function buttons common to many data entry pages.

The User Interface

This section introduces you to the Apex-Alpha System user interface.

Structure of the Apex-Alpha/Beta User Interface

The Apex-Alpha user interface is divided into Views, Pages and Sections.

Views

The Views are Apex-Alpha's major functions.

Views include: Main, Sample Assigner, Batches, Quality Assurance (QA), Calibration, Data Review, Setup, Reports, and Archive.

Pages

Except for the Main View, all Views have several “Pages”, accessed via the tabs at the top of the View's screen. In this manual, each tab's section has the word “Page” in its title. These are not to be confused with a page in the manual. In fact, it often takes more than one manual page to explain one Apex-Alpha Page.

Sections

Within each Page, there are usually sections or groups of controls or parameters.

Display Organization

The Apex-Alpha screen is similar to other Windows® applications. The Apex-Alpha screen includes a Title bar, a Menu bar, a Toolbar, and at the bottom of the screen, the Status bar.

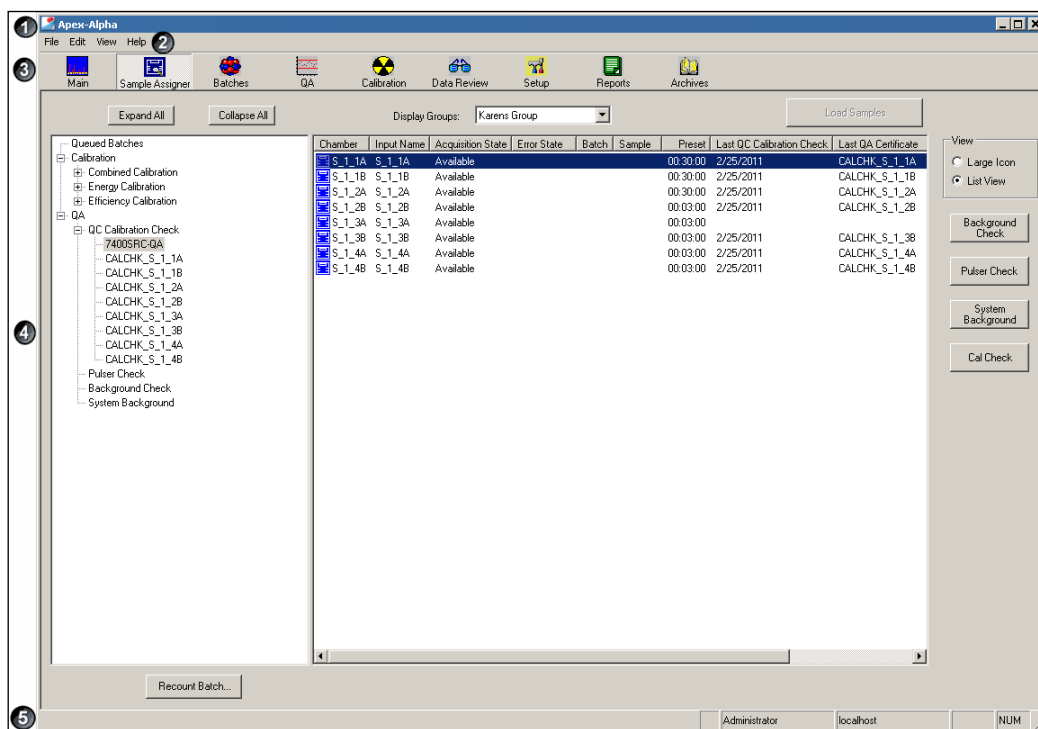


Figure 2: Typical Apex-Alpha Screen or “View”

① The Title Bar

The Title bar contains the application name (Apex-Alpha). The Title Bar also contains Minimize, Maximize, and Close buttons at the upper right corner of the screen. An icon is displayed at the upper left corner of the screen. Clicking on it will display a program menu with options to move the screen, change the size, minimize, maximize, and to close the program.

② The Menu Bar

Each menu option is explained in *Apex-Alpha Menu Commands* on page 11.

③ The System Toolbar

Located directly under the Menu bar, offers an easy way to select any of the Apex-Alpha Views.

④ The View

Shows the current view the user is using.

⑤ The Status Bar

Shows the logged in user and the computer.

Logging On

Apex-Alpha is started with the default user name “Administrator” and the password (<blank>). You’ll be asked for your Name and Password.

If Apex-Alpha is already running and you want to log on as a different user, select **File | Logon** to enter your Name and Password.

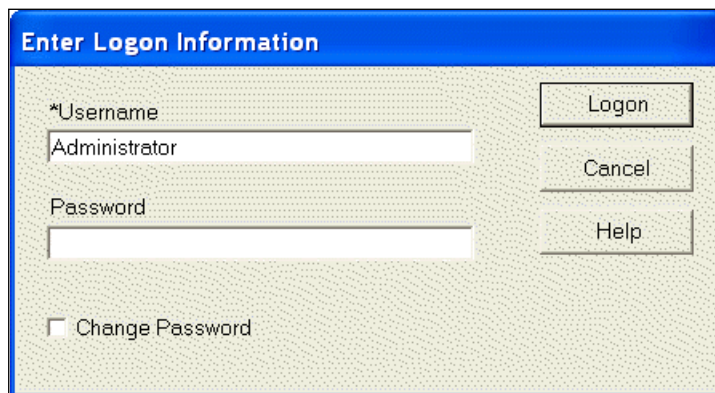


Figure 3: Logging On

Change Password

The Change Password option lets you change your password. After you’ve successfully logged on to Apex-Alpha, a dialog box will appear asking you to enter your new password and to confirm it.

Required Data

Any data field requiring an entry is marked with an asterisk (*), such as Batch ID on the Batches Page. You must fill in required fields before you can continue.

Access Rights

Apex-Alpha maintains a database of users, created and maintained by the System Administrator in *Security Setup - Groups* on page 21. This database defines the group each user is assigned to and each group’s access rights to Apex-Alpha functions.

Apex-Alpha Menu Commands

The Apex-Alpha menu commands are briefly explained here.

File Menu

In addition to the standard File options, the File Menu offers commands to log on to the system, log off of system, and set the current user's default server.

Logon

Signing on to Apex-Alpha is explained in Logging On.

Logoff

To leave the system, select **File | Logoff**. Since the system is still running, you can log on again with the same, or any other, username and password.

Set Default Server

This command, available only during logon, is used to select or change the default server for the current user.

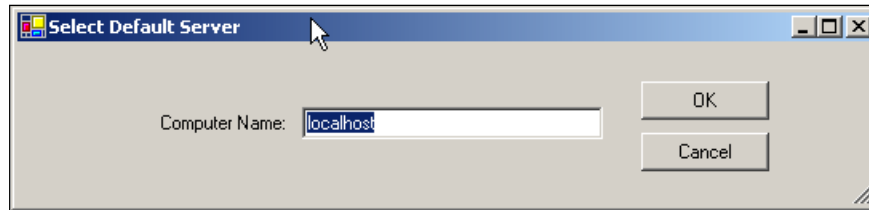


Figure 4: Changing the Default Server

Edit Menu

The Edit Menu offers standard editing commands.

View Menu

The View Menu lets you select any Apex-Alpha View.

Help Menu

The **Help** menu contains commands that provide access to on-line help, view the current software version, or view system information. You can also get help for the current Apex-Alpha page by pressing the F1 key.

About Apex-Alpha

When you select the **About Apex-Alpha** menu option the following dialog appears.



Figure 5: About Apex-Alpha Dialog

System Information

The Help menu's System Information selection displays information about your computer and, under its Modules tab, information about Apex-Alpha software.

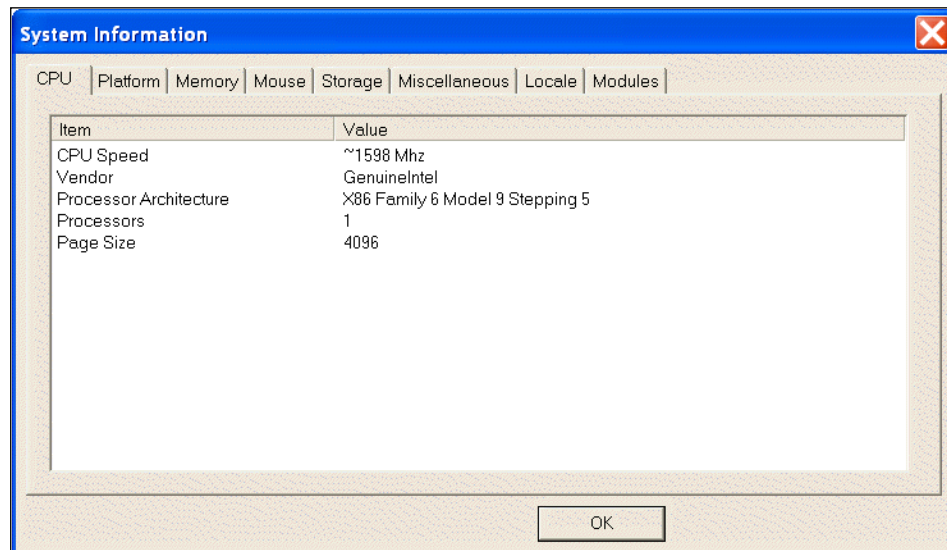


Figure 6: Typical System Information

Common Apex-Alpha Function Buttons

Apex-Alpha function buttons common to most dialogs are defined here.

Approve

The Approve button approves the displayed data or analysis.

Cancel

The Cancel button removes any changes to the page's parameters.

Clear Fields

This control halts the current copy/edit process, if any, clears data from all editable fields and takes the screen back to its default state.

If you click **Clear Fields** while editing or creating a sample, you'll see a warning message. Click **Discard Changes** to confirm that you want to abandon the changes.

Copy

The Copy button copies the current page's parameters for editing.

Delete

The Delete button deletes the highlighted data.

Edit

The Edit button opens the appropriate editor for the current function.

New

The New button clears the current page's parameters for entering data.

Next

The Next button takes you to the function's next page.

OK

The OK button accepts all changes made and exits the dialog.

Plot

The Plot button sends a plot of the current function to the default printer.

Previous

The Previous button takes you to the function's previous page.

Print

The Print button sends a printout of the current function to the default printer.

Save

The Save button saves all changes made, but does not exit the dialog.

Start

The Start button starts the selected function.

Stop

The Stop button stops the selected function.

View Report

Click the View Report button to generate and display a report of a completed calibration.

4. System Setup



The Setup View in Apex-Alpha lets the System Administrator set and maintain the system's security and lets an authorized user, defined by the Administrator, set system-wide defaults.

To access System Setup, launch the Apex-Alpha application, Logon using an Administrator-level account. Then, select the appropriate tab for system options to be configured.



CAUTION: The default password for the Administrator user is blank. For maximum security, the Administrator should change this Username's Password (see *Security Setup Page* on page 18) when installation is complete.

Configuring the Apex-Alpha System

After you've set your System Security parameters (see *Security Setup Page* on page 18), you'll want to create the basic Apex-Alpha configuration for counting a sample, as summarized in the following table.

Since many more functions are available than are listed in the table, it would be useful to spend a short time reviewing each of the other sections in the chapter to determine which of the setup functions would be most useful for your system.

The table's "Reference On Page" column tells you the view and tabbed page to refer to for configuring the specified Action and where in the manual the Action is discussed.

Step	Action	Reference On Page
1.	Define a detector in a MID file	The “MCA Input Definition” chapter in the Genie 2000 Operations Manual
2.	Add the device / detector in Apex-Alpha	Setup ⇒ Devices (see <i>Devices Setup Page</i> on page 27)
3.	Create a display group	Setup ⇒ Display Groups (see <i>Display Group Setup Page</i> on page 52)
4.	Define general counting parameters, sample	Setup ⇒ Counting (see <i>Counting Setup Page</i> on page 23)
5.	Define general calibration parameters for energy and efficiency calibrations (units, energy calibration procedure, preset count time, failure response, and expiration period)	Setup ⇒ Calibration (see <i>Calibration Setup Page</i> on page 33)
6.	Create a certificate file if needed	Setup ⇒ Certificates (see <i>Certificates Setup Page</i> on page 37)
7.	Create a nuclide library if needed	Setup ⇒ Editors ⇒ Nuclide Library Editor (see <i>Nuclide Library Editor</i> on page 61)
8.	Create a geometry	Setup ⇒ Geometries (see <i>Geometry Editor</i> on page 62)
9.	Define Region of Interests	Setup ⇒ Editors ⇒ ROI File Editor (see <i>ROI File Editor</i> on page 63)
10.	Define Elements	Setup ⇒ Editors ⇒ Element Parameter (see the <i>Elements Editor</i> on page 65)
11.	Setup ROI Directed Analysis	Setup ⇒ Editor ⇒ ROI Directed Analyses Editor (see <i>ROI Directed Analyses Editor</i> on page 67)
12.	Create an analysis sequence file if needed	Setup ⇒ Editors ⇒ Analysis Sequence Editor (see <i>Analysis Sequence Editor</i> on page 61)
13.	Define the analysis report criteria if needed	Setup ⇒ Reports (see <i>Reports View</i> on page 135)
14.	Setup QA Procedures (Pulsers, system bkg, bkg ck, cal. ck., etc.), failure responses, and reports	Setup ⇒ QA Procedures (see <i>QA Procedures Setup Page</i> on page 47)
15.	Define QA Parameter definitions in the QA Editor	Setup ⇒ QA Files (see <i>QA Files Setup Page</i> on page 50)
16.	Define sample types for customers and projects	Setup ⇒ Sample Types (see <i>Sample Types Setup Page</i> on page 57)
17.	Perform an energy calibration count or perform an energy and efficiency count	Calibration ⇒ Count (single mode) (see <i>Count Page</i> on page 109) or Sample Assigner ⇒ Calibration / Combined,

Step	Action	Reference On Page
		Energy, or Efficiency (batch mode) (refer to <i>Sample Assigner View</i> on page 84)
18.	Review energy calibration	Calibration $\Rightarrow$ Energy Review/Save or Make current (see <i>Energy Review Page</i> on page 113)
19.	Perform efficiency calibration count for the appropriate geometry if not performed in #17 above and efficiency is needed.	Calibration $\Rightarrow$ Count (see <i>Count Page</i> on page 109)
20.	Review efficiency calibration	Calibration $\Rightarrow$ Efficiency Review / Save or Make current (see <i>Efficiency Review Page</i> on page 118)
21	Background Count	Sample Assigner $\Rightarrow$ QA / System Background (see <i>Sample Assigner View</i> on page 84)
22.	Background Approval, if needed	Data Review $\Rightarrow$ Procedure Name = QA System Background (see <i>Data Review View</i> on page 124)

Security Setup Page

The Security Setup Page lets the System Administrator create and maintain a database of users, their group assignments and the functions each group can access.

Only the users in the *Administrator* group have access to this page; its functions will be grayed out for all other users.

Figure 7: The Security Setup Page

Username

The User Name identifies any User name entry. Initially, only the user name of *Administrator* is defined.

Full Name

Lists any Full Name entry for any defined User; this is an optional entry field.

User Information

Provides additional information about the user.

Group Name

Lists the Group names that have been defined. The user *Administrator* is assigned to the *Administrators* group (and cannot be changed or deleted). Default settings provide the Administrators group.

Group Description

Lists the description (if entered) for each of the Group Names.

[illegible]

Figure 8: Security Setup - Users and Groups Defined

New User/Edit User

Click **New User** to create or **Edit User** to edit a User Name and Password and assign or change the user's Group. The user's security rights are those of the assigned group. Make your entries/selection and select **OK** to save it.

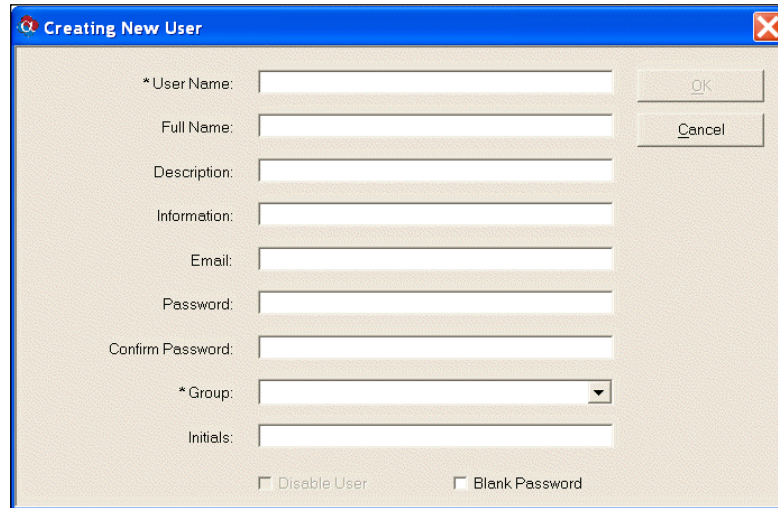
A screenshot of a 'Creating New User' dialog box. The dialog has a blue title bar with a red 'X' button. The main area is light beige. It contains several text input fields: '* User Name:', 'Full Name:', 'Description:', 'Information:', 'Email:', 'Password:', 'Confirm Password:', '* Group:' (with a dropdown arrow), and 'Initials:'. To the right of the first two fields are 'OK' and 'Cancel' buttons. At the bottom, there are two checkboxes: 'Disable User' and 'Blank Password'.

Figure 9: The New User Dialog

Note: In order to assign a User to a Group, the Group name must be defined already.

Username and Password

These fields are required; they must be between 1 and 16 characters each.

Full Name, Description, Email, and Information

These fields are optional; they can be up to 64 characters each.

Confirm Password

After typing in the Password, type it again in the Confirm Password field for confirmation.

Group

Each user is associated with one Group, for access privileges. Select the Group that this user is to be assigned to.

Initials

You can enter the user's initials here for a quick user ID.

Disable User

Select the **Disable User** check box to temporarily disable a user's access while retaining the full user definition. The Administrator user cannot be disabled in this manner.

Blank Password

Select the **Blank Password** check box to clear the User's password, allowing the user to log on without entering a password.

Delete User

Click the **Delete User** button to remove the selected user definition.

Note: The Administrator user cannot be deleted.

New Group/Edit Group

Click **New Group** to create a new group or Edit Group to edit an existing group's Description and Security Rights. Make your entries/selection and select **OK** to save it.

A Groups entry requires a Group Name entry, and may have a Description. Each Group is granted access Rights to features and functions by selecting check boxes for individual Apex-Alpha features.

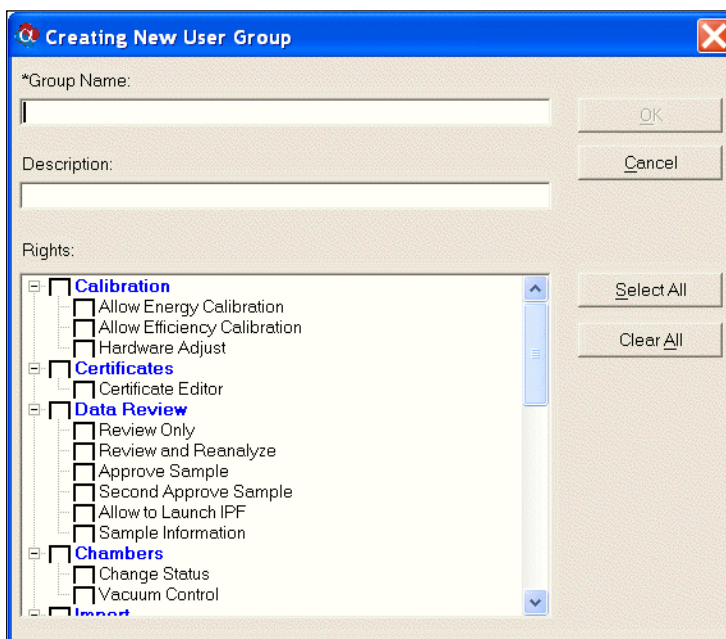


Figure 10: The New Group Dialog

Notes:

A new group has no rights to Apex-Alpha functions; rights *must* be assigned here before the group can use the system. The rights are described in *A Summary of Apex-Alpha Rights* on page 195.

The Administrator Group has all rights assigned; these cannot be changed.

Group Name

Required entry; it must be between 1 and 16 characters.

Description

The Group Description is optional; it can be up to 64 characters.

Select All

Click **Select All** to enable all security parameters for this group. Otherwise, select individual parameters as desired.

Clear All

Click **Clear All** to disable all security parameters for this group.

Delete Group

Click the **Delete Group** button to delete the highlighted group.

Notes:

A group cannot be deleted if users are still assigned to it. The user's group assignments must be changed in User Edit or the users must be deleted from the system before the group can be deleted.

The System Administrator group cannot be deleted.

Counting Setup Page

The Counting Setup Page lets an authorized user set up the system's general counting options.

Figure 11: The Counting Setup Page

Count Rate Checks

If the **Enable Count Rate Checks** check box is selected, the system will either generate an Alarm or Abort the count if the Counts value is exceeded within the specified number of Minutes.

Default Date/Time Range Filter

The Default Date/Time Range Filter sets a system-wide default range for selecting a sample. The range is between n days ago and the system's current date.

Sample Description Text

Selecting **Mandatory** will require the user to enter text in the Description field of certain functions, such as the "Sample Assigner" and "Data Review".

Selecting **Optional** will allow the user to omit the Description text.

Options

Enable Automatic Sample ID

If the Enable Automatic Sample ID option is selected, the system will automatically create Sample IDs when new samples are being defined. If not checked, the user is allowed, but not required, to enter a Sample ID manually.

Enable Automatic Batch ID

If the Enable Automatic Batch ID option is selected, the system will automatically create Batch IDs when new batches are being defined. The Batch ID will be preceded by a capital 'B' to differentiate it from the Sample ID. If the box is not checked, the user will have to enter a Batch ID manually.

Automatically Vent Chambers After Count

Selecting this box causes Alpha Analyst chambers to automatically vent after each sample count is completed or aborted.

Allow User to Change Count Time For Samples

Selecting this box enables the user to change the count time for a sample or group of samples within a batch at sample assignment time or during sample counting.

Sample Backup Rate

The Sample Backup Rate value determines how often, in minutes, a sample backup file is created.

Sample Units

The Amount Type Units list defines the sample units, both metric and English measurements, to be used by the *Default Sample Metrics* on page 96 settings in the Batch View.

New/Edit

Select **New** to create a new unit. Enter the unit's name in the Creating a New Measurement Unit window, then enter its Conversion Factor. You can specify a default unit.

Select **Edit** to change an existing (user-defined) unit. You can change the Sample Unit and the Conversion factor. You can change the state of the current unit. You cannot edit the system's default units.

Conversion Factor

The Conversion Factor is used to convert between a base unit (units, liters, kg) and its multiples. For example, the factor for kilograms is 1, for grams is 1000, and for pounds is 2.2046.

The system assumes that an added unit is a base unit and defaults to a conversion factor of '1'. If you create a multiple of this new unit, you must change the multiple's default conversion factor.

Note: The unit's conversion routine assumes that 1 kg = 1 L.

Active/Default

Note that only one Sample Unit can be the default unit.

Active – When this option is cleared, the sample unit will not be shown in the Sample Units list.

Default – When this option is selected, the sample unit appears at the top of the Sample Units list.

Delete

Deletes the highlighted unit. You cannot remove the system's default units.

Matrix Type

The Matrix Type box lists the matrices that can be selected on the second Batches View page and the QA View's Chemistry page.

New/Edit

Select **New** to create a new matrix type. Enter the matrix's name in the Creating a New Matrix Type list box. You can specify a default type.

Select **Edit** to change the highlighted matrix's Name. You can change the state of the current matrix type.

Active/Default

Note that only one Matrix Type can be the default type.

Active – When this option is cleared, the matrix type will not be shown in the Matrix Types list.

Default — When this option is selected, the matrix type appears at the top of the Matrix Types list.

Delete

Deletes the highlighted matrix.

ROI File Editor

This editor's functions are described in *ROI File Editor* on page 63.

Library Editor

This editor's functions are described in *Nuclide Library Editor* on page 61.

Geometry Editor

This editor's functions are described in *Geometry Editor* on page 62.

Devices Setup Page

The Devices Setup Page lets an authorized user configure Apex-Alpha to manage various Alpha spectroscopy hardware.

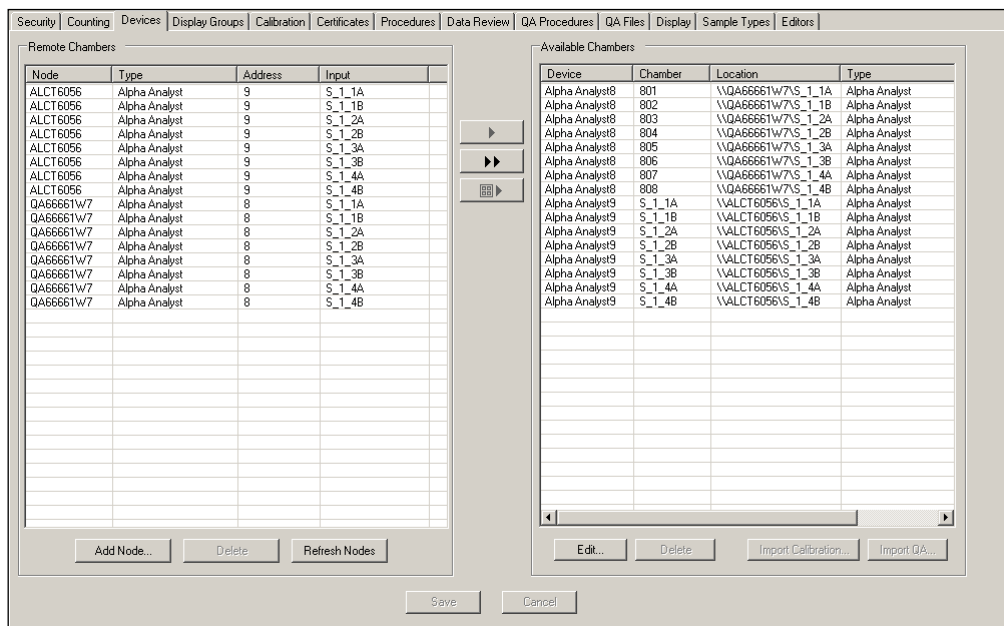


Figure 12: The Devices Setup Page

Remote Chambers

The Remote Chambers list lets you query a network computer to see what Alpha spectroscopy hardware is installed and configured and loaded into the Genie 2000 VDM. Any machine on the local network can be accessed. This screen will retain the list of remote chambers until the user either deletes them from the list or if a refresh operation is done on a device.

Available Chambers

The Available Chambers list shows the user which chambers are being managed by the Apex-Alpha system (i.e., they are visible to all Apex-Alpha clients). Once a chamber is added to the available list and saved to the database, the system will try to connect to the chamber and allow it to be used.

Note: When adding new chambers to your configuration, you'll have to change the SAD_TIMEOUT setting to at least the following values:

- For the **Multiport II**, SAD_TIMEOUT=150 (15 seconds)

- For the **Alpha Analyst** or an **AIM**, SAD_TIMEOUT=330 (33 seconds)

For specific instructions on how to change the SAD_TIMEOUT value, refer to “Genie 2000 Environment Settings” in the appendix, *Genie 2000 Configuration*, in the *Genie 2000 Operations Manual*.



CAUTION: Opening the Genie 2000 MID Editor on the Apex-Alpha Server while it is being accessed by Apex-Alpha clients can cause erratic Apex-Alpha operation. The editor should be opened only when Apex-Alpha is not accessing the server.

Making a Chamber Available

Highlight a single chamber in the Remote Chambers list on the left or use Ctrl-Click or Shift-Click to select multiple chambers.

- Click the ► button to add the selected chambers in the Remote Chambers list to the Available Chambers list
- Click the ►► button to add all chambers in the Remote Chambers list to Available Chambers list.
- Click the ◻► button to add all chambers for selected devices in the Remote Chambers list to Available Chambers list.

Add Node

Select **Add Node** to enter a computer’s name. Clicking on **OK** will query the computer node for all attached detectors and add them to the Remote Chambers list (on the left side of Devices Setup Page).

Delete (Node)

To delete one or more chamber from either list, select a single detector or use Ctrl-Click or Shift-Click to select multiple chambers, then click that list’s **Delete** button.

Note: If any samples are associated with a chamber, you will not be able to delete it.

Refresh Nodes

Click the **Refresh Nodes** button to update the Remote Detectors list with detectors attached to the nodes since nodes were last Added or since the last Refresh.

Edit

To edit the parameters of an Available Chamber, highlight it then click Edit to open the Edit Devices dialog.

Edit Devices

Device Information:

Device Name: Alpha Analyst8

Remote Workstation Name: QA6661W7

Device Address: 8

Device Type: Alpha Analyst

Controlling Workstation: QA6661W7

Chamber Information

Auto Rename Chambers...

Chamber Name	Remote Name	Chamber Serial #	Detector Serial #
801	S_1_1A	00080101A	QA6661W7801
802	S_1_1B	00080101B	QA6661W7802
803	S_1_2A	00080102A	QA6661W7803
804	S_1_2B	00080102B	QA6661W7804
805	S_1_3A	00080103A	QA6661W7805
806	S_1_3B	00080103B	QA6661W7806
807	S_1_4A	00080104A	QA6661W7807
808	S_1_4B	00080104B	QA6661W7808

Chamber Name: 801

Remote Name: S_1_1A

Chamber Serial Number: 00080101A

Detector Serial Number: QA6661W7801

OK Cancel Help

Figure 13: Editing Chamber Parameters

Device Name

Select the Device Name that the chamber is associated with.

Remote Workstation Name

This field displays the computer name of the defined host for this chamber. The name is normally not edited, but if the host computer name is changed, you'll have to enter the new name here.

Device Address

This read only field shows the assigned device address.

Device Type

This read only field shows the assigned device type.

Controlling Workstation

This is the computer name of the host workstation responsible for performing sample-counting operations. The name specified here be the workstation Apex-Alpha Desktop is installed on.



CAUTION: A name entered here is not checked for validity. If an invalid host name is specified, no Apex-Alpha computers will be able to assign samples or start a count.

Detector Serial Number

This is the serial number for the PIPS detector in the specified chamber. When a chamber is added, this will default to remote name with SN# prepended. For example, if you just add chamber A_1_1A, the default detector serial number will be SN#A_1_1A. You must supply a detector serial number for each detector. The serial number is used to allow QA to follow each detector.

Note: When you change the serial number for a detector, all calibrations for that chamber will automatically be invalidated. Additionally, after the changes have been saved you will need to perform a “Verify” from the MCA Menu in the Main View (refer to *Full Spectrum Mode - MCA* on page 80).

Auto Rename Chambers

Click the **Auto Rename Chambers** button to automatically assign three-digit sequential numeric names to all chambers associated with the current device. The sequence will start with the chamber that is currently selected when the button is selected. It doesn't need to start at 001.

Chamber Name Prefix

You can also specify a prefix for the sequence, for instance if the Chamber Name specified was CH007, then the sequence would be CH007, CH008...CH00n, where n is the number of chambers.

Import Calibration

The **Import Calibration** button is used to import a Genie/Apex calibration file for the selected chamber. The button is available only when a single chamber is selected in the Available Chambers list and all edits, if any, have been saved.

Import QA

The **Import QA** button is used to import a Genie/Apex QA file for the selected chamber. The button is available only when a single chamber is selected in the Available Chambers list and all edits, if any, have been saved.

Display Group Setup Page

The Display Groups Setup Page lets an authorized user create new or edit existing display groups, then add or subtract defined chambers for convenience in displaying common chambers in a single group.

[illegible]

Figure 14: The Display Groups Setup Page

Display Group

The Display Groups list shows each defined group's name, it's Device Type and whether currently Active.

New

To create a new display group, click **New** then enter all required parameters in the Display Group Information section, then click **Save**.

Edit

To edit an existing display group, double click on a group's name in the Display Groups list, or highlight the group's name then click the **Edit** button, to copy the group's data to the Display Group Information section. Edit the data as necessary and **Save** the display group.

Delete

To delete a display group, highlight it in the Display Groups list, then click **Delete**.

Display Group Information

The Display Group section allows you to assign chambers to a display group.

Group Name

Enter a name for the group.

Is Active

Select the **Is Active** check box to define the current group as an active group.

The << and < Buttons

The double << button moves all chambers in the Available Chambers list on the right to the Display Group Chambers list on the left. The single < button moves only the selected chambers in the Available Chambers list.

The >> and > Buttons

The double >> button deletes all chambers from the Display Group Chambers list on the left and restores them to the Available Chambers list on the right. The single > button deletes only the selected chambers from the Display Group Chambers list.

Display Group Chambers

The group's chambers are defined by moving selected chambers to this list from the Available Chambers list.

Up/Down

The **Up** and **Down** buttons move the selected chamber in the Display Group Chambers list up and down in the list.

Available Chambers

Available chambers listed here can be moved to a Display Group.

Calibration Setup Page

The Calibration Setup Page lets an authorized user set up the system's energy and efficiency calibration options.

Figure 15: The Calibration Setup Page

Units

Though energies are stored in keV, you can choose how they are to be shown on the calibration screens: eV, keV or MeV. The value specified here will apply to all calibration screens: Calibration Count, Energy Calibration Review, and Efficiency Calibration Review.

Retained Calibrations

This control defines the number of previous calibrations that will be seen in the Calibration Count list box in the Calibration view's Energy and Efficiency Review pages.

Report Options

These controls let you set the default Calibration report options.

Select Printer

This control lets you select the printer to be used when auto-printing reports. Defaults to the printer assigned to the Apex-Alpha Service Manager user.

Auto Print Report

If this check box is checked, a report will be printed each time a calibration is saved.

Number of Copies

Specifies how many copies of the report will be printed.

Print Spectral Plot

Select this check box to print a plot of the spectrum with the report.

Print Channel/Count Report

Select this check box to print a tabular listing of the spectrum's counts vs. channels.

Print Summary Report

Select this check box to print a QA Summary report for all chambers included in calibration batch.

Energy Calibration Procedures

The Energy Calibration Procedure settings define the default parameters used for energy calibrations.

Report Template

This field specifies the default Report Template to be used in the Calibration View.

Section Name

This field specifies the default Section Name to be used in the Report Profile.

Preset Count Time

The value and unit selected here set the default counting time, in Minutes or Hours, for all energy calibrations.

Parameters

Start Energy, End Energy

These values represent the expected energy range for the current hardware settings. See Table 1 in the appendix *Hardware Setup* on page 202 for a guide to configuration of the Alpha Analyst. For a given ADC Conversion Gain, ADC Offset, and Amplifier Gain the Low Energy will correspond to the Start Energy and the High Energy will correspond to the End Energy. The default energy range is 3.5 MeV – 6.5 MeV.

Expected Offset, Expected Slope

These read-only values are calculated based on the specified Start Energy, End Energy, and number of channels.

Peak Search Type

There are two peak locate options available for energy calibration: 2nd Difference Peak Search and ROI.

2nd Diff. Peak Search

This is the default Peak Search Type; in this case, the standard Genie 2nd Difference Peak Locate is used to locate peaks within the calibration spectrum.

ROI

Selecting the ROI options causes the selected ROI file to be loaded into the input at the start of the count. These ROIs will then be used to define the peak locations for the energy calibration. Note that the Start Energy and End Energy will be used to define seed energy calibration that is used to define the ROI locations.

Failure Response

The Failure Response settings let you choose how the system responds to a calibration fault.

Expiration Action

If the **Expiration Action** check box is selected and the calibration's age exceeds the specified Expiration Period, the selected System Response (below) will be triggered.

Expiration Period

This parameter limits the number of days a calibration can be used.

Action Level and Investigate Level

These two Levels are defined in the QA Check File associated with a chamber. If either check box is selected and the specified level for the chamber exceeds the Level defined in the associated QA Check File, the selected System Response (below) will be activated.

The System Response

Select the system response to a calibration fault from the drop down list to the right of the fault condition's check box.

- **Warning** – A warning message describing the failure will be displayed but counting can proceed.
- **Log Failure** – The failure will be noted in the event log but counting can proceed.
- **Lock Chamber** – The chamber's state will be changed to Out-of-Service. Further counting will not be allowed until the failure is corrected and the chamber is placed back in service.

Efficiency Calibration Procedure

The Efficiency Calibration Procedure settings define the default parameters used for efficiency calibrations.

Report Template

This field specifies the default Report Template to be used in the Calibration View.

Section Name

This field specifies the default Section Name to be used in the Report Profile.

ROI File

This field specifies the default ROI File to be used in the Report Profile.

Allow Efficiency Procedure to be Used for Combined Calibration

If this check box is selected, you'll be able to perform combined energy/efficiency calibrations.

Tolerance

Select the units for the Peak Search Tolerance value. Choose **Energy** for a fixed tolerance or **FWHM** for a variable tolerance.

Preset Count Time

The value and unit selected here set the default counting time, in Minutes or Hours for all efficiency calibrations.

Failure Response

Refer to *Failure Response* on page 35.

Certificates Setup Page

The Certificate Setup Page lists the system’s certificates by one or more selected type(s): Tracer, Control, QC and Calibration.

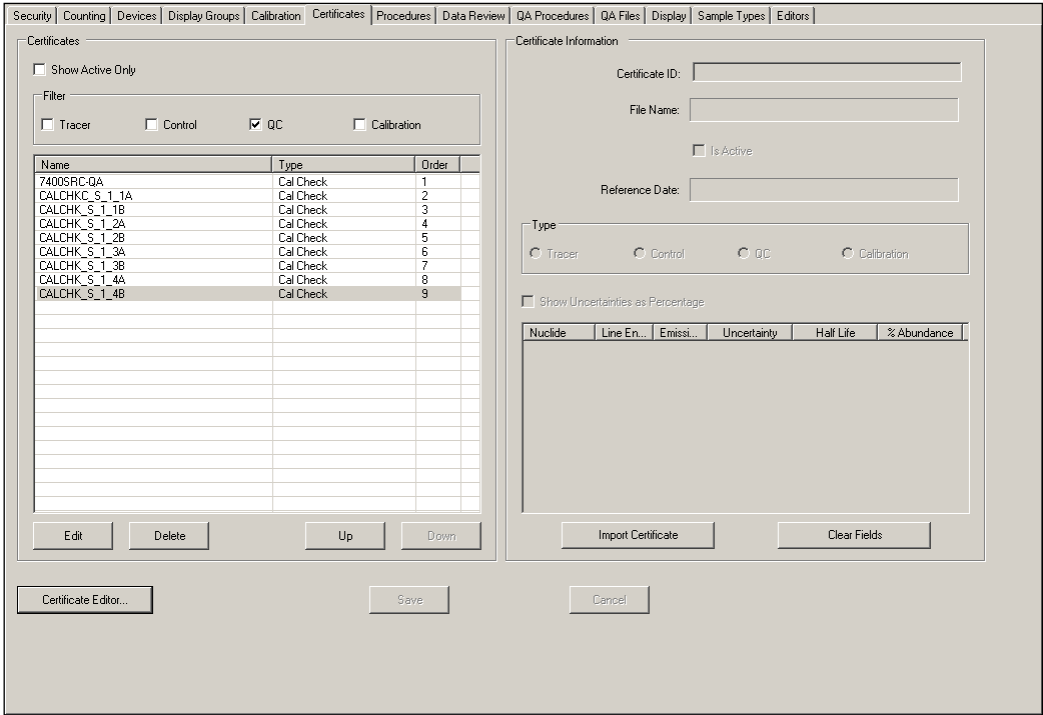


Figure 16: The Calibration Setup Page

Certificates

This section list the system's certificates.

Show Active Only

Select this check box to list only those certificates that are currently active.

Filter

Select the certificate type(s) to display in the list below.

Edit (Certificate)

Selecting the **Edit** button transfers the parameters of the selected certificate to the Certificate Information fields on the right side of setup page editing.

Delete (Certificate)

To delete a certificate, highlight it in the list, and then click **Delete**.

Up/Down (Certificate)

The **Up** and **Down** buttons move the selected certificate up and down in the list.

Certificate Information

The data in the Certificate Information group defines the current Certificate. If the current Certificate already includes this data, using either the **Edit** button will transfer the data to this section. If the selected Certificate's data is incomplete, it can be added or corrected here.

Certificate ID

Specifies the ID for the certificate.

File Name

Displays the name of the certificate file imported.

Is Active

Check to make the selected certificate active.

Reference Date

Displays the reference date of the imported certificate.

Type

Select the type for the current certificate: Tracer, Control, QC or Calibration.

Show Uncertainties as Percentage

Toggles uncertainties between value in terms of rate and as a percentage of emission rate.

Nuclide List

The Nuclide List displays all nuclides in the imported certificate file.

Import Certificate

The Import Certificate button lets you select a certificate file to *import*¹.

Certificate Editor

This editor's functions are described in *Certificate File Editor* on page 60.

¹ In a Standard Apex-Alpha installation, the file will be found in the Canberra\ApexAlpha\Root\Certificate folder. Consult your system administrator for the path used in a custom installation.

Procedures Setup Page

The Procedures Setup Page lets an authorized user create a new or edit an existing procedure.

The screenshot shows the 'Procedures Setup Page' with the following components:

- Procedures Table:**

Name	Description
U No QA Analysis ASF Directed...	This is the U No QA Analysis...
U Matrix Spike ASF Directed...	This is the U Matrix Spike A...
U Duplicate ASF Directed Pt...	This is the U Duplicate ASF...
U Tracer Blank ASF Directed...	This is the U Tracer Blank A...
U Laboratory Control ASF Dir...	This is the U Laboratory Con...
U No QA Samples ROI Direc...	This is the U No QA Sample...
U Duplicate ROI Directed Pt...	This is the U Duplicate ROI...
U Tracer Blank ROI Directed...	This is the U Tracer Blank R...
U Laboratory Control ROI Dir...	This is the U Laboratory Con...
- Information Section:**
 - Procedure ID: [Text Field]
 - ☒ Is Active
 - Description: [Text Area]
 - Geometry: Shell 3 [Dropdown]
 - Element: Americium [Dropdown]
 - ☒ ROI/Sum Directed [Dropdown]
 - ☐ ASF Directed [Dropdown]
 - Count Time: PresetTime: 60 [Text], ☒ Minutes, ☐ Hours, ☐ Tracer Peak Area, Counts: [Text]
- Report Options:**
 - Report Profile: <None> [Dropdown]
 - Section Name: [Text]
 - Activity Units: uCi [Dropdown]
 - Error Multiplier: 1.00 [Text]
 - Print Options: Select Printer [Button], Number of Copies: 1 [Text]
 - ☐ Auto Print Report
 - ☐ Print Spectral Plot
 - ☐ Print Channel/Count Report
- Data Review Requirements:**
 - ☒ Approval Required
 - ☒ Second Approval Required

Figure 17: Procedures Setup Page

Creating a Procedure

First, decide which group to add the procedure to. Be certain you've selected the correct group *before* defining your new procedure.

Group

To add your new procedure to an existing group, choose one from the Group drop down list.

Edit Groups

To create a new procedure group, click **Edit Groups** to open the Procedure Group Editor, which lets you create a new procedure group or delete an existing one.

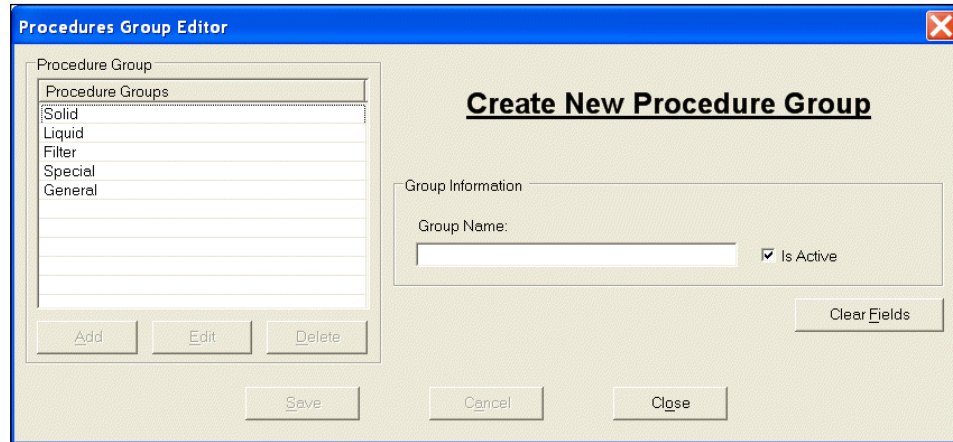


Figure 18: The Edit Procedures Group Dialog

Creating a New Group

To create a new group, type its name in the Group Name box, then click the **Add** button.

Is Active

If you select the **Is Active** check box, all of this group's procedures will be marked *Active*. If this box is not checked, all of the group's procedures will be marked *Not Active*.

Editing a Procedure Group

To edit an existing group, highlight it in the Procedure Group list, then click **Edit**. In the Group Name box, enter the new name. You can select or clear the **Is Active** check box.

Deleting a Procedure Group

To delete a group, highlight it in the Procedure Group list, and then click **Delete**.

Note: A group that contains procedures cannot be deleted; you'll have to delete the procedures first, then delete the group.

Procedures

The Procedures list on the left side of the screen shows all procedures, with their Procedure ID and optional Description. Selecting a procedure makes the Edit, Copy, and Delete buttons available.

Inverting the List

Clicking the Name/Procedures bar at the top of the list will invert the order of the list.

New

To create a new procedure directly, select a Group to add the procedure to, click **New** then fill out the data fields in the Create a New Procedure section then **Save** the procedure.

Edit

To edit an existing Procedure in the list highlight the procedure's, then click the **Edit** button, or double-click on a procedure's name, to copy the procedure's data, including the Procedure ID, to the Create a New Procedure section. Edit the data as necessary and then **Save** the display group.

Note: A procedure that is being used by a currently counting sample cannot be edited.



CAUTION: When you save the edited procedure definition, you'll overwrite the old definition. There is no way to recover a definition that has been overwritten.

Copy

The Copy function lets you create a new sample type by copying, then editing, the data from an existing procedure.

Select a sample type from the Procedure list then click the Copy button to copy all of the data except the Procedure ID to the Procedure Information section. Enter a new Procedure ID, edit the remaining data as necessary, then **Save** the new procedure.

Delete

To delete a procedure, highlight it in the Procedures list, then click **Delete**.

Information

The data in the Information group defines the current Procedure. If the current Procedure already includes this data, using either the **Edit** or the **Copy** button will transfer the data to this section. If the selected Procedure's data is incomplete, it can be added or corrected here.

Procedure ID

This is a required field; all procedures must have a unique identification.

Is Active

The Is Active box is selected by default so that a new procedure will immediately be available for use. Clearing the box removes a procedure from the list of active procedures. The procedure will remain in the database so samples associated with it can be analyzed.

Description

This text box lets you enter a description of this procedure.

Geometry

You can select a geometry for this procedure from the adjacent list. To create a new geometry, click the () button next to the list to open the *Geometry Editor* on page 62.

Element

You can select an element for this procedure from the adjacent list. To create a new element, click the () button next to the list to open the *Elements Editor* on page 65.

ROI/Sum Directed

Selecting this button then choosing an ROI Set from the adjacent list makes this procedure **ROI/Sum Directed**. To create a new ROI Set, click the () button next to the list to open the *ROI Directed Analysis Editor* on page 67.

ASF Directed

Selecting this button then choosing an Analysis Sequence File from the adjacent list makes this procedure ASF Directed. To create a new ASF, click the () button next to the list to open the Analysis Sequence Editor.

Note: Genie 2000's Analysis Sequence function lets you specify parameters that must be specified in Apex-Alpha. For example, you can define acquisition time, reports, QA transfer steps, nuclide libraries and background files in an ASF. In Apex-Alpha, these are defined at the time a procedure is created. Therefore, *any such information you define in the ASF file will be ignored at run time.*

This editor's functions are described in the *Using the Analysis Sequence Editor* chapter of the *Genie 2000 Operations Manual*.



CAUTION: Do not use a Genie 2000 editor outside of Apex to create or edit Apex-Alpha files. Doing so will cause unexpected operation and under some circumstances may corrupt Apex-Alpha's data.

Count Time

The data acquisition's **Preset Time** value for this procedure can be defined in minutes or hours. Acquisition will stop when elapsed time equals the preset value.

You can also check the **Tracer Peak Area** box and enter the number of **Counts** in the Tracer peak area required to stop data acquisition.

Report Options

Select the Report Profile, Section name, Activity Units, and Error Multiplier for the reports to be generated by this procedure.

Print Options

Select the options for the printouts to be generated by this procedure.

Select Printer

This control lets you select the printer to be used when auto-printing reports. Defaults to the printer assigned to the Apex-Alpha Service Manager user.

Number of Copies

Specifies how many copies of the report will be printed.

Auto Print Report

When this check box is checked, a report will be printed after the current batch's count, analysis and approvals are complete.

Print Spectral Plot

Select this check box to print a plot of the spectrum with the report.

Print Channel/Count Report

Select this check box to print a tabular listing of the spectrum's counts vs. channels.

Data Review Requirements

These check boxes let you specify whether the data generated by running this procedure must be approved by authorized personnel.

Approval Required

If you select Require Approval someone with first approval rights will have to approve the data.

Second Approval Required

If you select Second Approval Required, both the first approver and someone with second approval rights will have to approve the data.

No Approval Required

If you select none of the boxes, data approval will not be required.

Data Review Setup Page

The Data Review Setup Page defines the default data review requirements.

Note: Settings made when creating individual procedures will override these default parameters.

The screenshot shows a software window with a menu bar at the top containing: Security | Counting | Devices | Display Groups | Calibration | Certificates | Procedures | Data Review | QA Procedures | QA Files | Display | Sample Types | Editors. The 'Data Review' menu item is selected. Below the menu bar, the window title is 'Data Review Default Settings'. Inside the window, there are two checked checkboxes: 'Require Approval' and 'Second Approval Required'. To the right of these checkboxes is a 'Note' box with the text: 'Note: Settings defined for individual procedures will override these global defaults.' At the bottom center of the window are two buttons: 'Save' and 'Cancel'.

Figure 19: The Data Review Setup Page

Data Review Default Settings

These settings specify the default approvals required for counted samples. A user's right to approve samples is set on the *Security Setup Page* on page 18.

- If you select Approval Required, individuals with “Approve Sample” rights will have to approve the samples.
- If you select Second Approval Required, individuals with “Second Approve Sample” rights will have to approve the samples.
- If you select both boxes, the first approver will have to approve the samples, then the second approver will have to approve the samples.
- If you select none of the boxes, sample approval will not be required.

Note: The default approval requirements are assigned to all newly created procedures, but can be overridden in any individual procedure.

QA Procedures Setup Page

The QA Procedures Setup Page sets up the basic options for each of the system's Quality Assurance count types: QA Pulser Check, QA Background Check, QA System Background Check, and QA Calibration Check.

System Default Procedures

A system default procedure for each type has been added to the QA Procedure Group during software installation.

The screenshot shows the 'QA Procedures' tab in a software application. The interface includes a menu bar at the top with options: Security, Counting, Devices, Display Groups, Calibration, Certificates, Procedures, Data Review, QA Procedures, QA Files, Display, Sample Types, and Editors. The main window is divided into several sections:

- QA Procedures List:** A table on the left with columns 'Name' and 'Description'. It lists several QA procedures, with 'QA Calibration - Joe S.' selected. An 'Edit' button is located below the list.
- Information Section:** Contains fields for 'Procedure ID' (QA Calibration), 'Description' (QA Calibration - Joe Smoke), and 'Geometry' (Shell 3). It also has radio buttons for 'ROI/Sum Directed' and 'ASF Directed' (selected), and a checkbox for 'Approval Required'.
- Count Information Section:** Includes 'CountTime' (3) with 'Minutes' and 'Hours' radio buttons, and 'Pulser Energy' (MeV).
- Failure Response Section:** Features a checked 'Expiration Action' (Warning), a 'Frequency' of 8 Days, and checkboxes for 'Action Level' and 'Investigate Level' (both set to Lock Chamber).
- Report Setup Section:** Includes a 'Select Printer' button, checkboxes for 'Print Spectral Plot', 'Print Channel/Count Report', and 'Print Summary Report', and a 'QA Report Selection' section with checkboxes for 'Full Report', 'Last Report', and 'Bias Summary'.

'Save' and 'Cancel' buttons are located at the bottom of the window.

Figure 20: The QA Procedures Setup Page

Editing a Procedure

Double click on a line in the QA Procedure list or select a Procedure and then click the **Edit** button, to load its parameters into the editing fields. Edit the parameters as necessary, then **Save** the changes.

Information

The data in the selected QA Procedure will be copied to the Information and Count Information data fields for review and editing. Click **Save** when the edits are complete.

Procedure ID and Description

Accept or edit the data in these fields.

Geometry

If you are editing a QA Cal Check procedure, you can select a Geometry from the list. To create a new geometry, click the (...) button next to the list to open the *Geometry Editor* on page 62.

ROI/Sum Directed

Selecting this button then choosing an ROI Set from the adjacent list makes this procedure **ROI/Sum Directed**. To create a new ROI Set, click the (...) button next to the list to open the *ROI Directed Analysis Editor* on page 67.

ASF Directed

Selecting this button then choosing an Analysis Sequence File from the adjacent list makes this procedure **ASF Directed**. To create a new ASF, click the (...) button next to the list to open the *Analysis Sequence Editor* on page 61.

This editor's functions are described in the *Using the Analysis Sequence Editor* chapter of the *Genie 2000 Operations Manual*.

Note: Genie 2000's Analysis Sequence function lets you specify parameters that must be specified in Apex-Alpha. For example, you can define acquisition time, reports, QA transfer steps, nuclide libraries and background files in an ASF. In Apex-Alpha, these are defined at the time a procedure is created. Therefore, *any such information you define in the ASF file will be ignored at run time.*

Require Approval

Select the Require Approval checkbox to require background subtraction files to be approved before they can be used for background subtraction during a count.

Count Information

The procedure's data acquisition **Count Time's** value can be defined in minutes or hours.

The Pulser Energy value is only used by a Pulser Check procedure; it is grayed when any other QA Procedure is selected.

Failure Response

These controls set the default Overdue QA failure response for QA Procedures.

Expiration Action

If the **Expiration Action** check box is selected and the QA 's age exceeds the specified Expiration Period, the selected System Response (below) will be triggered.

Expiration Period

This parameter limits the number of days a calibration can be used.

Action Level and Investigate Level

These two Levels are defined in the QA Check File associated with a chamber. If either check box is selected and the specified level for the chamber exceeds the Level defined in the associated QA Check File, the selected System Response (below) will be activated.

The System Response

Select the system response to a calibration fault from the drop down list to the right of the fault condition's check box.

- **Warning** – A warning message describing the failure will be displayed but counting can proceed.
- **Log Failure** – The failure will be noted in the audit log but counting can proceed.
- **Lock Chamber** – The chamber's state will be changed to Out-of-Service. Further counting will not be allowed until the failure is corrected and the chamber is placed back in service.

Report Setup

These controls let you set the default Calibration report options.

Select Printer

This control lets you select the printer to be used when auto-printing reports. Defaults to the printer assigned to the Apex-Alpha Service Manager user.

Report Types

You can select a **Spectral Plot** printout, a **Channel by Channel** printout, a **Summary Report** or all, to be generated after the check is complete.

QA Report Selection

This section lets you select any or all of these reports: the **Last Report**, a **Full Report** or a **Bias Summary** report.

QA Files Setup Page

The QA Files Setup Page lets an authorized user create QA Check Files for specified chambers.

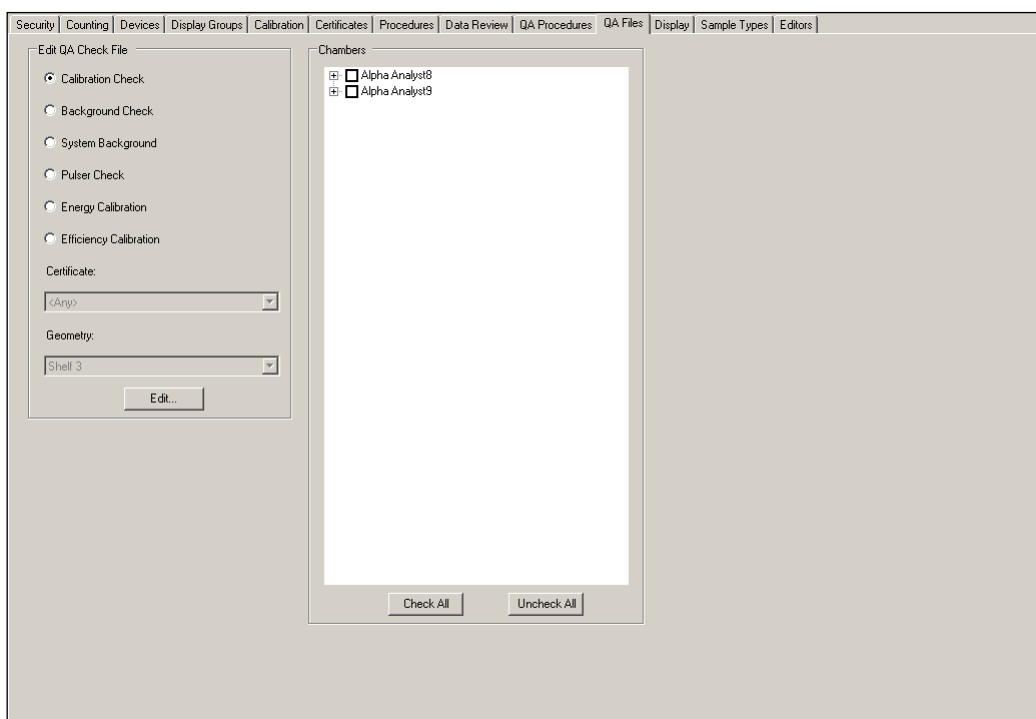


Figure 21: The QA Files Setup Page

Chambers

The Chambers tree lists the chambers associated with each of the system's hardware devices, allowing an authorized user to assign a QA Check File to each.

Check / Uncheck All

These buttons check or uncheck all nodes in the Chamber tree.

QA Check Files

A QA Check File, which is used by Apex-Alpha to store the data produced by the QA Check of a given chamber, must be assigned to the chamber before you can perform the Check.

For Calibration Check, Energy Calibration and Efficiency Calibration, QA files can be certificate specific. This control lets you edit the QA file for a specific QA Type/Certificate combination. Defaults to <Any>, indicating that all certificates counted with the specified type will see the changes made to the QA file.

For System Background and Efficiency Calibration, QA files can be geometry specific. This control lets you edit the QA file for a specific QA Type/Geometry combination. Defaults to the default Geometry for the system.

To edit an existing QA Check file, select the Chamber and its associated file, then click the **Edit** button to open the associated QA Check file in the Apex-Alpha QA File Editor. (Refer to the *Model S505 Genie 2000 QA Software User's Manual* for editing instructions.)

Note: All changes saved in the Genie QA Editor will propagate to the QA files for the chambers selected in the Chambers tree.



CAUTION: Opening a QA File in the QA File Editor while Apex-Alpha is performing an operation that might access the same File may cause an error. It is recommended that system editors be used only when you are certain no Apex-Alpha function will attempt to read or write the File while open.



CAUTION: Do not use the Genie 2000 QA Editor outside of Apex-Alpha to create or edit Apex-Alpha files. Doing so will cause unexpected operation and under some circumstances may corrupt Apex-Alpha's data.

Display Setup Page

The Display Setup Page lets an authorized user set up the system's display. All display setup parameters are global; they apply to all users.

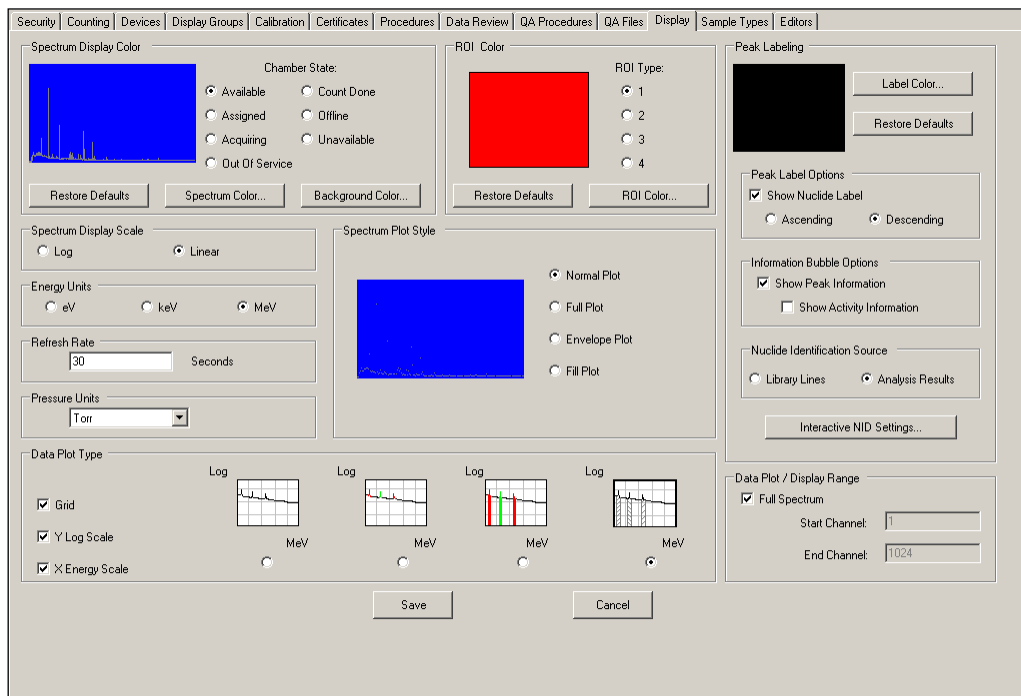


Figure 22: The Display Setup Page

Spectrum Display Colors

Spectrum/Background Colors

Select a **Chamber State** to assign a color to. You can change the state's **Spectrum Color** and **Background Color**. The sample spectrum to the left shows the chosen spectrum and background colors.

Restore Defaults

The **Restore Defaults** button lets you restore the spectrum and background colors for all chamber states to their factory default values.

ROI Colors

ROI Type settings are a system option for marking Regions of Interest.

Select an ROI Type to assign a color to, then click on **ROI Color** to set the color of that ROI type. Up to four ROI Types may be identified. The sample to the left shows the chosen ROI color.

Selecting an ROI type means that all of the ROIs entered from now on will be known as that type and will be displayed in the color chosen for that type.

ROI Types may be assigned by the user via a context appropriate menu selection.

Restore Defaults

The **Restore Defaults** button restores the ROI colors to their factory default values.

Peak Labeling

You can add two kinds of peak information to an energy calibrated spectral display:

- You can Show Nuclide Labels for identified peaks. (Refer to *Show Nuclide Labels* on page 54.)
- You can Show Peak Information in a “bubble”. (Refer to *Show Peak Information* on page 54.)

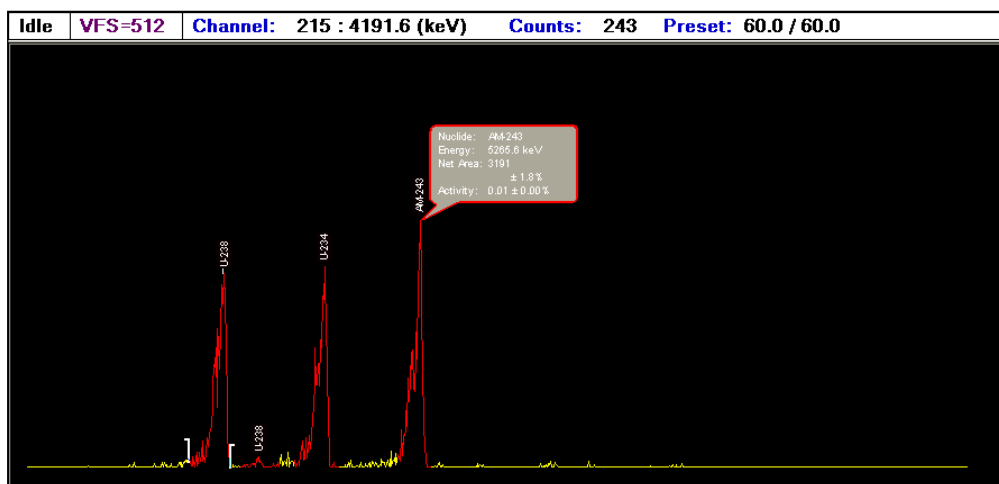


Figure 23: Typical Peak Labeling

Label Color

Select Label Color to assign a text color to the Nuclide ID labels and the Peak Information bubble's text. The sample to the left shows the chosen peak label color.

Restore Defaults

The **Restore Defaults** button restores the Label Color to its factory default value.

Show Nuclide Label

Select the **Show Nuclide Label** check box to add a nuclide label above every identified peak. Multiple labels will be attached to a peak if more than one nuclide can be associated with that peak.

Note: When data acquisition is active, the label will appear only at the peak cursor.

Ascending

Choose **Ascending** to show Nuclide Labels with their text oriented bottom-to-top.

Descending

Choose **Descending** to show Nuclide Labels with their text oriented top-to-bottom.

Show Peak Information

When **Show Peak Information** check box is selected, moving the mouse cursor over an identified peak will display the peak's Nuclide ID, Energy, and Net Area with percent error in a bubble (see the figure in Peak Labeling on page 53). If Show Activity Information (below) is selected, the peak's activity will also be displayed.

- The Energy Units displayed in the bubble are those specified for the entire system (Refer to *Calibration Setup Page - Units* on page 33.)
- The activity units displayed in the bubble are chosen in Interactive NID Settings. The activity value will be correctly displayed for the selected unit but the unit itself is not displayed.

The Library Lines and Analysis Results radio buttons, used for specifying the nuclide identification source, are enabled only if the Show Peak Information on Spectrum check box is selected.

Library Lines

Choose the **Library Lines** button to display peak bubble information from the Nuclide Library chosen in Interactive NID Settings. When you use Library Lines, the bubble's activity values will be estimated.

Analysis Results

Choose the **Analysis Results** button to display the Activity from the current NID results for this datasource.

Interactive NID Settings

The Interactive NID Settings lets you choose a nuclide library to be used for the Activity Units, as well as setting the tolerance for searching that library, and the activity units to be used in the Peak Information bubble. (Refer to *Peak Labeling* on page 53.)

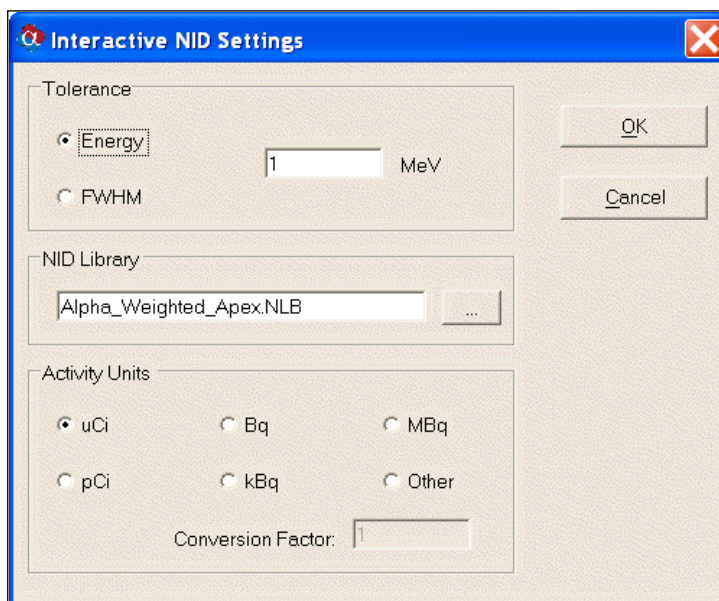


Figure 24: The Interactive NID Units Settings

Tolerance

Enter the value to be used in deciding if an energy line in the specified NID Library matches the peak being searched for.

Energy/FWHM – Specify the units for the Peak Match Tolerance value. Choose **Energy** for a fixed tolerance or **FWHM** and its **Units** for a variable tolerance.

NID Library

Select the default Nuclide Library to be used when Library Lines is used for the Nuclide Identification Source (refer to *Show Peak Information* on page 54).

Activity Units

The selected **Activity Unit** determines the activity units used for reporting in the Peak Information bubble. When you choose one of the standard activity units (μCi , pCi , Bq , kBq , MBq), the correct Conversion Factor is automatically supplied.

If none of the standard units is acceptable, select **Other** and enter the unit's **Conversion Factor**, referenced to $1\mu\text{Ci}$.

Spectrum Display Scale

This parameter lets you set the default spectral display scale: **Linear** or **Log**.

Energy Units

This parameter lets you set the default energy units for all spectra.

Refresh Rate

Sets the rate at which the spectral data is updated, in seconds.

Pressure Units

Select the unit to be used for pressure. Choices are: Torr, mbar, kPa, or Pa.

Spectrum Plot Style

This parameter lets you set the default plot style: Normal, Full, Envelope or Fill. The sample spectrum to the left shows the chosen plot style.

Data Plot Type

Although any of the four styles will work well with any printer, Styles 2 and 3 are intended for color printers and Styles 1 and 4 are intended for black and white printers.

The sample plots to the right show each plot style.

Style 1: Solid black spectrum line.

Style 2: Solid black spectrum line; ROIs outlined in color.

Style 3: Solid black spectrum line; ROIs filled with colors.

Style 4: Solid black spectrum line; ROIs filled with hatching.

Grid

Select the **Grid** box to add X and Y grid lines to the plot. The grid is printed as shown with dotted lines.

Y Log Scale

Select the **Y Log Scale** box to change the Y-axis scale from linear to log. The maximum number of counts is determined automatically.

X Energy Scale

Select the **X Energy Scale** box to change the X-axis scale from channels to energy.

Data Plot/Display Range

To plot the entire spectrum, select the **Full Spectrum** check box. If the box is not selected, the selected range from **Start Channel** to **End Channel** will be plotted.

Sample Types Setup Page

Sample Types Setup Page lets you review all current sample types and create new ones as needed.

[illegible]

Figure 25: The Sample Types Setup Page

Sample Types

The Sample Types list on the left side of the screen shows all sample types in the database. Selecting a sample type makes the Edit, Copy, and Delete buttons available.

To create a new sample type, enter all required parameters in the Sample Type Information field, then click **Save**.

To edit an existing sample type, double click on an entry in the sample type list, or highlight the sample type then click the **Edit** button, to copy the sample type's data, including the Type, to the Sample Type Information section. Edit the data as necessary and **Save** the batch.

The **Copy** function lets you create a new sample type by copying, then editing, the data from an existing sample type.

Select a sample type from the Sample Type list then click the Copy button to copy all of the data except the Type to the Sample Type Information section. Enter a new Type, edit the remaining data as necessary, then Save the new sample type.

To delete a sample type, highlight it in the Sample Type list, then click **Delete**.

New

To create a new sample type, enter all required parameters in the Sample Type Information field, then click **Save**.

Edit

To edit an existing sample type, double click on an entry in the sample type list, or highlight the sample type then click the **Edit** button, to copy the sample type's data, including the Type, to the Sample Type Information section. Edit the data as necessary and **Save** the batch.

Copy

The **Copy** function lets you create a new sample type by copying, then editing, the data from an existing sample type.

Select a sample type from the Sample Type list then click the Copy button to copy all of the data except the Type to the Sample Type Information section. Enter a new Type, edit the remaining data as necessary, then Save the new sample type.

Delete

To delete a sample type, highlight it in the Sample Type list, then click **Delete**.

Sample Type Information

The data in the Sample Type Information group defines the current Sample Type. If the current Sample Type already includes this data, using either the **Edit** or the **Copy** button will transfer the data to this section. If the selected Sample Type's data is incomplete, it can be added or corrected here.

Type

This field uniquely identifies the sample type.

Description

This field is used to enter additional information about the sample type.

Customer Information

This section is optional. Select the **Customer Information** check box to enter the necessary customer information.

Editors Setup Page

The Editors Setup Page provides convenient access to the system's Genie 2000 Editors and Apex-Alpha Editors.

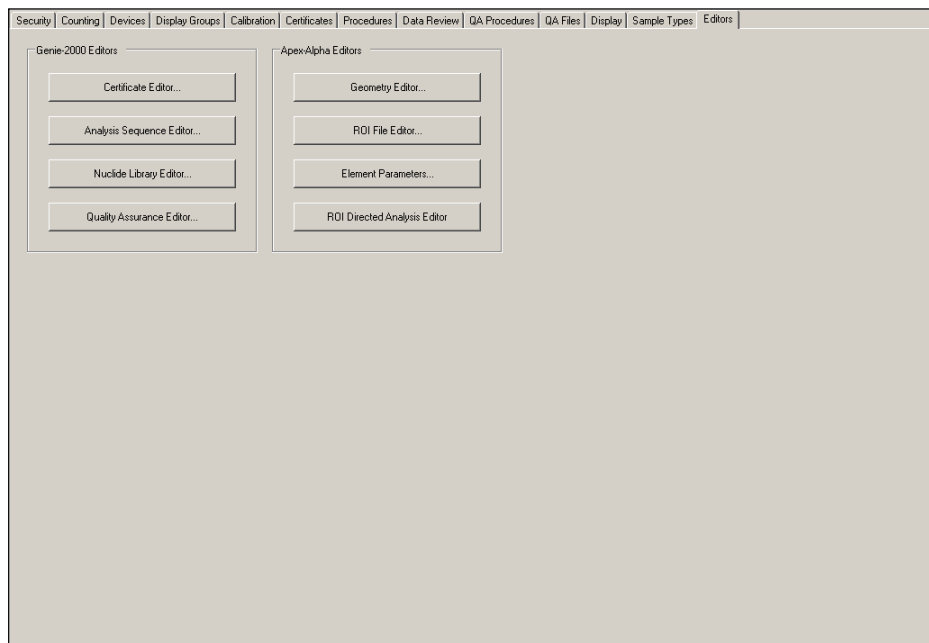


Figure 26: The Editors Setup Page

Genie 2000 Editors

Four Genie 2000 editors are available through Apex-Alpha: Certificate File, Analysis Sequence, Nuclide Library and Quality Assurance.



CAUTION: Do not use any Genie 2000 editor outside of Apex to create or edit Apex-Alpha files. Doing so will cause unexpected operation and under some circumstances may corrupt Apex-Alpha's data.

Certificate Editor

The Certificate File Editor creates and maintains certificate files, which greatly simplify the calibration process. They are basically disk copies of the data sheets for your calibration sources.

This editor is covered in detail in the *Using the Certificate File Editor* chapter of the *Genie 2000 Operations Manual*.

Analysis Sequence Editor

The Analysis Sequence Editor allows you to create or edit analysis sequence (ASF) files that you can use to automatically analyze your spectra.

Notes:

Apex-Alpha does not support the following ASF steps: Save Datasource, Acquire, QA Transfer and Reporting. If they are included in an analysis sequence, Apex-Alpha will ignore them.

Genie™ 2000's Analysis Sequence function lets you specify parameters that must be specified in Apex-Alpha. For example, you can define acquisition time, reports, QA transfer steps, nuclide libraries and background files in an ASF. In Apex-Alpha, these are defined at the time a procedure is created. Therefore, *any such information you define in the ASF file will be ignored at run time.*

This editor is covered in detail in the *Using the Analysis Sequence Editor* chapter of the *Genie 2000 Operations Manual*.

Nuclide Library Editor

The Nuclide Library Editor is used to create and maintain the nuclide libraries that are used for both qualitative and quantitative radionuclide analysis.

This editor is covered in detail in the *Using the Nuclide Library Editor* chapter of the *Genie 2000 Operations Manual*.

Quality Assurance Editor

The Quality Assurance Editor allows you to interactively establish a database of key system performance parameters – such as the gain and efficiency of a detector – which you want to monitor over time and warns you if the parameters drift outside the warning and error limits you have set.

This editor is covered in detail in the *Model S505 QA Software User's Manual*, which is part of the *Genie 2000 Operations Manual*.

Apex-Alpha Editors

There are several editors specific to the Apex-Alpha system. Four of these, Geometry, ROI File, Element Parameters and ROI Directed Analysis, can be accessed directly from this page as well as from the Setup Pages using them. Others are accessed only from their Setup Page.



CAUTION: Opening a File in one of these editors while Apex-Alpha is performing an operation accessing that file may cause an error. It is recommended that these editors be used only when you are certain no Apex-Alpha function will attempt to read or write the file while it's open.

Geometry Editor

The Geometry Editor lets you Add a new geometry to the list or Edit or Delete an existing one.

Geometry ID	Is Default
Shelf 1	No
Shelf 2	No
Shelf 3	Yes
Shelf 4	No
Shelf 5	No
Shelf 6	No
Shelf 7	No
Shelf 8	No
Shelf 9	No
Shelf 10	No
Shelf 11	No
Shelf 12	No

Create New Geometry

Information

ID:

Distance (cm):

☐ Is Default

Buttons: Add, Edit, Delete, Save, Cancel, Close, Clear Fields

Figure 27: The Geometry Editor

Add

Enter the values for the geometry's ID and Distance, then click **Add** to add the new geometry.

Edit

Select a geometry from the list then click **Edit**, or double click on the geometry, to move the geometry's data to the text boxes. Change the data as necessary, then click **Save**.

Delete

Select a geometry from the list then click **Delete** to remove the geometry from the list.

Information

ID and Distance

The element's name and its distance from the detector, in centimeters, are entered here.

The Distance from the detector to the sample is used to calculate the correct vacuum level when using recoil suppression mode. The vacuum level depends on the distance from the detector to the sample (Distance) and the Air Thickness that was defined when recoil suppression mode was selected. The latter is defined in the *Genie 2000 MID Editor*, which is covered in the MCA Input Definition chapter of the *Genie 2000 Operations Manual*.

Is Default

Select the **Is Default** check box to make the current geometry the default geometry.

ROI File Editor

The ROI File editor lets you create and edit an ROI file, which includes predefined regions of interest for the peaks expected in a specific sample type.

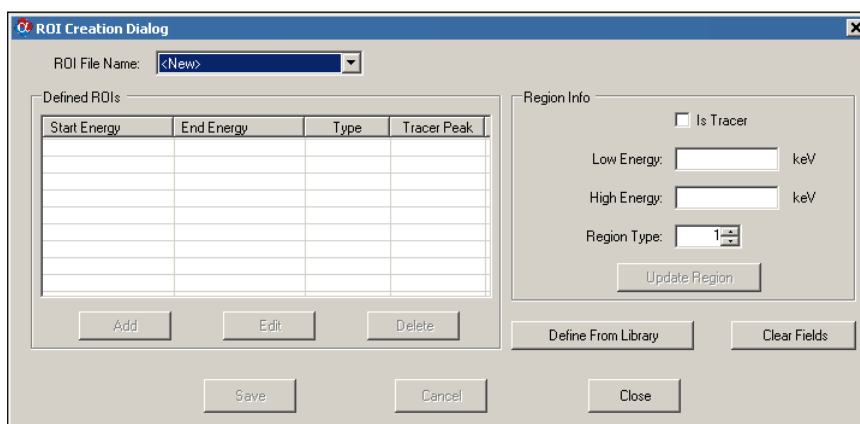


Figure 28: ROI File Editor

Creating an ROI File

With <New> displayed in the ROI File Name box, type the ROI's energy values into the Low and High Energy boxes. Next, select the **Region Type** and then the **Is Tracer** check box (optional). Click **Add** to add the values to the Defined ROIs list.

When all lines have been added, click **Save** to save the list as a new ROI file.

Editing an ROI File

Choose an existing ROI file from the **ROI File Name** box to populate the **Defined ROIs** list with its data.

ROI File Name

Selecting <New> lets you create a new ROI file. Selecting an existing file name lets you edit that file.

Edit an Energy line

To edit an energy line, double click on it, or select the line then click **Edit**. The Region Info fields will be populated with the selected line's values. Edit the values as necessary, then click the **Update Region** button to write the changes to the file.

Define From Library

To create a new ROI file from a library (NLB) file, click the **Define From Library** button, select a Library File, then click **Open**.

All of the library file's lines will be loaded into the editor's Defined ROIs list. Edit or delete the lines as required, and then click the **Save** button then add a file name.

The Elements Editor

The Elements Editor lets you **Add** a new element to the system or **Edit** or **Delete** an existing one.

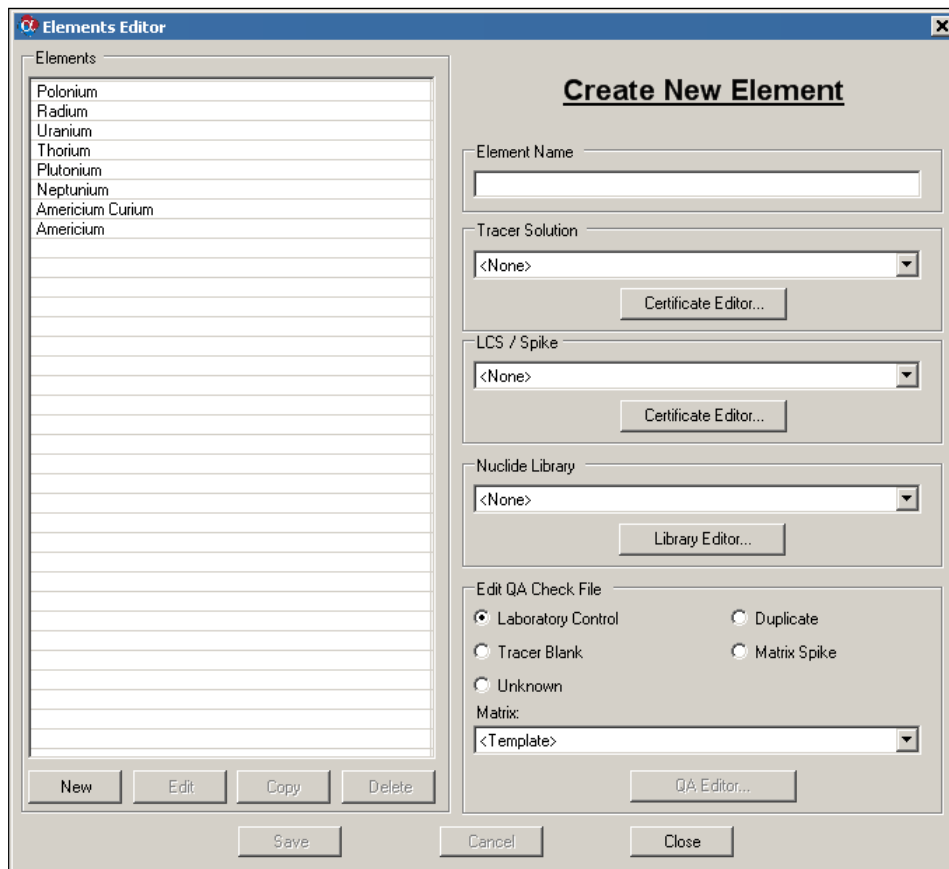


Figure 29: The Elements Editor

Editing an Element

To edit an existing element in the list, double click on the element or highlight the element, then click the **Edit** button to copy the procedure's data, including the Element Name, to the data area. Edit the data as necessary and **Save** the element.

Adding an Element

To add an element, select an element in the Elements list, then click the **Copy** button to copy all of the data except the element's name. Enter a new Element Name, edit the remaining data as necessary, then **Save** the new element.

Element Name

Enter the name of the element.

Tracer Solution

Choose a Tracer Solution from the drop down list. Refer to Certificate Editor, following.

LCS / Spike

Choose an LCS / Spike control from the drop down list. Refer to Certificate Editor, following.

Certificate Editor

Opens the highlighted Tracer Solution certificate or LCS/Spike certificate in the Certificate Editor.

If the chosen Certificate is <None>, clicking this button will open the Certificate Editor with no data in its fields. If a specific Tracer Solution or LCS/Spike was selected, the editor's fields will be populated with its data. (Refer to *Certificate Editor* on page 60.)

Nuclide Library

Choose a Nuclide Library from the drop down list.

Library Editor

If the chosen Nuclide Library is <None>, clicking this button will open the Library Editor with no data in its fields. If a specific library was selected, the editor's fields will be populated with that library's data. (Refer to *Nuclide Library Editor* on page 61.)

Edit QA Check File

Choose one of the QA Check file types here. This button will be disabled for new elements until the element has been saved.

Matrix

Choose a Matrix from the drop-down list. The list includes <None> and <Any> as choices.

QA Editor

This button launches the Apex-Alpha QA Editor, which functions like the Genie 2000 QA Editor. It is covered in detail in the *Model S505 QA Software User's Manual*, which is part of the *Genie 2000 Operations Manual*.

ROI Directed Analysis Editor

The ROI Directed Analysis Editor lets you define a set of ROIs to be used by a procedure.

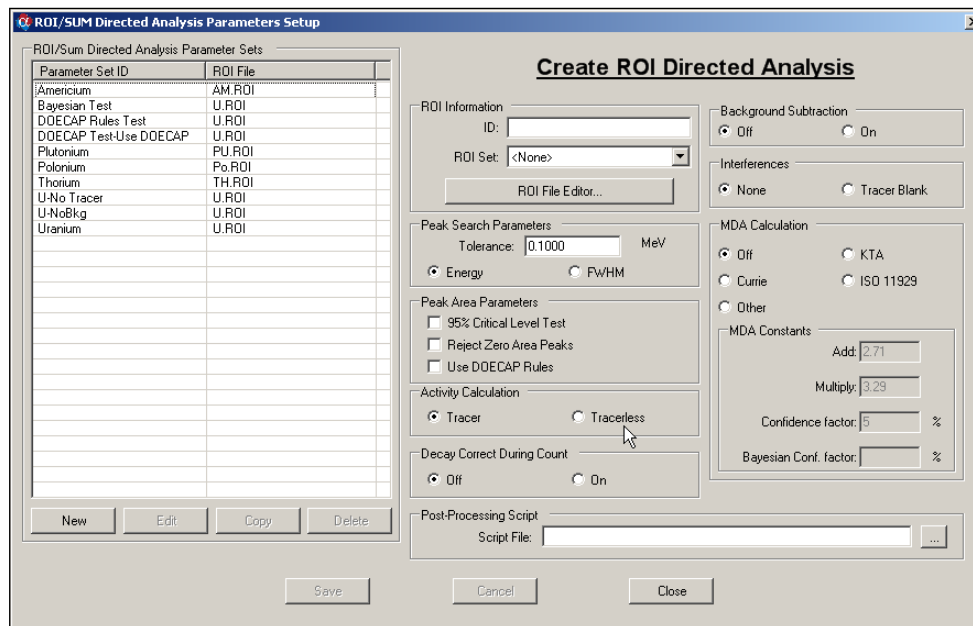


Figure 30: The ROI Directed Analysis Editor

Creating a New ROI Set

To create a new ROI Set click on **New**, enter all required parameters then click **Save**.

Editing an ROI Set

Double click on a Parameter Set ID or select a set, then click the **Edit** button to copy its parameters into the data fields. Edit the parameters as necessary, then **Save** the changes.

Copying an ROI Set

Select a Parameter Set ID then click the **Copy** button to copy all of the data except the ID into the data fields. Enter a new ID, edit the remaining data as necessary, then **Save** the new sample.

Deleting an ROI Set

To delete a ROI Set, highlight it in the list, then click **Delete**.

ROI File Editor

This editor's functions are described in *ROI File Editor* on page 63.

ROI Information

To identify a ROI set, it must have a unique ID and a ROI Set name must be selected from the ROI Set list.

Peak Search Parameters

Peak match tolerance is used to match the found peaks with the peaks in the specified ROI Set, plus or minus the entered **Tolerance** value in MeV. The tolerance can be specified in terms of **Energy** or **FWHM**.

Peak Area Parameters

If **95% Critical Level** option is selected, the net peak area is examined to see if it exceeds the 95% Critical Level value as described in the “Critical Level Testing” section of the *Algorithms* chapter in the *Genie 2000 Customization Tools Manual*.

If **Reject Zero Area Peaks** option is selected, peaks with no area will not be considered.

If **Use DOECAP Rules** option is selected, the peak area algorithm will report uncertainties in conformance with DOECAP Quality Systems for Analytical Services Revision 2.2 D.4 DOE 27 which states that “*Counting uncertainties may be estimated by the square root of counts except when there are zero (0) counts. In the case of zero (0) counts, the counting uncertainty is assumed to be one count.*”

That is, if the total peak area is zero and the continuum is none, the counting uncertainty will be reported at 1.0 count.

Activity Calculation

Determines whether a Tracer or Tracerless activity calculation is performed. If tracer based calculation is performed, the Element specified in the Procedure must include reference to a Tracer certificate.

Decay Correct During Count

Select **On** to have the sample’s data decay corrected during the count.

Background Subtraction

Select **On** to automatically subtract the background from the sample’s peak areas.

Interferences

Determines whether a Tracer Blank interference is performed or None. If enabled, Interference depends on the presence of a sample blank in the batch.

MDA Calculation

You can choose **Off** to specify that no MDA calculation be performed, or choose the **Currie, KTA**, or **ISO 11929** calculation (described in the “MDA Calculations” section of the *Algorithms* chapter in the *Genie 2000 Customization Tools Manual* and the *Genie 2000 Addendum for ISO11929/ISO10703*). Choose Other to enter your own MDA Constants parameters (below).

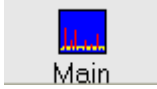
MDA Constants

Selecting Other lets you specify the values for the **Add Constant**, **Multiplier** and **Confidence Factor** parameters to be used by the Currie algorithm. Selecting ISO 11929 allows the Bayesian Confidence Factor to be defined.

Post Processing Script

Enter a Script File name or click on the editor button to specify the script that the ROI/Sum Directed procedure is to execute.

5. Main View



The Main View can be accessed by pressing the **Main** button on the Apex-Alpha toolbar or by selecting the **View | Main View** menu option.

The Main View of Apex-Alpha displays the spectra of several physically related chambers, such as the chambers of an Alpha Analyst, in either of two display modes:

- The *Thumbnail Spectra Mode* on page 72, which displays the small images of the spectra of up to 12 chambers at a time.
- The *Full Spectrum Mode* on page 75, which displays the full spectrum of a single chamber.

Spectrum Display Organization

There are two types of spectral display in the main view of Apex-Alpha: Thumbnail Spectra (in the Main View) and Full Spectrum (in several views). The Full Spectrum is shown in the following figure.

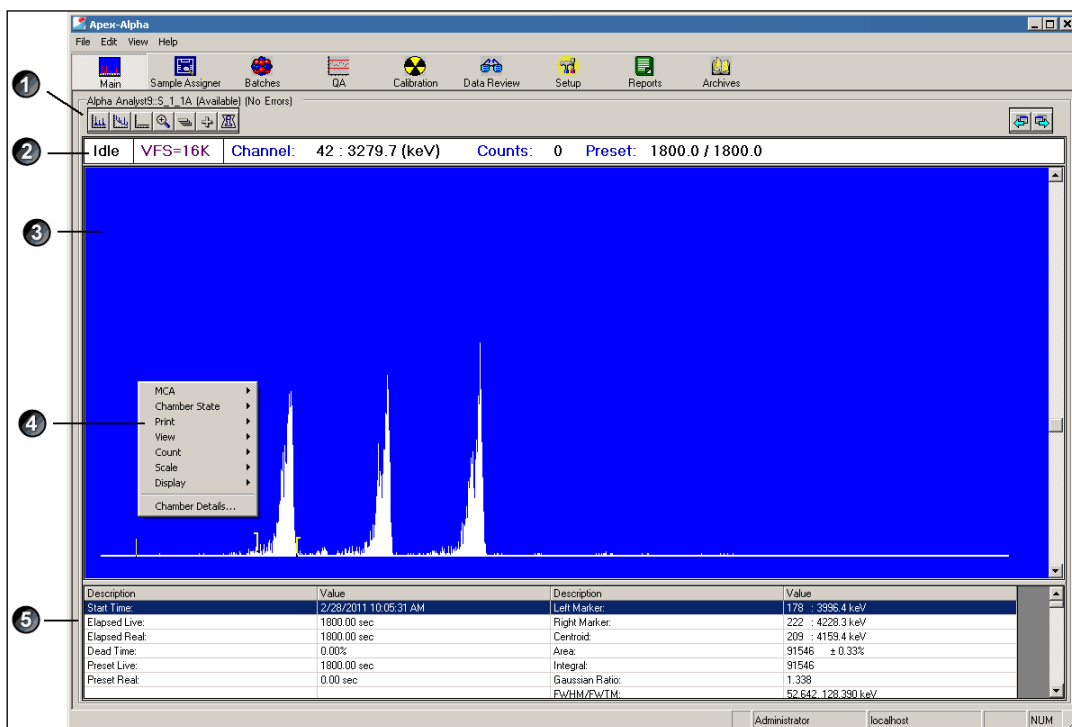


Figure 31: A Typical Full Spectrum Display

① The Spectrum Toolbar

The Spectrum Toolbar at the top of any Full Spectrum display lets you quickly select any of several common display functions. This item is not seen in the Thumbnail Spectrum view. Its functions are described in *Spectrum Toolbar* on page 76.

② The Spectrum Status Bar

The Spectrum Status Bar at the top of the Full Spectrum shows the current chamber's status, the display's vertical full scale (VFS), the cursor's current channel number, the energy and counts at that channel, and the preset's elapsed and preset values. This item is not seen in the Thumbnail Spectrum view. Its data are described in *Spectrum Status Bar* on page 79.

③ The Spectrum Area

The chamber's spectrum is displayed in this area.

④ The Context Menu

Right clicking on a spectrum area brings up a menu of context-specific functions, described in *Spectrum Context Menu* on page 79.

⑤ The Information Spreadsheet

The bottom section of the display is the Information Spreadsheet, showing the values for several spectral parameters. This item is not seen in the Thumbnail Spectrum view. It's described in *Information Spreadsheet* on page 79.

Thumbnail Spectra Mode

The Thumbnail Spectra mode shows groups of up to 12 spectra at a time as small (thumbnail) displays.

Double clicking on any thumbnail spectrum will change its display to *Full Spectrum Mode* on page 75.

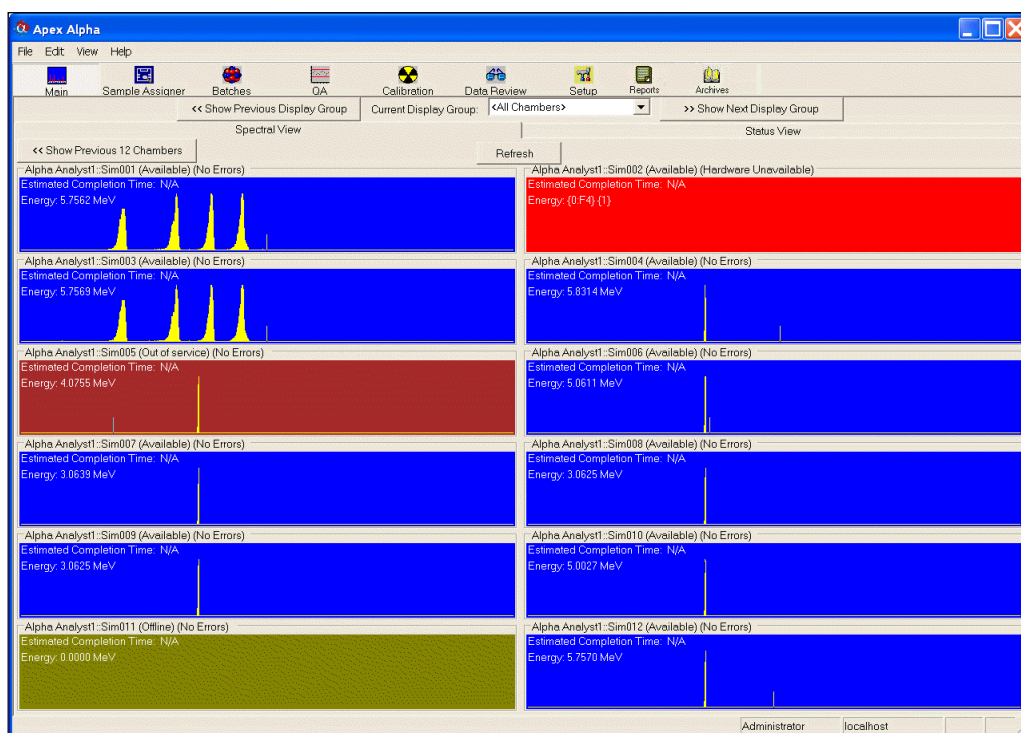


Figure 32: Thumbnail Mode Display

Show Previous/Next Display Groups

Chambers with shared controls, such as vacuum, can be grouped together. The **Show Previous Display Group** and **Show Next Display Group** buttons display up to 12 chambers of the previous (or next) Display Group.

Spectrum Context Menu

Right click on a spectrum brings up the *Spectrum Context Menu* on page 79.

Current Display Group

The **Current Display Group** list lets you choose a specific group to display, instead of the previous group or next group.

Show Previous/Next 12 Chambers

If more than 12 chambers have been defined for this display group, these buttons will be enabled. You can move from one display of 12 chambers to another in the same group by clicking on the **Show Previous 12 Chambers** or **Show Next 12 Chambers** buttons.

Refresh Button

Will refresh the displayed spectrum and the Display Information.

Display Information

Above each thumbnail display's spectrum, you'll see:

- The detector's name and status, such as available or counting.
- The estimated completion time, or N/A if data acquisition is not active.
- The energy at the cursor's location.

Status View

The Status View shows status information for all chambers in the currently selected display group. Some status information such as Chamber ID, Device ID, Status, Batch, Sample, Procedure, Preset and Elapsed will be common to all varieties of hardware devices. Other status information, such as Leakage Current, Pressure and Air Thickness, may be specific to a given device.

Clicking on a column's header will sort the rows in ascending/descending order of that column's data.

Chamber	Status	Error State	Batch	Sample	Procedure	Preset	Elapsed	Bias	Current	Pressure	Air Thickness	Vacuum State
Alpha Analyst9: S_1_1A	Counting		System Bkgd 1092	System Bkgd 1121	QA System ...	00:03:00	00:01:20	On	4	0.50 Torr	12	Pump
Alpha Analyst9: S_1_1B	Counting		System Bkgd 1092	System Bkgd 1122	QA System ...	00:03:00	00:01:19	On	4	0.50 Torr	12	Pump
Alpha Analyst9: S_1_2A	Counting		System Bkgd 1092	System Bkgd 1123	QA System ...	00:03:00	00:01:19	On	4	0.50 Torr	12	Pump
Alpha Analyst9: S_1_2B	Counting		System Bkgd 1092	System Bkgd 1124	QA System ...	00:03:00	00:01:18	On	4	0.50 Torr	12	Pump
Alpha Analyst9: S_1_3A	Counting		System Bkgd 1092	System Bkgd 1125	QA System ...	00:03:00	00:01:18	On	4	0.50 Torr	12	Pump
Alpha Analyst9: S_1_3B	Counting		System Bkgd 1092	System Bkgd 1126	QA System ...	00:03:00	00:01:17	On	4	0.50 Torr	12	Pump
Alpha Analyst9: S_1_4A	Counting		System Bkgd 1092	System Bkgd 1127	QA System ...	00:03:00	00:01:17	On	4	0.50 Torr	12	Pump
Alpha Analyst9: S_1_4B	Counting		System Bkgd 1092	System Bkgd 1128	QA System ...	00:03:00	00:01:16	On	4	0.50 Torr	12	Pump

Figure 33: The Status View

Full Spectrum Mode

The Full Spectrum mode is a full screen display of a single spectrum. Double clicking on an Individual Spectrum will change the display to the *Thumbnail Spectra mode*.

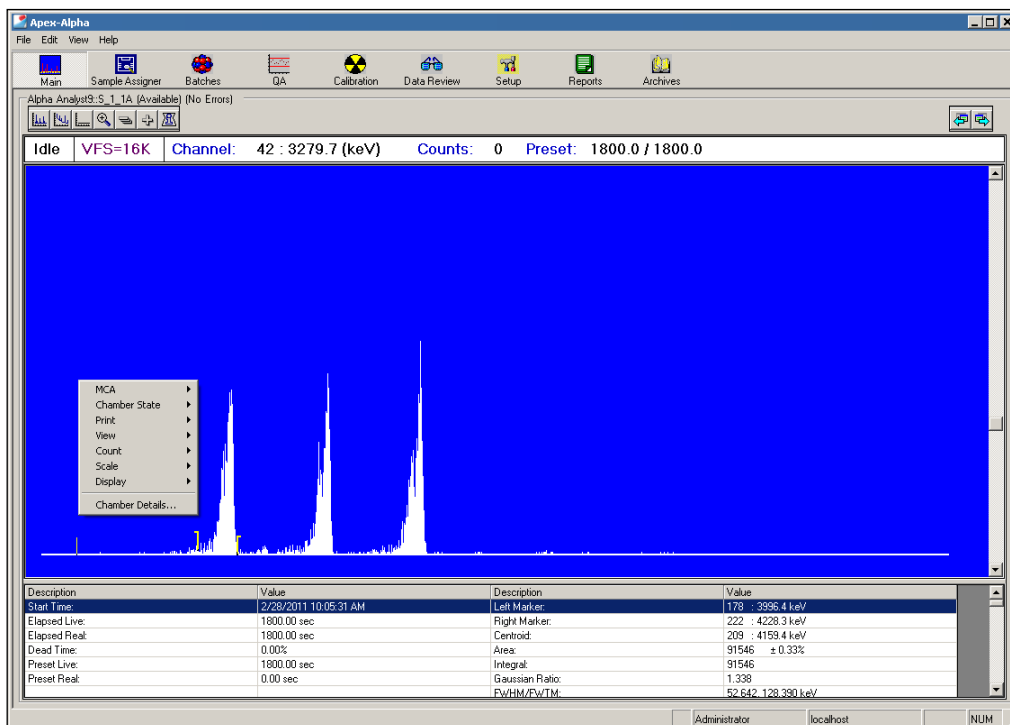


Figure 34: The Full Spectrum View

Resizing the Display

In the Full Spectrum mode, the horizontal line separating the Spectrum pane from the Data pane can be dragged up or down to change the size of the panes.

Expanding the Spectrum

Refer to *Expanding the Spectrum* on page 77 for details.

Display Information

Above the spectrum you'll see: the detector's name and status and, if counting, the current Sample ID; the estimated completion time or N/A if data acquisition is not active; the energy at the cursor's location.

In addition, there are several display elements that deserve a more complete discussion:

- The *Spectrum Toolbar* on page 76.

- The *Expand Spectrum Display* on page 77.
- The *Spectrum Status Bar* on page 79.
- The *Information Spreadsheet* on page 79.
- The *Spectrum Context Menu* on page 79.

The Spectrum Toolbar

The spectrum toolbar at the top of the individual spectrum display lets you quickly select any of several common display functions.



Figure 35: The Spectrum Toolbar

From left to right, the Spectrum Toolbar icons:

- Select linear scale
- Select log scale
- Select auto scale (automatic vertical full scale)
- Toggle between expanded and normal displays
- Go to the previous ROI
- Go to the next ROI
- Show the hardware status

Hardware Status

Hardware Status displays status information for the current hardware input.

Expanding the Spectrum

Expanding the Spectrum is described in detail in *Expanding the Spectrum* on page 77.

Display Modes

The spectral display defaults to the **Linear** mode and autoscale (automatic vertical full scale) display.

- The **Log** mode can be manually selected from the Spectrum Toolbar or by right-clicking on the display to bring up the Spectrum Context Menu, then selecting **Scale | Log**.
- You can manually scale the display by dragging the right hand scroll bar.

Spectrum Colors

The spectrum display color indicates the current detector's state. The default colors are:

- Blue for available.
- Cyan for assigned.
- Dark green for acquiring.
- Light brown for out of service
- Olive drab for count done.
- Dark brown for offline.
- Red for unavailable detectors, such as a hardware error.

These colors can be changed in *Spectrum Display Colors* on page 52.

Expanding the Spectrum

The expanded display, is a split-screen display, with the whole spectrum in the lower half of the display and the expanded portion in the upper half.

The upper and lower parts of the window can be resized by moving the splitter bar between the upper and lower halves.

The focus of the expanded display, the rectangle, can be moved through the spectrum by putting the mouse pointer inside the rectangle, then clicking and dragging it to a new location. The data shown in the expanded half of the display will track the moving rectangle.

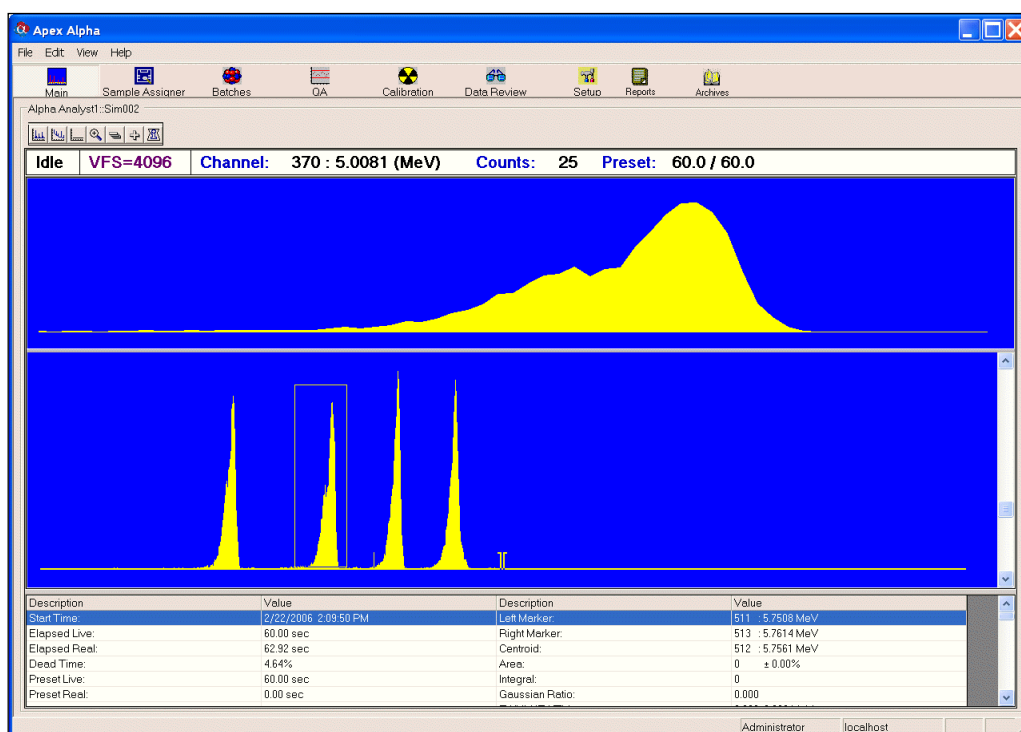


Figure 36: A Typical Expanded Display

Resizing the Rectangle

The rectangle can be resized by moving the mouse pointer to any side or corner of the rectangle so that the pointer changes to a two-headed arrow. Click the mouse button and drag the rectangle to a new height or width.

Rescaling With the Rectangle

Changing the height of the rectangle will automatically rescale the expanded display to accommodate the data in the rectangle. The normal (unexpanded) display's scale will not change.

Pressing CTRL+M on the keyboard will move the markers to the sides of the rectangle in the lower half and to either end of the expanded region in the upper half.

Spectrum Status Bar

The Spectrum Status Bar at the top of the spectrum, shows the detector's status, the display's vertical full scale (VFS), the cursor's current channel number and its energy, the counts in that channel, and the preset's elapsed and preset values.

Idle	VFS=16K	Channel: 217 : 4202.0 (keV)	Counts: 4831	Preset: 1800.0 / 1800.0
------	---------	-----------------------------	--------------	-------------------------

Figure 37: The Spectrum Status Bar

Information Spreadsheet

The bottom section of the individual spectrum display is the Information Spreadsheet, showing the values for many spectral parameters.

Description	Value	Description	Value
Start Time:	2/22/2006 2:09:50 PM	Left Marker:	511 : 5.7508 MeV
Elapsed Live:	60.00 sec	Right Marker:	513 : 5.7614 MeV
Elapsed Real:	62.92 sec	Centroid:	512 : 5.7561 MeV
Dead Time:	4.64%	Area:	0 ± 0.00%
Preset Live:	60.00 sec	Integral:	0
Preset Real:	0.00 sec	Gaussian Ratio:	0.000

Figure 38: The Information Spreadsheet

Spectrum Context Menu

Right clicking on a spectrum brings up the Spectrum Context Menu; its settings and functions are described in the following paragraphs.

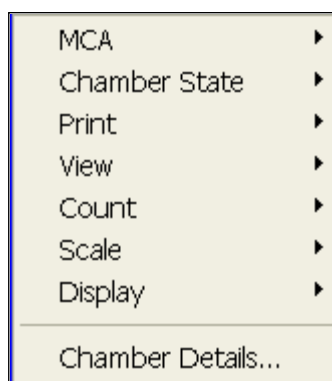


Figure 39: The Spectrum Context Menu

MCA

HW Status brings up a report listing the current status of the system's front-end hardware (amplifier, ADC, etc.).

In Service returns an Offline or Out of Service chamber to service. Selecting the In Service option while pressing the Ctrl+Shift keys will clear the detector's state.

Out of Service means the chosen chamber is not available for use; possible reasons are:

- The chamber was manually set to Out of Service because it was removed for decontamination, repair or maintenance.
- The chamber was set to Out of Service by the system because an operator Rejected its calibration (refer to *Calibration View - Reject* on page 118).
- Depending on the system's Failure Response settings (located in the *Calibration Setup Page* on page 33 and *QA Procedure Setup Page* on page 47), the system may have automatically forced the chamber Out of Service.

Offline disconnects the chamber from the system.

Reconnect reconnects the chamber to the system.

Verify is enabled only when there is a hardware verification error. You can determine the source of the error by viewing HW Status. Any verification errors detected at open time will be flagged with an asterisk (*). If no errors are detected at open time, then the asterisk will indicate that a given parameter has changed value since the initial open. To clear the error you must decide whether to use Hardware Settings or the Apex-Alpha settings these will then be used by Genie and the Verify error will be cleared.

View Backup, enabled only if there has been a system error during acquisition, lets you view the most recent backup file before choosing to restore it.

Note: The system creates a sample backup file at the interval set by the Sample Backup Rate (located in the *Counting Setup Page* on page 23) in case the detector is disconnected from the system. When the problem has been fixed, select the Restart Count command (below).

Restart Count is seen only if a count was interrupted. Selecting the command gives you three choices:

- **Abort the count** – The chamber's data will be deleted.
- **Restore From Backup** – The backup file will replace the current spectrum (you might want to use the View Backup command (above) before selecting this option).

- **Use Current Spectrum** – The displayed spectrum will be used to continue the count.

Chamber State

The **Chamber State** command lets you set the chamber's state to Vent, Pump or Hold.

- **Vent** – This command vents the highlighted chambers.
- **Pump** – This command connects the highlighted chambers to the vacuum manifold. The chambers will be pumped down to the appropriate pressure.
- **Hold** – This commands places the highlighted chambers in a vacuum hold mode.

Print

The **Print** command lets you print the current spectrum.

View

The View command lets you:

- Look at the **Event Log** report for the current chamber (refer to *Reports- Event Log* on page 136).
- Toggle between **Thumbnail Spectra** and **Full Spectra**.

Count

The **Count** commands, except for Start, are available only if the current chamber is actively acquiring data.

- **Abort** – Immediately stops the count in the current chamber.
- **Restart** – Clears the spectrum and begin a new count.
- **Stop and Analyze** – Analysis occurs when all the samples in the batch complete counting. The Stop and Analyze command stops counting for the sample counting on that chamber, making the sample ready for analysis.
- **Change Preset** – Changes the current preset to another value. Available only if the chamber is in the Counting state.

- **Force Analyze** – In the rare instance of system failure to analyze the current chamber's data, this command lets an authorized user start the analysis. To prevent accidental use of this command, you must press and hold the Shift key before clicking Force Analyze.

Scale

The **Scale** command lets you choose either Linear or Logarithmic mode for the current data display.

Display

The Display command lets you change how the current spectrum is shown.

- **Normal** shows the highest data point in each channel.
- **Full** shows a data point for each channel.
- **Envelope** connects the Normal data points with a continuous line.
- **Fill** fills in the area under the Envelope display's continuous line.

Chamber Details

The **Chamber Details** command displays information about the current chamber. To update the information, click the **Refresh** button.

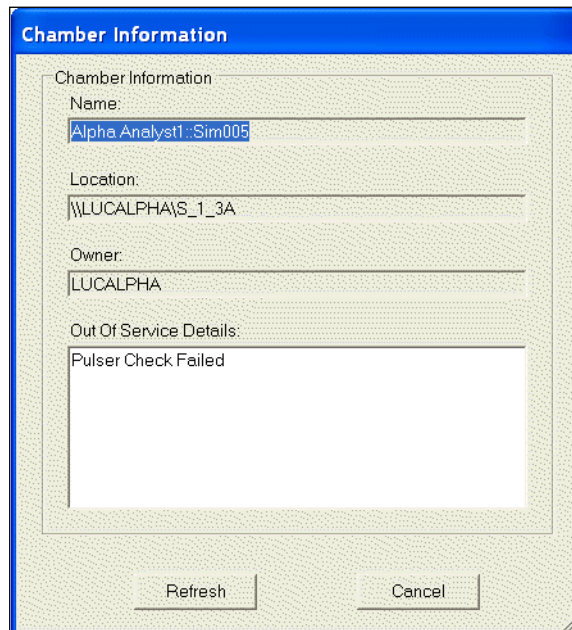
The image shows a Windows-style dialog box titled "Chamber Information". It has a blue title bar and a light gray background. Inside the dialog, there is a section labeled "Chamber Information" with four text input fields: "Name:" containing "Alpha Analyst1 :Sim005", "Location:" containing "\\LUCALPHA\S_1_3A", "Owner:" containing "LUCALPHA", and "Out Of Service Details:" containing "Pulser Check Failed". At the bottom of the dialog, there are two buttons: "Refresh" and "Cancel".

Figure 40: The Chamber Details

Peak Labeling

If Peak Labeling is enabled, you'll see either or both of Peak (nuclide ID) Labels and a Peak Information “bubble” with or without activity, to any energy calibrated spectral display. Refer to *Peak Labeling* on page 53 for more information.

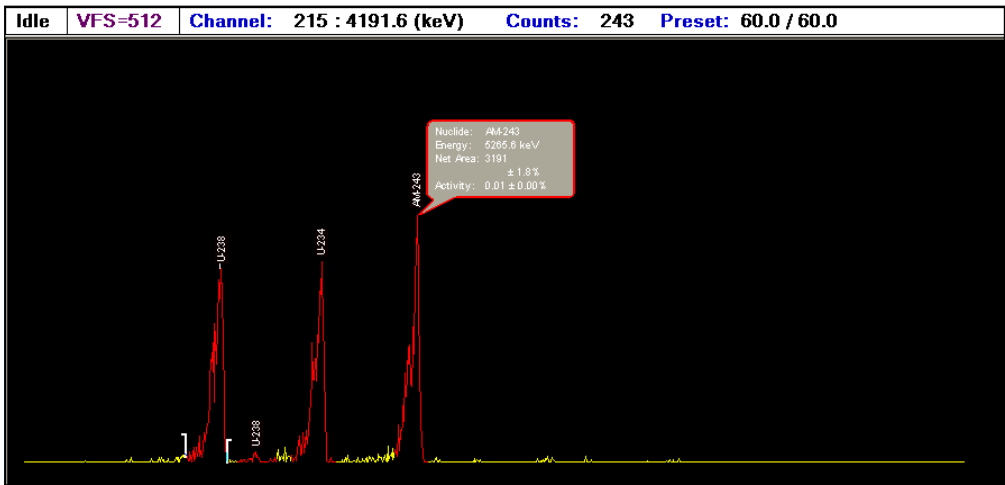


Figure 41: Typical Peak Labeling

6. Sample Assigner View



The Sample Assigner View is used to start a count by associating a sample with a chamber.

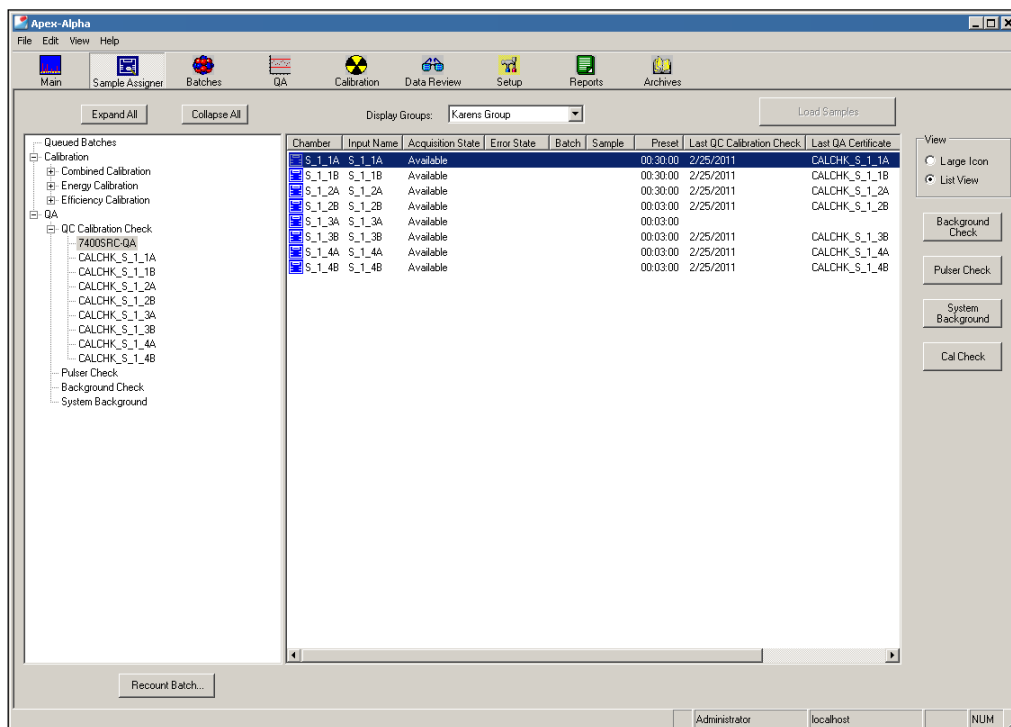


Figure 42: Sample Assigner View

Resizing the Display

The horizontal line separating the Batch/Sample Tree pane from the Chambers list can be dragged left or right to change the size of the panes.

The Batch/Sample Tree

The Batch/Sample Tree on the left side of the view lists Count types by category (Unknown, Calibration and QA). The Sample Assigner dynamically updates the tree, showing only batches, samples and certificates that are available for counting.

Expand All

The **Expand All** button above the list creates a full view all sample details.

Collapse All

The **Collapse All** button above the list creates a summary view of the list.

Display Group

Displays the name of the current display group. From the drop down list select from all display groups to quickly navigate to the desired group.

Queued Batches

Queued batches are normal batches of unknowns that you create and run once. Batches are listed in alphabetical order; their samples are listed by the sample order defined when you create the batch. If there are no queued batches, this category is not shown.

Queued Batches Context Menu

Right-clicking on a queued batch displays a context menu listing the valid options for that batch or sample.

Recounted Sample

When recounting a batch/sample, if the option to “Clear and Recount” was selected it will contain the Dequeue Batch (for a batch) or Dequeue Sample (for a sample) option. Selecting the dequeue item will remove the entire batch from the batch tree and reset the batch state to “Done” or reset the sample state to its previous state. If there are no more samples in that batch, the batch state resets to “Done”.

Calibration Category

The Calibration category includes the Energy and Efficiency calibration counts. Each of these node lists the available certificates for its calibration counts. Certificates appear in the order defined in *Certificates Setup* on page 37.

If you selected the “Allow efficiency procedure to be used for combined calibrations” option in the Efficiency Calibration Procedure section of the *Calibration Setup Page* on page 33, the Calibration node will also contain Combined Calibrations, which lists the available certificates for Combined calibrations. Certificates appear in the order defined in Certificates Setup.

QA Category

The QA category contains nodes for Pulser Check, Background Check, and System Background counts. These count types do not require certificates.

If you have added or imported QC certificates, the QA category also contains a node for QC Calibration Check, listing all available certificates for QC calibration counts. Certificates appear in the order defined in *Certificates Setup* on page 37.

The Chambers List

The Chambers list on the right side of the view shows the chambers selected by the Display Group, above the list. The Sample Assigner dynamically updates this list to reflect any changes to the chamber status information.

For Calibration and QA count types, select and drag the count type or, where applicable, the individual certificate, from the Sample Tree to the Chambers List. The Sample Assigner automatically creates the necessary batches and samples with unique IDs.

Chambers List Context Menu

If you right click on a chamber, you’ll see a context menu, which varies depending on the chamber's current acquisition state and error state.

When you select more than one chamber, the menu shows options valid for all of the selected chambers. For example, if you select an assigned chamber and a counting chamber, the menu shows only the Change Preset option.

Pulser Check, Background Check, Calibration Check and System Background Check let you run the named check on the current chamber.

Change Preset lets you change the preset on the selected chamber. The “Allow User to Change Count Time For Samples” check box in *Counting Setup* on page 23 must be checked to enable this function (both menus).

Abort Count lets you stop the count without performing analysis. For unknown samples, the count will return to the assigned state, otherwise it will return to the available or out of service state (Acquiring menu only).

Pump/Vent lets you set the currently selected chamber's state to Vent or Pump (Assigned menu only).

Unassign Sample clears the sample assignment for the currently selected chamber (Available and Assigned menus).

Unassign All samples in Batch clears the sample assignment for all samples in the batch assigned to the currently selected chamber (Assigned menu only).

Unassign All samples in Display Group clears all samples assignments in the Chamber list view (Assigned menu only).

View Buttons

The View buttons let you select one of two ways of displaying the items in the Chambers list: as icons or a list.

Large Icons

Select the **Large Icons** option to display each chamber as an icon with the chamber's name.

List View

Select the **List View** option to display more information about each individual chamber, including information about the current or last count.

QA Checks Buttons

QA Checks can be started from the Chamber List context menu or by selecting one or more chambers then clicking on one of the check buttons on the right, **Background Check**, **Pulser Check**, **System Background Check**, or **Cal Check**, the appropriate count will be assigned to the selected chambers. For the Calibration Check, the certificate used during the last QA count will be used for this count.

Assigning Samples and Batches

You can assign a single sample from a batch by dragging and dropping a single sample or an entire batch at once by dragging and dropping the batch node. Once the Sample Assigner successfully completes the assignments, it removes all assigned samples from the Batch/Sample Tree.

If there are no more unassigned samples in the batch, the Sample Assigner also removes the batch node. If there are no queued batches left, the Sample Assigner removes the Queued Batches node completely.

Drag and Drop

Drag a sample or batch from the Batch/Sample tree on the left onto a desired Chamber on the right.

Sample assignment starts with the first chamber; if there is more than one sample, the chamber assignments will be made in sequential order. Samples are assigned to only to chambers that are available for counting.

If not enough chambers are available for all of the samples, you'll be given the option of canceling the drop or choosing to have the Sample Assigner assign only as many samples as there are chambers available.

The Chamber Manager performs one or more Error Checks, depending on the type of count (energy or efficiency calibration, QA count, etc.). If the check fails, you'll see either an error message that aborts the assignment or a warning message that asks you whether you want to cancel the count or proceed with it. Refer to *Error Checks* on page 90 for more information.

Once you've successfully assigned one or more samples, the Sample Assigner will enable the **Load Samples** button. Refer to *Load Samples* on page 92 for more information.

Unknown Batches

You can assign a single sample from a batch by dragging and dropping just that sample, or you can assign the entire batch at once by dragging and dropping the batch node. Once the Sample Assigner successfully completes the assignments, it removes all assigned samples from the Batch/Sample Tree. If there are no more unassigned samples in the batch, the Sample Assigner also removes the batch node.

Calibration Counts

To initiate a calibration count, drag a certificate for the calibration type onto the chamber. You can also drag the calibration count type node to a chamber, which assigns all the available certificates in order, starting with the first chamber.

For efficiency or combined calibrations, the Sample Assigner asks you for the Geometry to use. The Geometry Dialog shows all available geometries.

Finally a batch is created which contains one sample per certificate that has been assigned. The Sample Assigner then removes the certificate name(s) from all three calibration nodes: Energy, Efficiency, and Combined until the calibration has been completed.

QA Counts

QA Checks can be started from the Chamber List context menu or by selecting one or more chambers then clicking on one of the check buttons on the right.

The Batch/Sample Tree

To initiate a Pulser, Background, or System Background count, drag the count node type onto the chamber. QA Calibration Checks behave the same way as Calibration Counts: drag either a single certificate onto a chamber, or drag the QA Calibration Check node to assign all available certificates. Each distinct drag and drop operation will create a new batch with the appropriate number of samples.

QA Count Buttons

You can also initiate QA Counts from the buttons on the far right of the Sample Assigner view: Pulser Check, Background Check, System Background or Cal Check.

The Sample Assigner will only enable these buttons if you have selected one or more chambers that are available for counting, and that have no errors. For Cal Check, the selected chambers will use the certificate used during the previous Cal Check. If no previous Cal Check was performed for that chamber, the button will not be enabled. Each distinct click operation will create a new batch with the appropriate number of samples based on the selected number of chambers

Unassigning Samples and Batches

You can unassign samples or batches by selecting one or more chambers then right clicking to see the Chamber context menu.

Chamber View Context Menu

Options for unassigning batches/samples are:

- **Unassign Sample** unassigns the individual sample for the selected chamber(s)
- **Unassign All Samples in Batch** unassigns all uncounted/assigned samples that are in the same batch as the sample in the selected chamber. If the user has selected more than one chamber, the Sample Assigner cycles through all affected batches.
- **Unassign All Samples in Display Group** unassigns the uncounted/assigned samples for all the chambers in the display group, whether the user selected them or not.

If you unassign all samples from the current display group, the Sample Assigner disables the Load Samples button.

Error Checks

Error checks are performed at the at sample assignment time and at sample load time to determine whether the assignment or count will be allowed to proceed. While checks are in progress, the status “performing system checks” will be shown in the detector status line.

If an error is encountered, it must be corrected before the assignment or count can proceed. If a warning occurs you’ll be given the choice to cancel the operation or continue.

Changing Preset Time

Once you assign a sample to a chamber, the Sample Assigner sets the preset time according to the procedure associated with this sample or count type. You can change the preset time via the Change Presets option in the Chamber view's context menu.

Sample Counting

When a sample is counted on a given chamber, the system automatically selects and uses the efficiency calibration defined for that chamber and the geometry identified in the procedure. ROIs will be applied to the spectrum/display as soon as acquisition is started.

Recounting a Batch

When you click on the **Recount Batch** button at the lower left of the Sample Assigner View, you'll see the Recount dialog, which lets you select Samples or a Batch to recount.

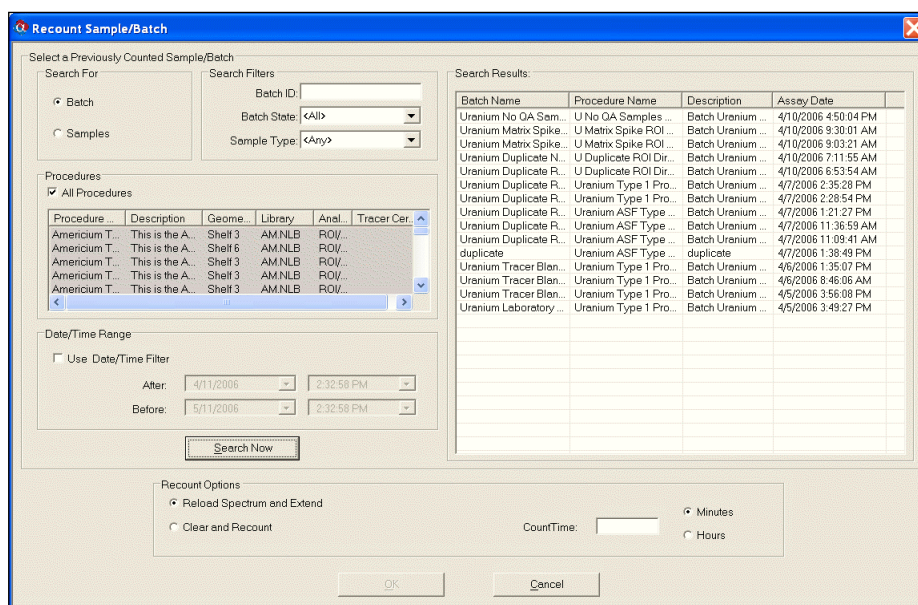


Figure 43: The Recount Sample/Batch Screen

Note: Recounting a sample will not overwrite the results of the original count; you'll be able to see the results of both the old and new counts in Data Review.

Filtering the Search

You can use Search Filters, Procedures and Date/Time Range to narrow the search.

Search Now

Click **Search Now** to search the database for Batches or Samples that match the filter criteria and display them in the Search Results box. When a sample or batch is selected from the list the **OK** button will be enabled.

Reload Spectrum and Extend

For Reload Spectrum, the samples are automatically assigned to the chambers where they were originally counted. If one or more chambers are not available for counting, the reload assignment will be canceled.

Clear and Recount

For Clear and Recount, the sample(s) and parent batch are added to the list of Queued Batches in the Sample Assigner's batch/sample tree. From there, you can drag and drop the sample(s) onto chambers. You can dequeue a recount batch or sample using the batch tree's context menu.

From this point on, the user can start the samples, change their preset values, or unassign them. If the user unassigns a recount sample, the sample resets to its previous state. Once all recount samples are unassigned, the batch state returns to “Done”.

The recount options let you select how the recount will be performed. The “Reload Spectrum and Extend” option adds the recount data to the original spectrum; the “Clear and Recount” option overwrites the old spectrum with the recount data.

Loading Samples

To load samples and start acquisition, click the **Load Samples** button.

On automatic systems, the Sample Assigner shows a message asking if it's okay to vent the chambers. (If the chambers have already vented, you'll be prompted to remove the old samples and insert the new ones). When you confirm the message, the Sample Assigner will vent the chambers.

For both manual and automatic chambers, the Sample Assigner displays a dialog box with a report to show all the chamber-sample assignments.

Sample acquisition begins when the samples have been assigned and (for Alpha Analyst only) meet vacuum conditions. Additional checks are also performed before a count starts. Energy calibration and system background must exist and be current. Note that system background is geometry-dependent, so a background must exist for the specified geometry.

7. Batches View



To efficiently manage a large number of samples and manage analysis sample counting in a production batch mode environment, samples can be grouped into batches and managed in that mode.

Batches Page One

The first Batches View page lets you edit an existing or create a new batch of samples.

The view defaults to the Create New Batch state, meaning that you can begin entering or editing batch information right away. This process is continued and completed on the Batches View Page Two when all required fields on Batches View Page One are completed. The title at the top of the page shows the current action, “Create New Batch” or “Edit Batch:BatchID”. Only Unknown Batches can be created/edited on this screen.

In the Create Batch mode, the Sample Creation Info and Default Sample metrics areas provide a quick way to specify information about the samples to be included in the batch. The Sample Creation Info lets you specify either the number of Unknowns to be created for the batch or that the samples will be imported from the shared sample information table. There are also check boxes that allow you to specify which special samples will be included in the batch: Laboratory Control, Duplicate, Matrix Spike or Tracer Blank.

The Default Sample Metrics let you specify Sample Amount and one of External Recovery or Tracer Amount. The specified values will then be applied to all samples created for the batch. It will be possible to edit the values on a sample by sample basis on Batches View Page Two. There are also optional parameters available via the Correction Factors button: Systematic Error, Random Error, Generic Multiplier (x) and Generic Divisor (1/x) factors that will be used as multipliers in activity calculation.

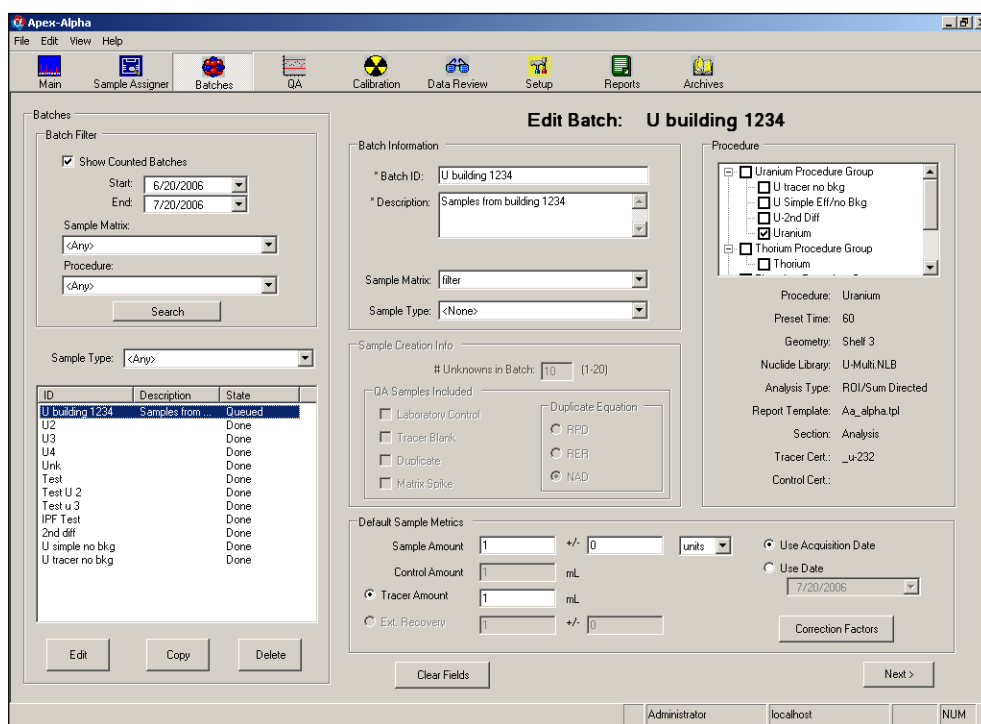


Figure 44: The First Batch View Page

Batch Filter Selection

The Batch Filter parameters specify which batches are to be listed in the window at the bottom of this section.

Selecting <Any> will allow all entries to be included in the search.

Show Counted Batches

Selecting this check box enables batches that have been previously counted to be shown in the Batch list below.

Search filters are available based on **Sample Matrix**, the specified **Procedure** and dated between the specified Start and End dates.

Sample Type

This control filters batches based on Sample Type.

Batch List

The list displays all queued and created batches. By default, the list is ordered by Batch ID; you can order the list by the Description instead by clicking on its column heading.

Creating or Editing a Batch

You can edit an existing batch or create a new batch by copying the parameters of the existing batch.

Edit

To edit the data in an existing batch, double click on a batch in the Batch List, or highlight the batch then click the **Edit** button, to copy the batch's data, including the Batch ID, to the Information section. Edit the data as necessary and **Save** the batch.

You cannot edit counted batches. If you double-click on a counted batch, the Batch View screen displays the batch and sample information as read-only fields.

Copy

The Copy function lets you create a new batch by copying, then editing, the data from an existing batch. You can copy both counted and uncounted batches.

Select a batch from the Batch List then click the **Copy** button to copy all of the data except the Batch ID to the page's Information section. Enter a new Batch ID, edit the remaining data as necessary, then **Save** the new batch.

Note: If Enable Automatic Batch ID is turned on, the Batch ID will be added by the system; an auto ID cannot be edited. Refer to *Counting Setup Page - Options* on page 24.

Delete

To delete a batch, highlight it in the Batch List, then click **Delete**. You cannot delete counted batches.

Batch Information

Note: If you are Editing or Copying a sample, these fields will be filled in by the system.

Enter the **Batch ID** (required) and **Description**. You can define the **Sample Matrix** and **Sample Type** for all samples in the batch.

Notes:

If Enable Automatic Batch ID is turned on, the Batch ID will be added by the system; an auto ID cannot be edited. Refer to *Counting Setup Page - Options* on page 24

If you are viewing a counted batch, the Batch ID and Description are presented as read-only fields.

Sample Creation Info

Note: If you are Editing, Copying, or Viewing a batch, the Sample Creation Info fields will be disabled.

Unknowns in Batch

This controls specifies the number of unknown samples, from 1 to 20, to be included in the batch. The Unknowns value defaults to last number used when creating a batch.

QA Sample Included

Specify which QA samples, Laboratory Control, Tracer Blank, Duplicate, or Matrix Spike should be included in the batch.

There can only be one each of those sample types.

- Matrix Spike and Duplicate samples require you to specify a reference unknown that will be used in post-processing.
- Matrix Spike and Laboratory control samples require a control amount and measurement unit.

Duplicate Equation

Specifies the Duplicate Equation to be used for a Duplicate QA Sample: RPD, NAD or RER. The supporting algorithms are described in the appendix Algorithms.

Default Sample Metrics

The Default Sample Metrics let you specify Sample Amount and one of External Recovery or Tracer Amount. The specified values will then be applied to all samples created for the batch.

Sample Amount

Specifies the default sample amount, uncertainty and units to be used for all samples. Sample amount must be a decimal number greater than zero. Uncertainty must be a decimal number greater than or equal to zero.

Control Amount

Specifies the default control amount and units to be used for Matrix Spike and Laboratory controls. Control amount must be a decimal number greater than zero.

Tracer vs. External Recovery

Indicates whether a tracer amount will be specified. If the selected procedure uses simple efficiency, the controls will be disabled and External Recovery will be the selected option.

Tracer Amount

Specifies the default tracer amount and units to be used for all samples. Tracer amount must be a decimal number greater than zero. These controls are enabled only if the selected procedure uses tracer efficiency or is ASF-based.

External Recovery

Specifies the default tracer amount and uncertainty to be used for all samples. External Recovery amount must be a decimal number greater than zero, and less than or equal to 1.5. Uncertainty must be a decimal number greater than zero.

Sample Date

This control determines whether the “Acquisition Date” or a manually entered “Use Date” is used as the sample date for decay correction.

Correction Factors

The following optional user defined correction factors are available.

- Systematic Error
- Random Error
- Generic Multiplier (x)
- Generic Divisor (1/x)

Systematic Error and Random Error must be decimal numbers greater than or equal to zero. Generic Multiplier and Generic Divisor must be decimal numbers greater than zero.

Procedure

The Procedures list shows available procedures ordered by group. Summary information for the currently selected procedure is displayed below the list.

Next

When you have entered all required information for the batch, click the **Next** button to proceed to the Batches Page Two, where you can add, edit, copy, move, and delete individual samples.

Note: When you click Next, Apex-Alpha will validate all input fields for the first Batches Page. If any information is missing or incorrect, an error message will be displayed. You must correct the error before you can proceed to the next page.

Batches Page Two

Many of the controls you used on the first Batches page to modify batches are used on Batches Page Two to modify samples in the Sample List.

The screenshot displays the Apex-Alpha software interface for the Batches Page Two. The window title is 'Apex-Alpha'. The menu bar includes File, Edit, View, and Help. The toolbar contains icons for Main, Sample Assigner, Batches (active), QA, Calibration, Data Review, Setup, Reports, and Archives.

The 'Samples' section on the left contains a table with the following data:

#	Sample ID	Type	Amount
1	20-Jul-2006-00003	Unknown	1.00
2	20-Jul-2006-00004	Unknown	1.00
3	20-Jul-2006-00005	Unknown	1.00
4	20-Jul-2006-00006	Unknown	1.00
5	20-Jul-2006-00007	Unknown	1.00
6	20-Jul-2006-00008	Unknown	1.00
7	20-Jul-2006-00009	Unknown	1.00
8	20-Jul-2006-00010	Unknown	1.00
9	20-Jul-2006-00011	Unknown	1.00
10	20-Jul-2006-00012	Unknown	1.00
11	20-Jul-2006-00013	Tracer Blank	1.00

Below the table are buttons for 'Move Up', 'Move Down', 'Edit', 'Copy', and 'Delete'. At the bottom of the Samples section are '< Previous', 'Save', and 'Cancel' buttons.

The 'Sample Information' panel on the right is for editing the selected sample (Sample ID: 20-Jul-2006-00003). It includes fields for:

- * Sample ID: 20-Jul-2006-00003
- * Description: (empty text box)
- Sample Matrix: filter
- QA Sample Type: Unknown
- Sample Type: <None>
- Sample Amount: 1 +/- 0 units
- Control Amount: 1 mL
- ☒ Tracer Amount: 1 mL
- ☐ Ext. Recovery: 1 +/- 0
- ☒ Use Acquisition Date
- ☐ Enter Date Manually: 7/20/2006

 At the bottom of the panel are buttons for 'Correction Factors', 'Clear Fields', and 'Update Sample'.

At the bottom right of the window is a 'Queue Batch' checkbox and a status bar showing 'Administrator', 'localhost', and 'NUM'.

Figure 45: The Second Batch View Page

Note: You cannot edit, copy, move, or delete a counted sample. If you are viewing a counted batch, all edit fields and controls on this page are set to read-only.

Sample List

The Samples List shows all samples in the current batch, listed in sample assignment order.

Duplicate and Matrix Spike samples are prefixed by a square. A red square indicates that you have not yet selected a reference unknown for the Duplicate or Spike sample. A black square with a check inside indicates that you have. The Select Unknown Sample dialog tells you how to make that selection. Refer to *Select Unknown Sample Dialog* on page 100 for more information.

Move Up/Move Down

The order of the samples in the list will be used during sample assignment. The **Move Up** and **Move Down** buttons can be used to change order of the samples in the list. These buttons are disabled for a sample that is being counted or has already been counted.

Edit/Copy/Delete

Only uncounted samples can be manipulated with these controls. If a sample is being counted or has already been counted, these buttons will be disabled. You'll still be able view a counted sample by double-clicking on it.

Edit

To edit the data in an existing sample, double click on or highlight the sample then click the **Edit** button to copy the sample's data, including the Sample ID, to the Information section. Edit the data as necessary and click **Update Sample** to confirm the changes.

Note: If you click Edit while editing or creating a sample, you'll see a warning message. Click **Discard Changes** to confirm that you want to abandon the changes. To save the changes to the current sample, click **Continue Editing**, then **Update Sample**.

Copy

The Copy function lets you create a new sample by copying, then editing, the data from an existing sample.

Select a sample from the Samples List then click the **Copy** button to copy all of the data except the Sample ID to the Information section. Enter a new Sample ID, edit the remaining data as necessary, then **Save** the new sample.

Note: If you click Edit while editing or creating a sample, you'll see a warning message. Click **Discard Changes** to confirm that you want to abandon the changes. To save the changes to the current sample, click **Continue Editing**, then **Update Sample**.

Delete

To delete a sample, highlight it in the Samples List, then click **Delete**.

Note: You cannot delete counted samples. Nor can you delete an Unknown sample that is designated as the reference sample for a Matrix Spike or Duplicate sample.

Select Unknown Sample Dialog

If there is a Matrix Spike or Duplicate in the batch being edited, a reference unknown must be assigned for each before the batch can be saved. To do this, right click on a Matrix Spike or Duplicate sample, you'll see the sample context menu, with the option Select Reference Unknown. Select this option to display the Select Unknown Sample dialog, where you can specify the reference unknown sample for the current Duplicate or Matrix Spike sample. The Matrix Spike Recovery and Duplicate algorithms are described in the appendix *Algorithms* on page 228.

Note: This option is not available for other sample types.

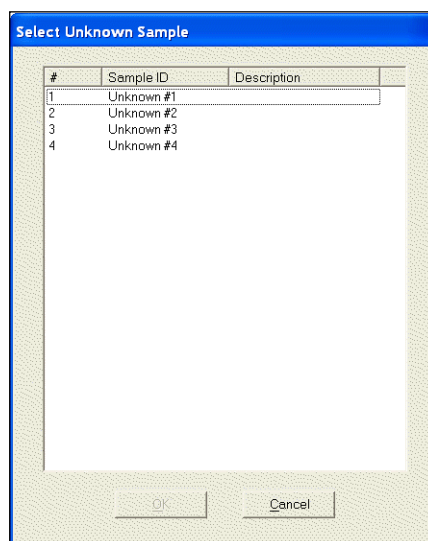


Figure 46: Selecting an Unknown Sample

Sample Information

Note: If you are Editing, Copying or Viewing a sample, these fields will be filled in by the system. If you are viewing a counted sample, these fields will be read-only.

Sample Types

Enter the Sample ID (required) and Description. You can define the **Sample Matrix**, **QA Sample Type** and **Sample Type** for the sample.

If **Enable Automatic Sample ID** is selected in setup, the sample ID field cannot be edited. Refer to *Counting Setup Page - Options* on page 24 for more information.

Amounts

Enter the value and units of the Sample Amount, Control Amount, Tracer Amount, and External Recovery, as appropriate for the sample. See *Default Sample Metrics* on page 96 for valid values.

Manual/Acquisition Date

Select either **Use Acquisition Date** for decay correction or **Enter Date Manually**.

Correction Factors

The following optional user defined correction factors are available.

- Systematic Error
- Random Error
- Generic Multiplier (x)
- Generic Divisor (1/x)

Systematic Error and Random Error must be decimal numbers greater than or equal to zero. Generic Multiplier and Generic Divisor must be decimal numbers greater than zero.

Update Samples

When you're satisfied with your changes, click **Update Sample** button to permanently change the sample's record in the list.

At this point, the application will validate all input fields for the sample. If any information is missing or incorrect, the application will display an error message. You must correct the data before you can successfully update the sample.

Note: Once the application updates the sample, it will automatically edit the next sample in the list. If there is no next sample, the application resets the Sample Information fields to their default values and returns to Insert Sample mode.

Queue Batch

Select the **Queue Batch** box to queue the current batch for counting. If the batch is already queued, this field will be disabled.

Previous

Click this button to return to the first Batch View page. This allows you to edit the batch name, description, and procedure, as well as the Default Metrics information. The Create Sample Info fields, however, will be disabled. Also note that when you return to the first batch page, you are still editing the same batch. To save the batch, you must click the **Next** button to return to the second Batch View page, then click the **Save** button.

Save

Saves all changes to the batch and its samples and returns you to the first Batch View page in Create Batch Mode.

Note: At this point, the application will validate all input fields for first Batch View page. If any information is missing or incorrect, the application will display an error message. You must click **Previous** and correct the data. When page one's data is correct, click **Next** then **Save** to save the data for the batch and its samples.

Cancel

Cancels edits to the current sample. If you are editing a sample, the fields revert to the sample's original values. For new samples, clicking this button is the same as clicking Clear Fields. If you have started to edit or create a sample, you'll see a warning message. Click **Discard Changes** to confirm that you want to abandon any changes. Click **Continue Editing**, then **Update Sample**, to save your changes.

8. Quality Assurance (QA) View



Apex-Alpha's Quality Assurance (QA) function monitors the performance of the instrument over time, performs statistical tests to monitor system degradation, and generates reports and charts presenting the data and results.

Charts and Reports Page

The Charts and Reports Page lets you review or print the contents of the QA files maintained by Apex-Alpha.

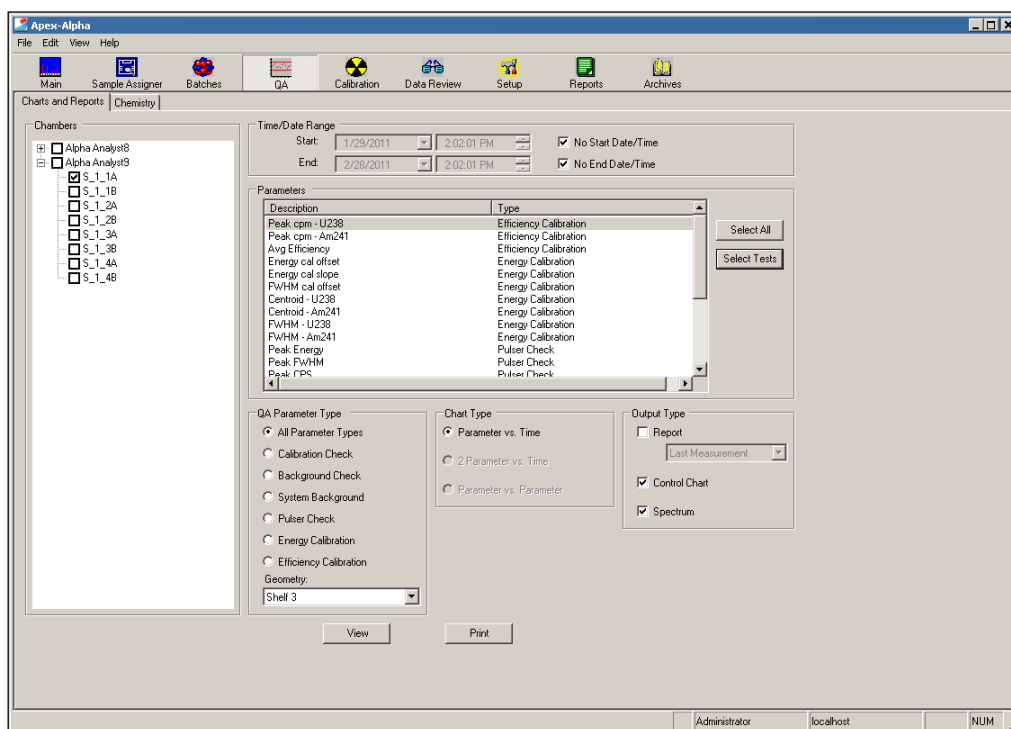


Figure 47: Charts and Reports View

Chambers

Selecting one or more chambers and QA Parameter Types determines which QA files will be used. Refer to *QA Parameter Types* on page 105 for more information.

Time/Date Range

Only the data in the selected Parameters that falls within the specified Time and Date Range will be included in the specified Output Type.

Note: Changes to the Time and Date Range are not retained; when you leave this page, these parameters revert to their default state.

No Start/End Date/Time

You can remove either or both of the Starting Date/Time and Ending Date/Time limits from the data filter by checking the appropriate box.

Parameters

The Parameters list shows the parameters of the specified chambers that match the selected QA Parameter Type. Refer to *QA Parameter Types* on page 105 for more information.

Selecting Parameters

Use the standard Shift-Click or Ctrl-Click to select one or more parameters.

Select All

Click the **Select All** button to select all parameters.

Select Tests

With any one parameter selected, the **Select Tests** button presents a dialog that lets you choose QA Tests.

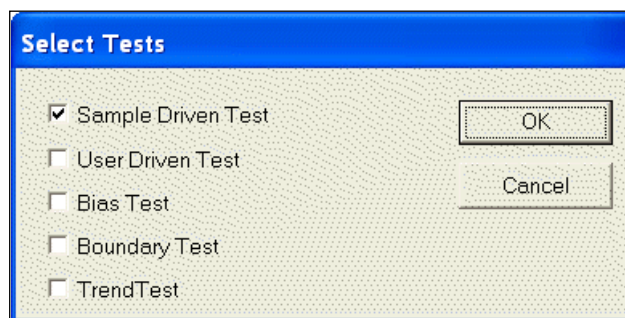


Figure 48: Selecting Tools

The default state of the check boxes, selected or cleared, is defined in the QA File, but you can select different tests here.

Note: When you click **OK**, the changes will be written back to the QA File.

These tests are described in “Limit Checking” in the *Using QA* chapter of the *Model S505 QA Software User’s Manual*.

QA Parameter Type

Select the QA Parameter Type to filter which parameters are listed in the Parameters list.

Geometry

A Geometry can be selected for report or chart generation only for a few QA Parameter Types: System Background, Efficiency Calibration and All Parameter Types.

Chart Type

Which Chart Types can be selected depends on the QA Parameter Type you selected and how many Parameters you chose from the Parameters list box.

- If you selected “All Parameter Types”, you can select only the “Parameter vs. Time” chart type.
- If you selected any other Parameter Type and you chose *one* Parameter, you can select only the “Parameter vs. Time” chart type.
- If you selected any other Parameter Type and you chose *two* Parameters, you can select any chart type.
- If you selected any other Parameter Type and you chose *three* or more Parameters, you can select only the “Parameter vs. Time” chart type.

Output Type

Select the type of output you want to generate.

Report

Choose the type of Report you want to create, **Full Report** or **Last Measurement**.

Control Chart

Choose **Control Chart** to produce the report in graphical form.

Spectrum

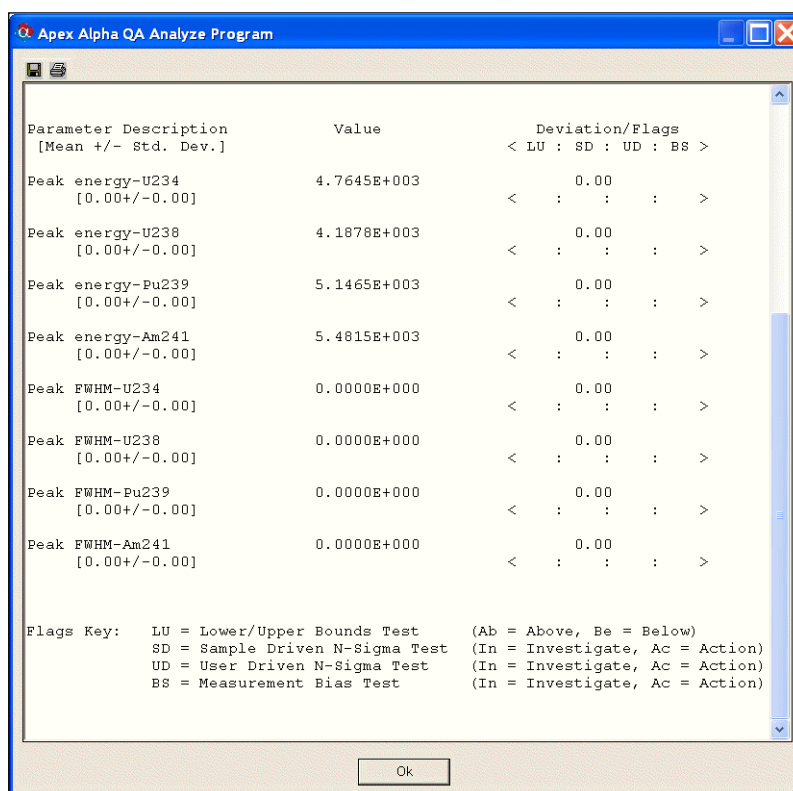
Choose **Spectrum** if you want to print the spectrum.

View/Print

These buttons are enabled when the Output Type is set to Spectrum or Last Measurement Report.

- Click **View** to display all reports as shown in the figure below.
- Click **Print** to print all reports.

If multiple reports were chosen, they will be presented sequentially, with a choice after each report to cancel or continue to the next report.



Parameter Description [Mean +/- Std. Dev.]	Value	Deviation/Flags < LU : SD : UD : BS >
Peak energy-U234 [0.00+/-0.00]	4.7645E+003	< : : : >
Peak energy-U238 [0.00+/-0.00]	4.1878E+003	< : : : >
Peak energy-Pu239 [0.00+/-0.00]	5.1465E+003	< : : : >
Peak energy-Am241 [0.00+/-0.00]	5.4815E+003	< : : : >
Peak FWHM-U234 [0.00+/-0.00]	0.0000E+000	< : : : >
Peak FWHM-U238 [0.00+/-0.00]	0.0000E+000	< : : : >
Peak FWHM-Pu239 [0.00+/-0.00]	0.0000E+000	< : : : >
Peak FWHM-Am241 [0.00+/-0.00]	0.0000E+000	< : : : >

Flags Key: LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

Figure 49: A Typical QA Report

Chemistry Page

The Chemistry Page lets you track chemistry parameters by Matrix and Element instead of by Chamber. As with other QA types, a date range and output type are selectable as well as the Recovery Type, Matrix and Element of interest are selectable.

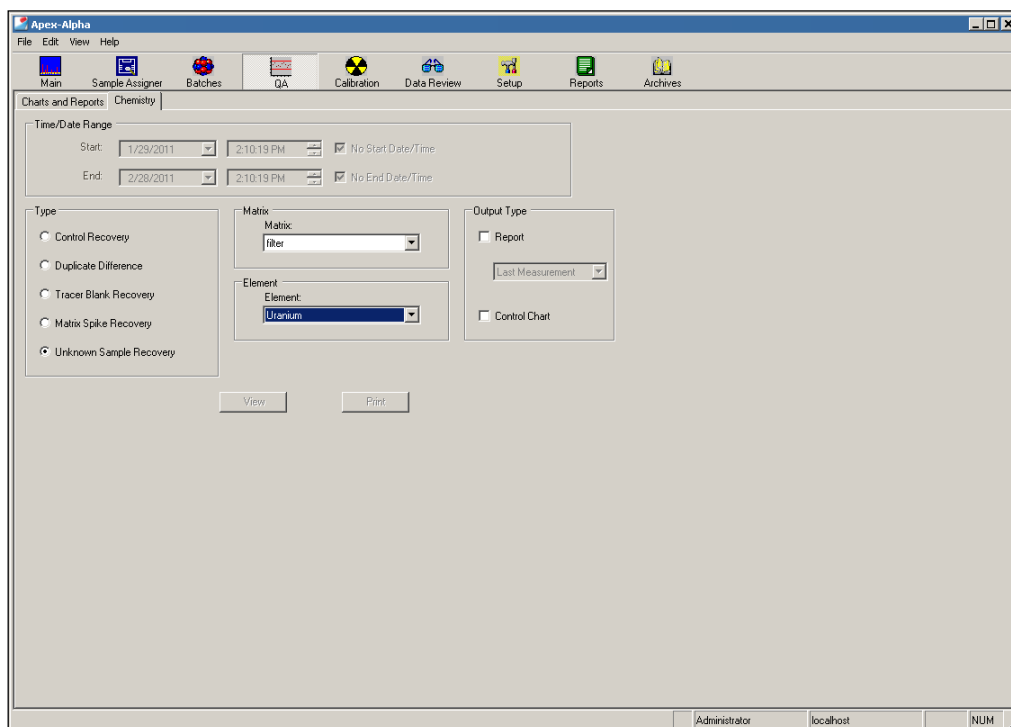


Figure 50: The QA Chemistry Page

Time/Date Range

Only the data that falls within the specified Time and Date Range will be included in the specified Output Type. This option is only used by the Last Report, otherwise is not available.

Note: Changes to the Time and Date Range are not retained; when you leave this page, these parameters revert to their default state.

No Start/End Date/Time

You can remove either or both of the **Starting Date/Time** and **Ending Date/Time** limits from the data filter by selecting the appropriate box.

Type

Select the Type of interest: Control Recovery, Duplicate Difference, Tracer Recovery, Matrix Spike Recovery or Unknown Sample Recovery.

Matrix/Element

Choose the Matrix and/or Element of interest.

Output Type

Select the type of output you want to generate. You can choose either or both.

Report

Select the report type: Full Report or Last Measurement.

Control Chart

Choose Control Chart to produce the report in graphical form.

9. Calibration View



The Calibrations View provides tools for performing calibration and reviewing calibrations on a chamber by chamber basis.

- Each calibration count performed will automatically be analyzed upon sample completion. If the calibration is successful it will automatically become the current calibration.
- Energy and efficiency calibrations can be reviewed and reanalyzed. Both spectral data and results will be displayed..

Count Page

The Count Page lets you perform a single chamber count to be used for calibration operations.

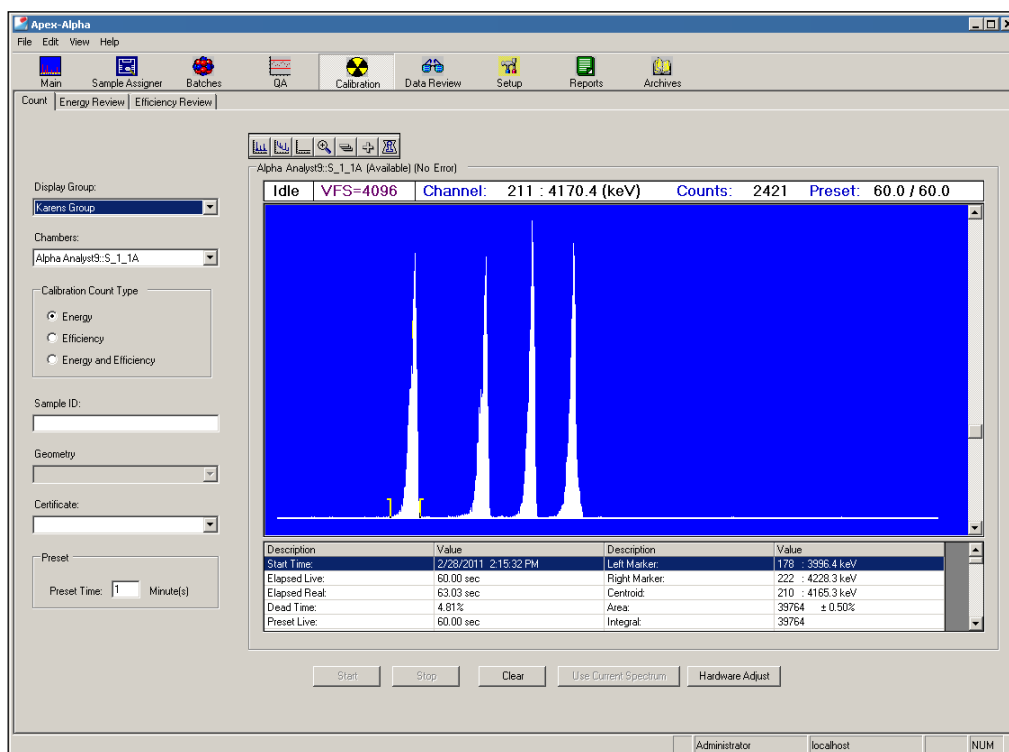


Figure 51: The Calibration Count Page

The Spectrum Toolbar

The spectrum toolbar at the top of the individual spectrum display lets you quickly select any of several common display functions.

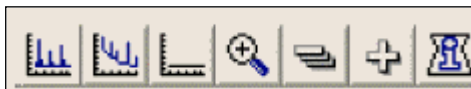


Figure 52: The Spectrum Toolbar

From left to right, the Spectrum Toolbar icons:

- Select linear scale
- Select log scale
- Select auto scale (automatic vertical full scale)
- Toggle between expanded and normal displays
- Go to the previous ROI
- Go to the next ROI
- Show the hardware status

Hardware Status

Hardware Status displays status information for the current hardware input.

Expanding the Spectrum

Expanding the Spectrum is described in detail in *Expanding the Spectrum* on page 77.

Display Group

Select the Display Group containing the chamber of interest.

Chambers

Select the Chamber in that group to be calibrated.

Calibration Count Types

Select the Calibration Count type for the selected chamber:

- Select **Energy** to acquire data for an energy calibration.
- Select **Efficiency** to acquire data for an efficiency calibration.
- Select **Energy and Efficiency** to acquire data for both an energy calibration and an efficiency calibration.

Sample ID

Assign an identifier to the current sample. Entry required to enable calibration Start.

Geometry

Select the **Geometry** to be used for this count. The Geometry list is available only for Efficiency and Energy and Efficiency counts.

Certificate

Displays the certificate associated with the currently selected calibration count. This drop down list box can also be used to apply a different calibration certificate to the selected calibration count. If a new certificate is selected you'll be able to reanalyze the calibration count and generate a new calibration based on the selected certificate.

Preset

This field displays the preset value for the selected calibration type. You can change the preset value as required.

Start

When all parameters have been entered, click the **Start** button to start a calibration count on the selected chamber. When the count is complete, the data will automatically be saved and analyzed.

Stop

Click **Stop** to stop the calibration count on the selected chamber. The data will not be saved.

Clear

Clicking **Clear** will clear acquisition data from the selected chamber, even if acquisition is underway. The data will not be saved.

Use Current Spectrum

Click **Use Current Spectrum** to save the spectral data of the selected chamber as if a calibration count had just completed, then perform the selected calibration.

Note: A count performed on the Count Page is automatically saved as a calibration count. Clicking on Use Current Spectrum *after* completing the count will store the count again as an unnecessary duplicate.

Hardware Adjust

The **Hardware Adjust** button lets you change settings for the selected hardware, such as an ADC. Note that the adjust dialogs you see depend on the type of hardware associated with the selected chamber.

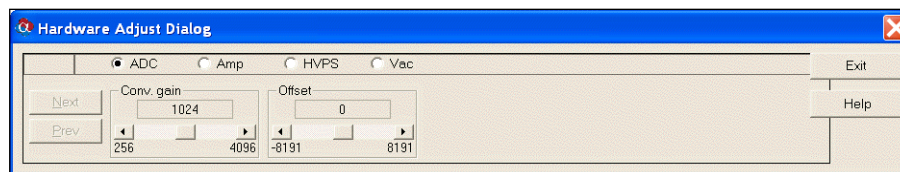


Figure 53: An ADC Adjust Dialog

For more information on Adjust dialogs, refer to the “MCA Menu – Adjust” section of the *Gamma Acquisition and Analysis* chapter in the *Genie 2000 Operations Manual*.

When an Adjust dialog is active, only Apex’s Start, Stop and Clear functions will be available. You must exit the Adjust dialog to use any other functions.



CAUTION: Any changes you make in a Hardware Adjust dialog are permanent and will take effect as soon as you exit the dialog.

Note: You can’t exit the Adjust dialog while a hardware operation is in progress, as shown by the Wait message in the upper left corner of the window.

Energy Review Page

The Energy Review Page lets you review an energy calibration associated with a previously analyzed calibration sample.

After an energy calibration has been performed, the energy values will automatically be calculated for each ROI. It will then be possible to view the energy values and the calculated energy curve via the Energy Review View.

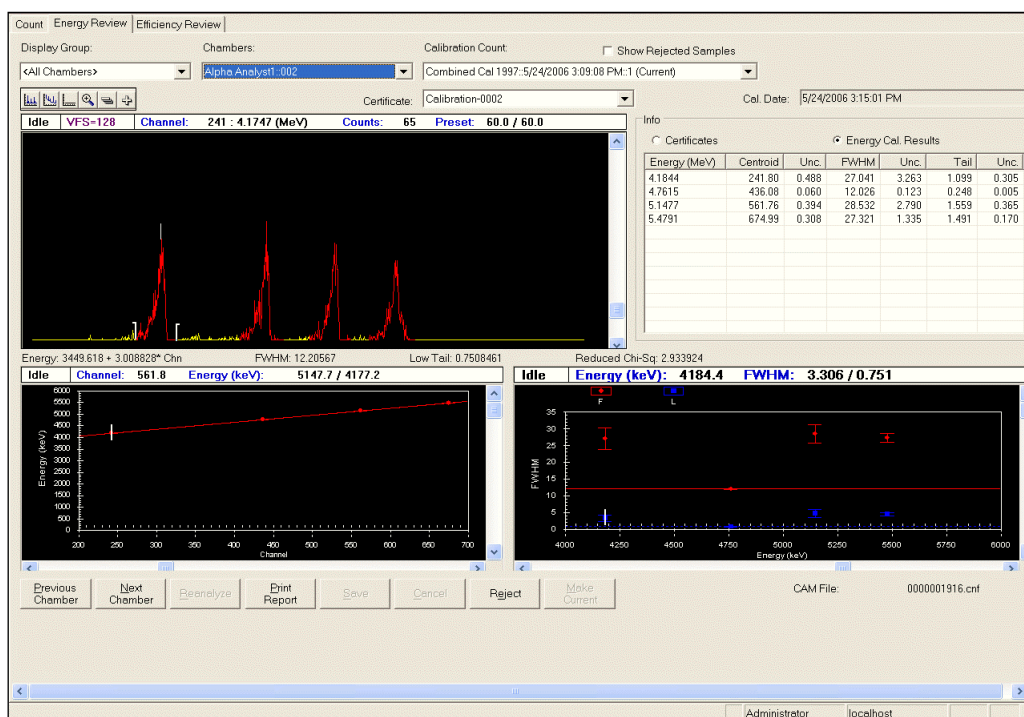


Figure 54: The Energy Review Page

Expanding the Spectrum

Refer to *Expanding the Spectrum* on page 77 for details.

Display Group

Select the Display Group containing the chamber of interest.

Chambers

Select the Chamber in that group to be calibrated.

Calibration Count

The Calibration Count drop down list shows the calibration counts for the selected chamber, up to the *Retained Calibrations setting* on page 33. The list is sorted with the most recent count at the top.

Show Rejected Samples

If you want to include all of the current chamber's rejected samples in the list, select this check box. See also *Reject* on page 118.

Cal. Date

This read-only field displays the calibration date for the selected calibration count.

Certificate

This drop-down list box displays the certificate associated with the currently selected calibration count. You can apply a different calibration certificate to the selected calibration count. If a new certificate is selected, you'll be able to reanalyze the calibration count and generate a new calibration based on the selected certificate.

The Spectrum Display

The Spectral portion of the Energy Review display is a read-only view of the spectral data for the current calibration file. The display includes the *Spectrum Toolbar* on page 76, the markers and the expand region for examining data. Neither spectral data nor ROIs can be changed.

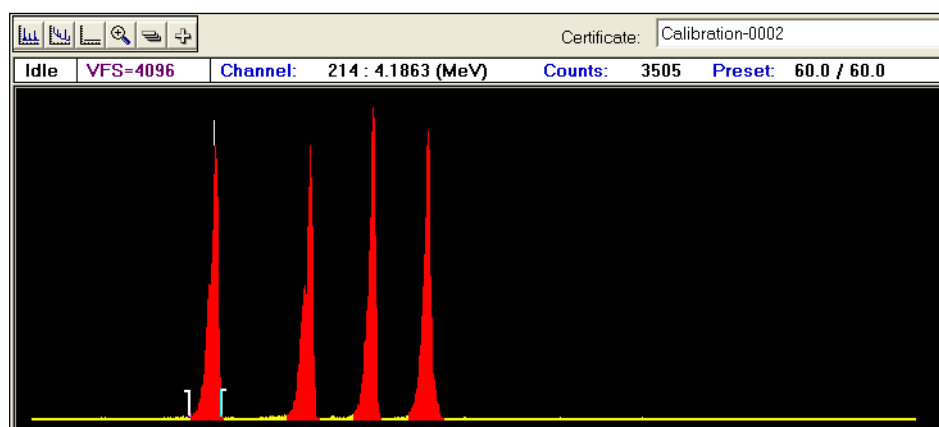


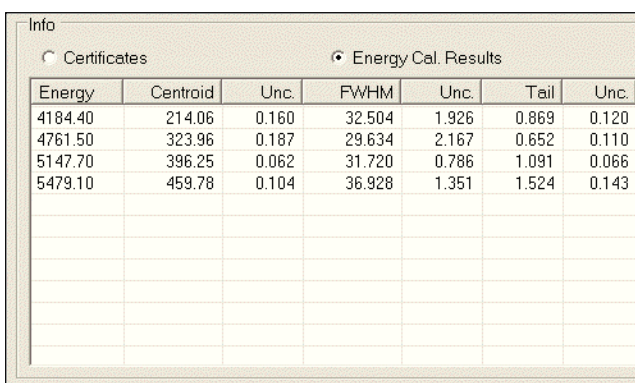
Figure 55: A Typical Calibration Spectrum Plot

Energy Calibration Parameters

The line below the Spectral Display shows the current energy calibration's Offset, Slope, FWHM, Low Tail and Reduced Chi-Square values.

Calibration List

The Info list to the right of the spectral plot lists either the **Nuclides** or the **Energy Cal. Results** for the current calibration.



The screenshot shows a window titled 'Info' with two tabs: 'Certificates' and 'Energy Cal. Results'. The 'Energy Cal. Results' tab is selected. Below the tabs is a table with 7 columns: Energy, Centroid, Unc., FWHM, Unc., Tail, and Unc. The table contains 4 rows of data.

Energy	Centroid	Unc.	FWHM	Unc.	Tail	Unc.
4184.40	214.06	0.160	32.504	1.926	0.869	0.120
4761.50	323.96	0.187	29.634	2.167	0.652	0.110
5147.70	396.25	0.062	31.720	0.786	1.091	0.066
5479.10	459.78	0.104	36.928	1.351	1.524	0.143

Figure 56: Typical Calibration List Data

Energy Cal Results Context Menu

If the list is set to show Energy Cal Results, right clicking on a line in the list brings up a context menu.

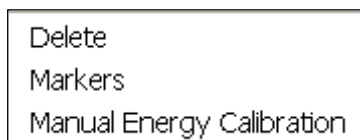


Figure 57: The Calibration List Context Menu

Delete

Click **Delete** to delete the highlighted line from the list.

Markers

To identify the peaks manually, select a line in the Calibration List, then place the markers around a peak. When you select **Markers** from the context menu, the current peak's data will replace the data in the current line.

If you want to add a new line, click on the blank line after the last item in the list. This will place both markers at channel zero. Now move the markers to the desired location and right click on the new line. The context menu will be displayed with the Markers menu item enabled. Select it to add the new peak to the list. You'll have to enter the new peak's energy manually.

Manual Energy Calibration

When the data for all peaks have been added to the Calibration List, select Manual Energy Calibration from the context menu; the system will calibrate the spectrum based on the updated data.

Energy Calibration Plot

The Energy Calibration portion of the Energy Review display shows the fitted energy calibration equation as a function of channel vs. energy.

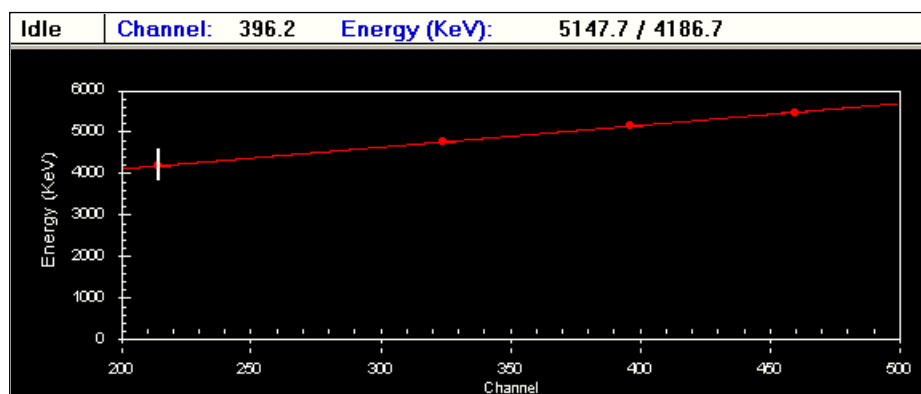


Figure 58: A Typical Energy Calibration Plot

Shape Calibration Plot

The Shape Calibration portion of the Energy Review display shows the fitted FWHM and low-energy tail calibration equations as a function of energy vs. FWHM.

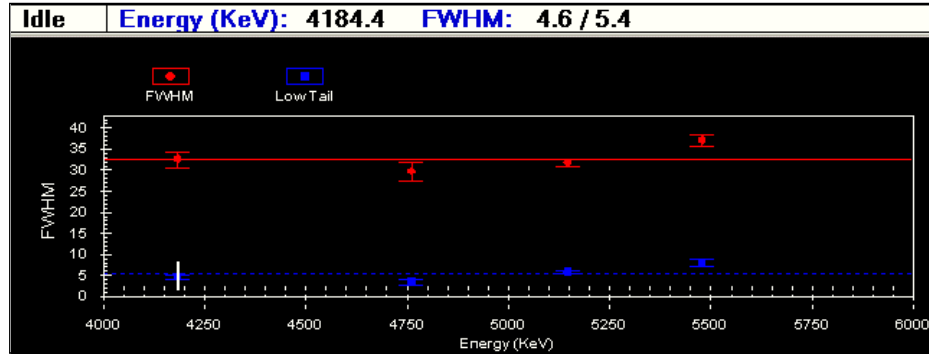


Figure 59: A Typical Shape Calibration Plot

Previous/Next Chambers

These controls replace the current chamber's data with the data for the **Previous Chamber** or the **Next Chamber** in the selected Display Group.

Reanalyze

Select the **Reanalyze** button to perform another calibration on the current sample. This button is available only if the current calibration data has changed.

Print Report

These controls let you one or more types of printouts.

Print Report

Select this check box to print a combination calibration and spectrum analysis report.

Print Spectral Plot

Select this check box to print a plot of the energy/efficiency calibrated spectrum. You can use the printer selection button to print to a printer other than your default printer.

Print Channel by Channel Report

Select this check box to print a listing of the sample's spectral data, channel by channel.

Save

Select the **Save** button to save the current calibration data. This button is available only if the current calibration data has changed.

Cancel

Select the **Cancel** button to delete changed calibration data and return to the original data. This button is available only if the current calibration data has changed.

Reject

Select the **Reject** button to mark the current calibration as “Rejected”. This means that the current calibration data is no longer valid.



CAUTION: You will not be able to count samples in this chamber until a new calibration is performed or a calibration marked as Current is associated with this chamber.

Make Current

Select the **Make Current** button to mark the calibration as “Current”. This button is available only if the current calibration data has changed.

CAM File

This read-only field identifies the file datasource providing the current spectral and calibration data. Hover the mouse cursor over the filename to see its complete path.

Efficiency Review Page

The Efficiency Calibration Review Page lets you review an efficiency calibration associated with a previously analyzed calibration sample.

After an efficiency calibration has been counted the efficiency values will automatically be calculated for each ROI. It will then be possible to view the efficiency values and the calculated average efficiency via Efficiency Review.

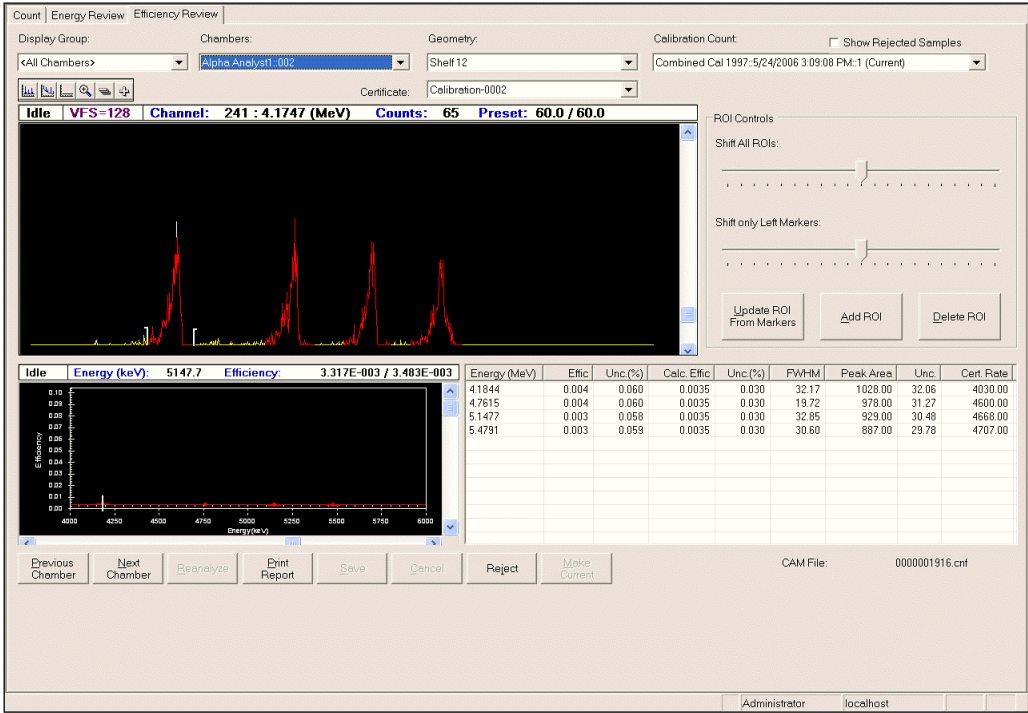


Figure 60: The Efficiency Review Page

Display Group

Select the Display Group containing the chamber of interest.

Chambers

Select the Chamber in that group to be calibrated.

Geometry

Select the Geometry to be used for this count from this list.

Certificate

This list box lets you select a calibration certificate to apply to the selected chamber.

Calibration Count

The Calibration Count drop down list shows the calibration counts for the selected chamber. The list is sorted with the most recent count at the top.

Show Rejected Samples

If you want to include all of the current chamber's rejected samples in the list, select this check box. See also *Reject* on page 118.

The Spectrum Display

The Spectral portion of the Efficiency Review display is a read-only view of the spectral data for the current calibration file. The display includes the *Spectrum Toolbar* on page 76, the markers and the expand region for examining data. Neither spectral data nor ROIs can be changed.

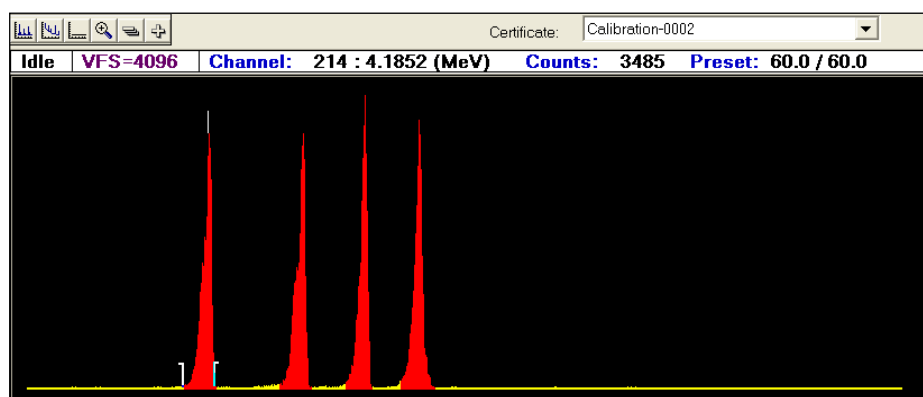


Figure 61: A Typical Calibration Spectrum Plot

Shift All ROIs

The **Shift All ROIs** slider moves the left and right limits for all ROIs to the left or the right by the same amount.

Shift Only Left Markers

The **Shift Only Left Markers** slider moves the only the left limit for all ROIs to the left or right.

Update ROIs From Markers

When the markers are bracketing the desired region, click the **Update ROIs From Markers** button to replace the limits of all ROIs with the new limits.

Note: If you want to update only one side of a region, move its marker to the new location, then click the **Update ROI** button. If you intend to move both markers, the correct approach is use the **Delete** button to delete the existing ROI, move the markers to the desired location, then click the **Add ROI** button.

Add an ROI

The **Add ROI** button adds a new ROI based on the current position of the left and right markers.

Delete an ROI

The **Delete ROI** button deletes the current ROI and makes the next ROI to the right the current ROI. If there are no ROIs to the right, the first ROI at the left of the spectrum becomes the current ROI.



CAUTION: Any changes you make to the ROIs are not permanent until you click Save. If you exit this screen without saving, the changes will be lost.

Efficiency Calibration Plot

The Efficiency Calibration portion of the Efficiency Review display shows the fitted efficiency calibration equation as a function of energy vs. efficiency.

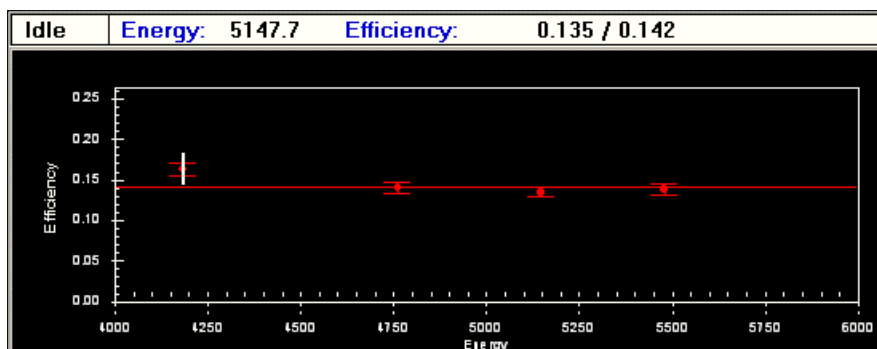


Figure 62: A Typical Efficiency Calibration Plot

Calibration Results

The list to the right of the calibration plot shows the calibration results for the current calibration listed in increasing order of the Energy of each ROI.

Energy	Effic	Unc.(%)	Calc. Effic	Unc.(%)	FWHM	Peak Area	Unc.	Cert. Rate
4184.40	0.163	0.052	0.14	0.025	47.48	39410.00	198.52	4030.00
4761.50	0.140	0.051	0.14	0.025	41.35	38672.00	196.65	4600.00
5147.70	0.135	0.049	0.14	0.025	40.89	37853.00	194.56	4668.00
5479.10	0.138	0.049	0.14	0.025	40.46	38675.00	196.66	4707.00

Figure 63: A Typical Calibration Results List

Previous/Next Chambers

These controls replace the current chamber's data with the data for the **Previous Chamber** or the **Next Chamber** in the selected Display Group.

Reanalyze

Select the **Reanalyze** button to perform another calibration on the current sample. This button is available only if the ROI definitions or a different certificate is selected.

Print Report

These controls let you one or more types of printouts.

Print Report

Select this check box to print a combination calibration and spectrum analysis report.

Print Spectral Plot

Select this check box to print a plot of the energy/efficiency calibrated spectrum. You can use the printer selection button to print to a printer other than your default printer.

Print Channel by Channel Report

Select this check box to print a listing of the sample's spectral data, channel by channel.

Save

Select the **Save** button to save the current calibration data. This button is available only if the current calibration data has changed.

Cancel

Select the **Cancel** button to delete changed calibration data and return to the original data. This button is available only if the current calibration data has changed.

Rejected

Select the **Reject** button to mark the current calibration as “Rejected” and put the chamber in an Out of Service state.



CAUTION: You will not be able to count samples in this chamber until a new calibration is performed or a calibration marked as Current is associated with this chamber.

Make Current

Select the **Make Current** button to mark the calibration as “Current”. This button is available only if the current calibration data has changed.

CAM File

This read-only field identifies the file datasource providing the current spectral and calibration data. Hover the mouse cursor over the filename to see its complete path.

10. Data Review View



The first Data Review page lets you assign filters so you can search the system's Sample Information Database for specific batches or samples. The second page presents the found batch/sample for review and approval.

Data Review – Sample Info

If you have searched for batches, selecting a batch in the Search Results list will display list of samples associated with that batch in the Sample Info list.

The first Data Review page lets an authorized user select batches and samples for review.

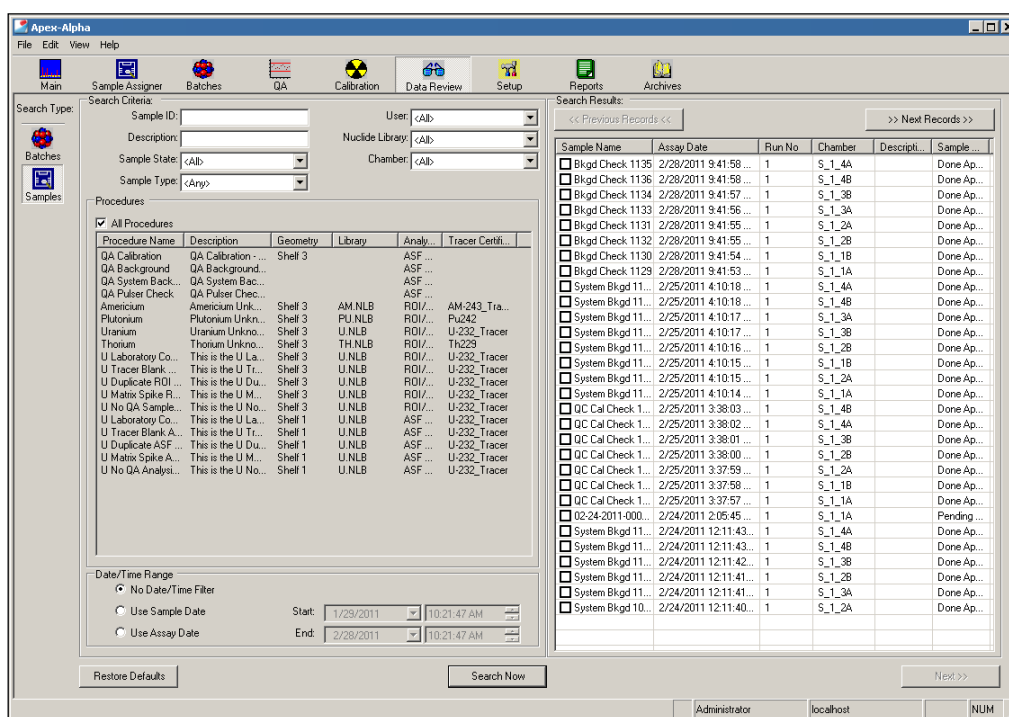


Figure 64: The Data Review — Samples View

Search Type

The first step in reviewing data is choosing whether **Batches** or **Samples** are to be reviewed.

Search Criteria

These parameters are used to limit the search of the Sample Information Database to Batches or Samples meeting the selected search criteria.

Filters for Batches and Samples

Entering a **Batch/Sample ID** requests a search for a specific batch/sample. If either of these fields is blank, that parameter will not be used in the search.

Any combination of the other filters, **Description**, **Batch/Sample State** and **Sample Type**, can be selected to narrow the search.

Additional Sample Filters

A search for samples can be further limited by the User, **Nuclide Library** and **Chamber** filters.

All

For many filters, you can select <All> to remove the filter from the search criteria.

Procedure

Checking one or more of the listed procedures will limit the search to batches/samples using the specified procedures.

Select the **All Procedures** check box to remove the procedures filter from the search criteria.

Date/Time Range

Select **No Date/Time Filter** to find samples regardless of their date or time.

Select **Use Sample Date** or **Use Assay Date** to find only those samples falling within the specified range of Start and End dates and times.

Restore Defaults

The **Restore Defaults** button voids most of the parameters you selected, returning each field to its default condition.

Note: The Start and End dates and times and the sample chamber filter have no default state; they will not be reset.

Search Now

Click the **Search Now** button to start a search of the Sample Information Database for a set of batches/samples matching the search criteria. The first 30 batches/samples will be searched. If there are more than 30 batches/samples, the **Next Records** and/or **Previous Records** buttons (above the Search Results list) will be enabled, allowing you to see all the samples.

Sample Info

If you have searched for batches, selecting a batch in the Search Results list will display a list of samples associated with that batch in the Sample Info list.

Data Review – Reanalysis/Review

The second Data Review page lets you review the retrieved spectral data. You can make adjustments, reanalyzing as necessary, and approve or reject the data.

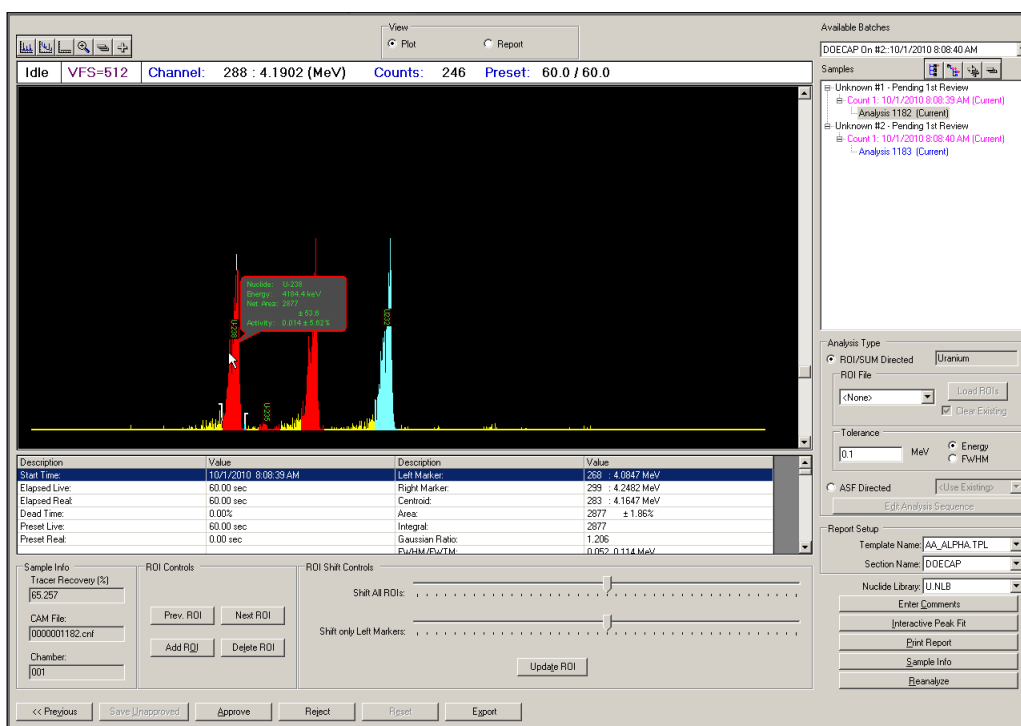


Figure 65: A Data Review Plot

Spectrum Toolbar

The toolbar at the top of the spectrum display lets you quickly select any of several common display functions.

From left to right, the Spectrum Toolbar icons are:

- Select linear scale
- Select log scale
- Select auto scale automatic vertical full scale)
- Toggle between expanded and normal displays
- Go to the previous ROI
- Go to the next ROI

View

The **Plot** button displays the current data as a spectral plot; the **Report** button displays it as a report, using the parameters entered in *Report Setup* on page 49.

Tracer Recovery (%)

If the current batch's procedure uses tracer-based efficiency, this field will show the calculated tracer recovery.

CAM File

This read-only field identifies the datasource providing the current spectral and calibration data. Hover the mouse cursor over the filename to see its complete path.

Chamber

This read-only field displays the chamber name for the chamber the current sample was counted on.

ROI Controls

Prev. ROI

Goes to the previous ROI.

Next ROI

Goes to the next ROI.

Add ROI

The **Add ROI** button adds a new ROI based on the position of the left and right channel markers and makes this the current ROI.

Delete ROI

The **Delete ROI** button deletes the current ROI and makes the next logical ROI the current ROI.

ROI Shift Controls

The ROI Shift Controls let you redefine the current ROI.

Shift All ROIs

The **Shift All ROIs** slider moves the left and right limits for all ROIs to the left or the right by the same amount.

Shift Only Left Markers

The **Shift Only Left Markers** slider moves the only the left limit for all ROIs to the left or right.

Update ROI

When the ROI's markers are bracketing the desired region, click the **Update ROI** button to replace the ROI's current limits with the new limits.

Note: If you want to update only one side of a region, move its marker to the new location, then click the **Update ROI** button. If you intend to move both markers, the correct approach is use the **Delete ROI** button to delete the existing ROI, move the markers to the desired location, then click the **Add ROI** button.

Approval Controls

The buttons along the bottom of the page are used to approve, reject or export the current sample.

Save Unapproved

Click **Save Unapproved** to save all changes to the current sample without approving them. This command is available only if a sample has been reanalyzed, but not yet approved.

Approve

Click **Approve** to approve and save the current sample. The procedure under which this batch was counted must have **Approval Required** enabled to see this option. Refer to *Data Review Requirements* on page 45.

Reject

Click **Reject** to reject the current sample.

Reset

Click **Reset** to reset all values to their last saved state. If one of the approval buttons was used, any further changes will be lost if Reset is selected. If changes have been made but none of the approve buttons was used, Reset discards the changes.

Export

Click **Export** to export the displayed spectrum's data to a *specified file*².

Make Current

The **Make Current** button marks the sample as “Current”. This button is available only when displaying System Background samples or when the sample state was “analysis error” and a successful reanalysis has been performed.

Available Batches

The Available Batches drop down list displays all of the batches selected in the first Data Review page. It's used to select another batch for review.

Samples

The Samples box lists all samples associated with the current batch.

The Samples Toolbar

The Samples Toolbar () above the Samples list lets you select one of four list views: Root, Detailed, Expanded, or Collapsed.

Analysis Type

The **Analysis Type** radio buttons show the default analysis type for the current sample. You can choose to use the other type here for the sample.

ROI/Sum Directed

Selecting this button then choosing an ROI Set from the adjacent.

² In a Standard Apex-Alpha installation, the file will be stored in the ApexAlpha\Root\Data folder. Consult your system administrator for the path used in a custom installation.

ROI File

The drop down list allows you to select a new ROI file to load into the current sample. By default the current ROI values will be overwritten, this behavior can be changed by clearing the “Clear Existing” check box. When you are ready to load the new ROIs click on the **Load ROIs** button.

Tolerance

Select the units for the Peak Search Tolerance value. Choose **Energy** for a fixed tolerance or **FWHM** for a variable tolerance.

ASF Directed

Selecting this button then choosing an Analysis Sequence File from the adjacent list makes this analysis **ASF Directed**.

Edit Analysis Sequence

Click the **Edit Analysis Sequence** button to launch the *Genie 2000 ASF Editor* on page 61. Its use is covered in the Using the Analysis Sequence Editor chapter of the Genie 2000 Operations Manual.

Notes:

Genie 2000's Analysis Sequence function lets you specify parameters that must be specified in Apex-Alpha. For example, you can define acquisition time, reports, QA transfer steps, nuclide libraries and background files in an ASF. In Apex-Alpha, these are defined at the time a procedure is created. Therefore, *any such information you define in the ASF file will be ignored at run time.*

Additionally, in Data Review it's possible to edit the analysis sequence for a given sample by selecting ASF Directed as Analysis Type and <Use Existing> for the analysis sequence. In doing this, it's important to be aware that some of the values specified in the ASF will be overwritten by selections made in Apex-Alpha. Some examples of this are: Background File, Nuclide Library, Tolerance, Nuclide Library, Tracer Amount and Control Amount. Any modifications to these values must be done in Apex-Alpha, *not* in the ASF.

Report Setup

These controls specify how to generate a data review report. By default they are populated with settings from the current procedure. To generate a new report, the sample will have to be reanalyzed.

Template Name

This field specifies the default Template Name to be used for the report.

Section Name

This field specifies the default Section Name to be used for the specified Template.

Nuclide Library

This field specifies the default Nuclide Library to be used for the report.

Enter Comments

Click the **Enter Comments** button to add comments about the current sample to the Event Log . A comment cannot be edited, but can be removed by highlighting it, then clicking **Delete Comment**.

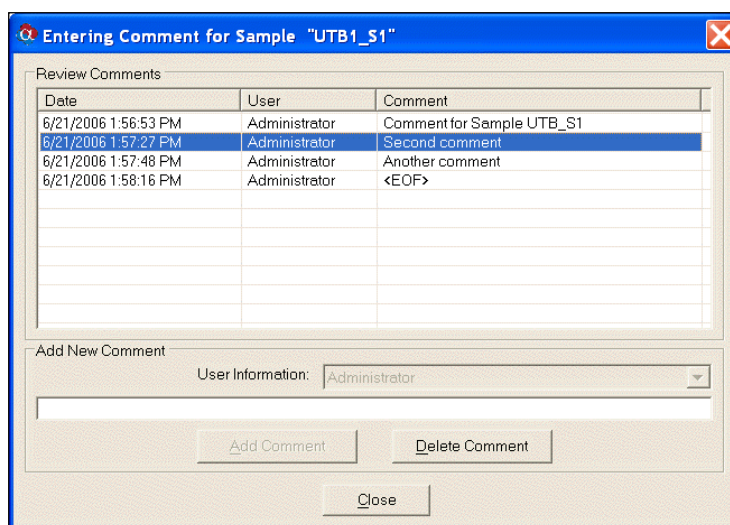


Figure 66: The Enter Comments Dialog

Interactive Peak Fit

Clicking on the **Interactive Peak Fit** button starts Genie 2000's Interactive Peak Fit editor using the selected sample.

Refer to the *S506 Genie 2000 Interactive Peak Fit User's Manual* for information on using this program.

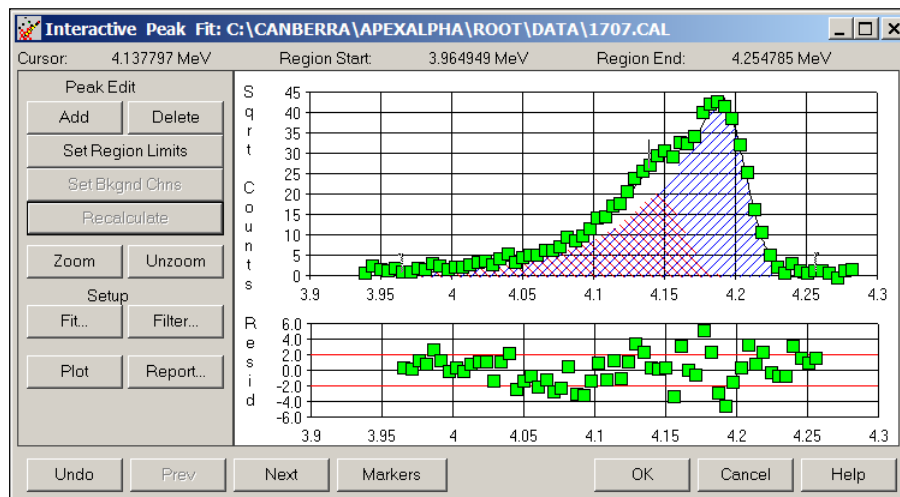


Figure 67: Data Review Interactive Peak Fit

Print Report

These controls let you one or more types of printouts.

Print Report

Select this check box to print a combination calibration and spectrum analysis report.

Print Spectral Plot

Select this check box to print a plot of the spectrum. You can use the printer selection button to print to a printer other than your default printer.

Print Channel by Channel Report

Select this check box to print a listing of the sample's spectral data, channel by channel.

Sample Info

The **Sample Info** button opens an editor which lets you edit the current sample's information.

Figure 68: The Sample Information Editor

Correction Factors

The Sample Correction Factors dialog lets you update the correction factors for the currently selected sample.

Systematic Error and Random Error must be decimal numbers greater than or equal to zero. Generic Multiplier and Generic Divisor must be decimal numbers greater than zero.

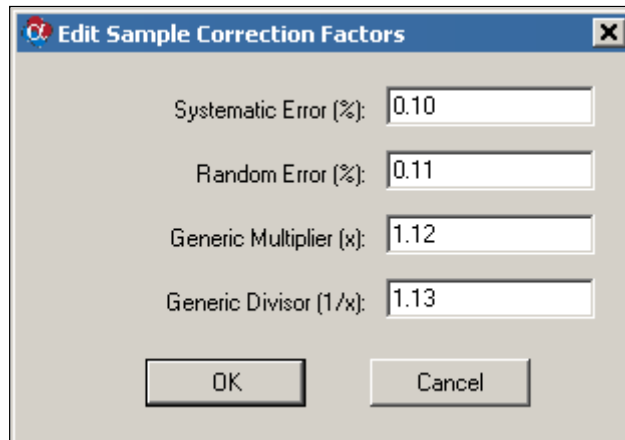


Figure 69: Entering Correction Factors

Reanalyze

Select the **Reanalyze** button to perform another analysis on the sample. If you have modified parameters on Data Review Page Two, those parameters will be used in the reanalysis. Additionally, any modifications to ROIs will be used; if the ROIs have not been modified, the current ROI set will be used.

Note: After re-analyzing a sample if you choose to make more changes to the sample analysis parameters you must click **Save Unapproved** to correctly preserve the state of the sample and analysis parameters prior to making additional alterations.

CAM File

This read-only field identifies the file datasource providing the current spectral and calibration data. Hover the mouse cursor over the filename to see its complete path.

11. Reports View



The Apex-Alpha Reports View lets you view several types of system reports.

Summary Report

The Summary Reports Page lets you generate a summary of the energy calibration or efficiency calibration of the specified Device.

Alpha Calibration Report 2/28/11 10:09:12 AM Page 1

***** ALPHA CALIBRATION SUMMARY REPORT *****

Chamber Name	Geometry	Avg %Eff	Cal Date	Expiration Date
S_1_1A	Shelf 3	14.24	5/8/06	5/20/06
S_1_1B	Shelf 3	14.24	5/8/06	5/20/06
S_1_2A	Shelf 3	14.24	5/8/06	5/20/06
S_1_2B	Shelf 3	14.24	5/8/06	5/20/06
S_1_3B	Shelf 3	14.24	5/8/06	5/20/06
S_1_4A	Shelf 3	14.24	5/8/06	5/20/06
S_1_4B	Shelf 3	14.24	5/8/06	5/20/06

Device Name: Alpha Analyst9

Report Type: ☐ Energy Calibration ☒ Efficiency Calibration

Geometry: Shelf 3

View

Administrator localhost NUM

Figure 70: A Efficiency Calibration Summary Report

Device Name

Lets you select the device for which the report will be generated. You can only print a summary report for one device at a time.

Report Type

Lets you select which report type to display, Energy Calibration or Efficiency Calibration.

Geometry

Lets you specify the geometry for efficiency summary report. This control is available only if Efficiency Calibration is selected.

View

Select the View button to generate and display the selected Report type.

PDF and Print Icons

The two icons ( ) above the upper left corner of each report let you Save as a PDF document file or Print the Report to the default Windows printer.

Event Log

The Event Log Page offers Event Type controls and Search Procedures letting you specify the event report to be displayed.

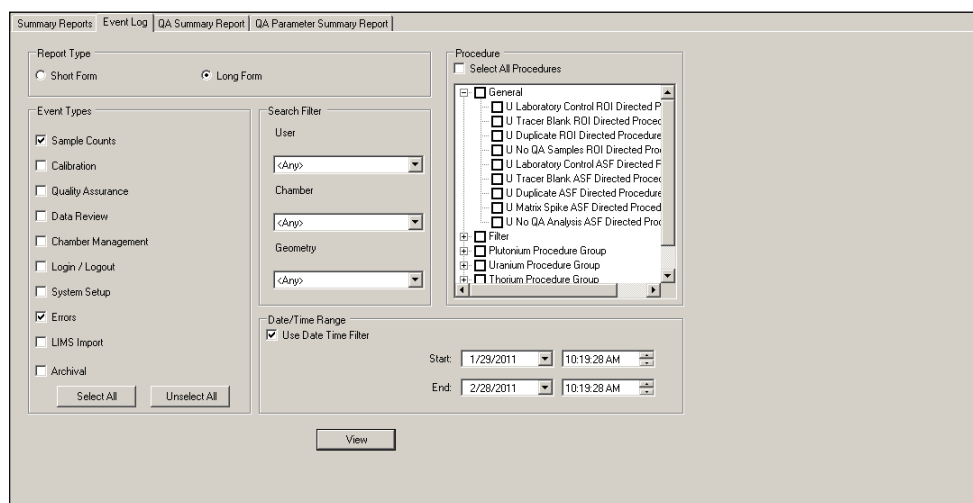


Figure 71: Event Log Report Page

Report Type

The **Short Form** displays one event per line. The **Long Form** displays each event in more detail. Click on View to generate and display the report.

Short Form

The Short Form report displays one event per line, resulting in a multi-page report. If the report is too long, use the Event Type filters to limit the number of events. Refer to *Event Types* on page 138 for more information.

DATE	TIME	CHAMBER	DESCRIPTION	DETAILS
6/15/2006	3:35:12 PM	022	Assay Complete	
6/15/2006	3:35:12 PM	021	Assay Complete	
6/15/2006	3:35:11 PM	020	Assay Complete	
6/15/2006	3:35:10 PM	019	Assay Complete	
6/15/2006	3:35:09 PM	018	Assay Complete	
6/15/2006	3:35:03 PM	017	Assay Complete	
6/15/2006	3:35:03 PM	016	Assay Complete	
6/15/2006	3:35:02 PM	015	Assay Complete	
6/15/2006	3:35:01 PM	014	Assay Complete	
6/15/2006	3:35:00 PM	013	Assay Complete	
6/15/2006	3:34:59 PM	012	Assay Complete	
6/15/2006	3:34:57 PM	011	Assay Complete	
6/15/2006	3:34:56 PM	010	Assay Complete	
6/15/2006	3:34:54 PM	009	Assay Complete	
6/15/2006	3:34:53 PM	008	Assay Complete	
6/15/2006	3:34:51 PM	007	Assay Complete	
6/15/2006	3:34:50 PM	006	Assay Complete	
6/15/2006	3:34:48 PM	005	Assay Complete	
6/15/2006	3:34:46 PM	004	Assay Complete	
6/15/2006	3:34:45 PM	003	Assay Complete	
6/15/2006	3:34:44 PM	002	Assay Complete	
6/15/2006	3:34:42 PM	001	Assay Complete	
6/15/2006	3:31:12 PM	001	Start Count	
6/15/2006	3:31:12 PM	002	Start Count	
6/15/2006	3:31:12 PM	003	Start Count	
6/15/2006	3:31:12 PM	004	Start Count	

Figure 72: A Typical Short Form Report

Long Form

The Long Form reports each event in detail, with many lines per record. The resulting report could be hundreds of pages long. If the report is too long, use the Event Types filters to limit the number of events. Refer to *Event Types* on page 138 for more information.

Apex-Alpha Event Log Viewer

Page 1 of 13

6/21/2006 4:35:48 PM

Apex-Alpha

EVENT LOG REPORT

Date : 6/21/2006
Time : 4:35:48 PM
User : Administrator

FILTERS APPLIED

Data/Time Range : 6/14/2006 4:35:48 PM - 6/21/2006 4:35:48 PM
User : Administrator
Chamber : Any
Geometry : Any
Procedure(s) : Any
Event Types : Errors
Sample Counting

EVENTS

Date/Time : 6/15/2006 3:35:12 PM
User Name : Administrator
Detector Name : 022
Geometry Name : Shelf 3
Procedure Name : QA System Background
Sample ID : System Bkgd 2243
Description : Assay Complete
Error Code :
Details :

Date/Time : 6/15/2006 3:35:12 PM
User Name : Administrator
Detector Name : 021
Geometry Name : Shelf 3
Procedure Name : QA System Background
Sample ID : System Bkgd 2242
Description : Assay Complete
Error Code :
Details :

Date/Time : 6/15/2006 3:35:11 PM
.. ..

Ok

Figure 73: A Typical Long Form Report

Event Types

The Event Types section lets you choose which events to report.

Select All

The **Select All** button adds all events of all types to the report query by checking all the boxes in the Event Types section.

Unselect All

The **Unselect All** button removes all events of all types from the report query by clearing all the boxes in the Event Types section.

Search Filter

You can select a specific item in any of the search filters, User, Chamber, and Geometry, or select <Any> to include all of a category's items in the search.

Date/Time Range

If you select the **Use Date/Time Filter** check box, only those events matching the specified Date and Time Range will be reported. Any change in the default range will be lost when you leave this page.

Procedures

To complete your event selection, you must either select the **Select All Procedures** check box or select any one procedure from the list. Only events identified with the specified procedures will be reported.

View

When you've specified all of your criteria, click **View** to search for and display the report.

QA Summary Report

The QA Summary Report summarizes the data from one or more chambers for the chosen report type as limited by the date/time range filter.

QA Report Type

☒ Calibration Check
 ☐ Pulser Check
☐ Background Check
 ☐ Energy Calibration
☐ System Background
 ☐ Efficiency Calibration

Geometry: Shell 3

Date/Time Range

Start: 1/23/2011 10:11:51 AM

End: 2/28/2011 10:11:51 AM

Chambers

☐ Alpha Analyst8
☒ Alpha Analyst9

Check All Uncheck All

Page 1 of 1

2/28/2011 10:12:11 AM

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Cal Check

Date : 2/28/2011
Time : 10:12:11 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
S_1_1A	Alpha Analyst9	ALL	Passed	2/25/2011 3:37:37 PM
S_1_1B	Alpha Analyst9	ALL	Passed	2/25/2011 3:37:39 PM
S_1_2A	Alpha Analyst9	ALL	Passed	2/25/2011 3:37:39 PM
S_1_2B	Alpha Analyst9	ALL	Passed	2/25/2011 3:38:00 PM
S_1_2A	Alpha Analyst9	ALL	Not Done	
S_1_3B	Alpha Analyst9	ALL	Passed	2/25/2011 3:38:01 PM
S_1_4A	Alpha Analyst9	ALL	Passed	2/25/2011 3:38:02 PM
S_1_4B	Alpha Analyst9	ALL	Passed	2/25/2011 3:38:03 PM

APPROVED BY: _____

APPROVAL DATE: _____

View

Figure 74: A Typical QA Summary Report

QA Report Type

The QA Report Types section lets you choose which QA Report you want to see.

Date/Time Range

This filter lets you limit the report to those events matching the Date and Time Range. Any change in the default range will be lost when you leave this page.

Chambers

This filter limits the reported data to the selected chambers.

QA Parameter Summary Report

The QA Parameter Summary Report summarizes the Last Measurement data from one or more chambers for the selected QA parameter.

The report configuration page is located in the Reports view.

Summary Reports | Event Log | QA Summary Report | QA Parameter Summary Report

Chambers

- ☐ Alpha Analyst123
- ☒ S_1_1A
- ☒ S_1_1B
- ☒ S_1_2A
- ☒ S_1_2B
- ☐ S_1_3A
- ☐ S_1_3B
- ☐ S_1_4A
- ☐ S_1_4B
- ☐ S_1_5A
- ☐ S_1_5B

QA Parameter Type

☐ Calibration Check ☐ Pulser Check
☐ Background Check ☒ Energy Calibration
☐ System Background ☐ Efficiency Calibration
☐ All Parameter Types

Geometry:

Shelf 3

Parameters

Description	Type
Energy cal offset	Energy Calibration
Energy cal slope	Energy Calibration
FWHM cal offset	Energy Calibration
Centroid - U238	Energy Calibration
Centroid - Am241	Energy Calibration
FWHM - U238	Energy Calibration
FWHM - Am241	Energy Calibration

Page 1 of 1

2/16/2009 9:20:11 AM

Apex-Alpha™

ENERGY CALIBRATION SUMMARY REPORT
Last Measurement Summary for 'FWHM - U238'

Date : 2/16/2009
Time : 9:20:11 AM

CHAMBER	DEVICE	VALUE	UNCERTAINTY	LU	UB	UD	BS	DATE
S_1_1A	Alpha Analyst123	4.372E+01	--					1/14/2009 11:52:27 AM
S_1_1B	Alpha Analyst123	4.701E+01	--					2/13/2009 9:31:37 AM
S_1_2A	Alpha Analyst123	4.741E+01	--					1/14/2009 3:44:35 PM
S_1_2B	Alpha Analyst123	4.850E+01	--					1/14/2009 4:06:20 PM

APPROVED BY: _____

APPROVAL DATE: _____

Flags Key: LU = Lower/Upper Bounds Test UB = Above, BS = Below
 SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
 UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
 BS = Measurement Bias Test (In = Investigate, Ac = Action)

View

Administrator localhost NUM

Figure 75: The QA Parameter Summary Report Page

Chambers

Selecting one or more chambers and QA Parameter Types determines which QA files will be used.

QA Parameter Type

Select the QA Parameter Type to filter which parameters are listed in the Parameters list.

Geometry

A Geometry can be selected for report or chart generation only for a few QA Parameter Types: System Background, Efficiency Calibration and All Parameter Types.

Parameters

The Parameters list shows the parameters of the specified chambers that match the selected QA Parameter Type. Choose the parameter to generate the report on.

View

Select the **View** button to generate and display the selected QA parameter.

Sample QA Parameter Summary Report

Typical QA Parameter Summary Report is shown below.

Page 1 of 1
2/18/2009 10:36:14 AM



ENERGY CALIBRATION SUMMARY REPORT

Last Measurement Summary for 'FWHM - Am241'

Date : 2/18/2009
Time : 10:36:14 AM

CHAMBER	DEVICE	VALUE	UNCERTAINTY	LU	SD	UD	BS	DATE
S_1_1A	Alpha Analyst123	3.518E-01	--		Be			1/14/2009 11:52:27 AM
S_1_1B	Alpha Analyst123	4.146E-02	--		In			2/13/2009 8:31:37 AM
S_1_2A	Alpha Analyst123	4.145E-01	--					1/14/2009 3:44:35 PM
S_1_2B	Alpha Analyst123	4.094E-01	--					1/14/2009 4:06:20 PM
S_1_3A	Alpha Analyst123	4.239E-01	--					1/14/2009 4:06:20 PM
S_1_3B	Alpha Analyst123	4.063E-01	--					1/14/2009 4:06:20 PM
S_1_4A	Alpha Analyst123	3.999E-01	--					1/14/2009 4:06:21 PM
S_1_4B	Alpha Analyst123	8.264E-03	--		Ab			1/14/2009 4:06:21 PM
S_1_5A	Alpha Analyst123	3.924E-01	--					1/14/2009 4:06:21 PM
S_1_5B	Alpha Analyst123	4.074E-01	--					1/14/2009 4:06:21 PM
S_1_6A	Alpha Analyst123	9.295E-01	--			Ac		1/14/2009 4:06:22 PM
S_1_6B	Alpha Analyst123	Not Done	Not Done					

APPROVED BY: _____

APPROVAL DATE: _____

Flags Key: LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)

SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)

UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)

BS = Measurement Bias Test (In = Investigate, Ac = Action)

Figure 76: A Typical QA Parameter Summary Report

PDF and Print Icons

The two icons ( ) above the upper left corner of each report let you Save as a PDF document file or Print the Report to the default Windows printer.

12. Archives View



The Archives View in Apex-Alpha lets you archive and delete approved batches and restore archived batches.

Archive Page

The Archive Page lets you search the **Sample Information Database** for specific batches and select which of the found batches are to be archived. Only approved batches can be archived.

Archive | Restore | Delete

Batch Search

Batch ID: Sample Type: <Any>

Description: Geometry: <Any>

Batch Procedures

☒ Select All Procedures

Procedure Name	Description	Geometry	Library	Analysis	Tracer Certificate
QA Calibration	Cal Check	Shelf 3		ASF DL	
QA Background	Background Check			ASF DL	
QA System Backg...	System Background			ASF DL	
QA Pulse Check	Pulse Check			ASF DL	
Americium	Americium Unknown...	Shelf 3	AM NLB	ROI/S...	Am243
Plutonium	Plutonium Unknown...	Shelf 3	PU NLB	ROI/S...	Pu242
Uranium	Uranium Unknown...	Shelf 3	U NLB	ROI/S...	U232
Thorium	Thorium Unknown...	Shelf 3	TH NLB	ROI/S...	Th232
U-NoBg	Uranium Unknown...	Shelf 3	U NLB	ROI/S...	U232
U-No Tracer		Shelf 3	U NLB	ROI/S...	U232

Date/Time Range

☐ Use Date/Time Filter

After: 10/19/2010 2:40:02 PM

Before: 10/26/2010 2:40:02 PM

Restore Defaults Search Batches

Search Results

Batch Name	Description	Procedure Name	Assay Date
QC Cal Check 1051		QA Calibration	10/26/2010 8:55:25 AM
QC Cal Check 1050		QA Calibration	10/26/2010 8:52:19 AM
QC Cal Check 1049		QA Calibration	10/26/2010 8:43:32 AM
Bkgd Check 1047		QA Background	10/26/2010 12:06:25 PM
Po-Dup #2		Polonium	10/8/2010 2:00:03 PM
Po-Dup		Polonium	10/8/2010 2:00:51 PM
Polonium		Polonium	10/8/2010 11:40:51 AM
DOECAP #2		DOECAP Test Use DOE	10/7/2010 8:11:22 AM
DOECAP Dn #2		DOECAP Test Use DOE	10/7/2010 8:08:39 AM
U-NoDOECAP		Uranium	9/29/2010 9:23:19 AM
DOECAP test		Uranium	9/29/2010 9:08:27 AM
U-50 11529		Uranium	8/31/2010 3:20:05 PM
Blue		Uranium	8/27/2010 1:55:01 PM
Bkgd Check 1026		QA Background	8/25/2010 9:00:26 AM
Dup Test #2		Uranium	8/25/2010 8:59:29 AM
Dup Test #1		Uranium	8/25/2010 8:54:12 AM
ASF test		U-ASF with Background	8/23/2010 3:03:07 PM
U #2		Uranium	8/16/2010 2:06:05 PM
U-ASF #3		U-ASF with Background	8/16/2010 2:00:53 PM
U-ASF #2		U-ASF with Background	8/16/2010 1:52:36 PM

Displaying batch search results for records 1 to 21.

Selected Batches to Archive

Batch Name	Description	Procedure Name	Assay Date
QC Cal Check 1051		QA Calibration	10/26/2010 8:55:25 AM
QC Cal Check 1049		QA Calibration	10/26/2010 8:43:32 AM
Po-Dup		Polonium	10/8/2010 2:00:51 PM
Polonium		Polonium	10/8/2010 11:40:51 AM

Archive File Information

Browse... Location: C:\CANBERRA\APEX\ALPHA\ROOT\BACKUPS

Archive Name:

Archive Selected Batches ☐ Delete Batches After Archiving

Figure 77: The Archive Page

Batch Search

The Batch Search section lets you limit the batch search by using specified filters.

Sample ID

Entering a Batch ID requests a search for a specific batch. If this field is blank all Batch IDs will be included.

Other Filters

Any combination of the other filters, Sample Type, Batch Description, Geometry, and Procedures, can be specified to search for batches matching the specified criteria.

All

If you don't want to limit a category, you can select **<Any>** to include all of that category's items in the search.

Date/Time Range

Select **Use Date/Time Filter** to find only those batches falling within the specified Before and After date and time range. Any change in the default range will be lost when you leave this page.

Batch Procedures

You can select the **Select All Procedures** check box or can limit the search to batches that use a specific procedure.

Restore Defaults

Restores all filter settings to their default values.

Search Batches

When all search parameters have been specified, press the **Search Batches** button. The found batches will be listed in the Search Results window.

Search Results

This window displays all samples found by the Search Now routine that match the selected filters.

Note: Only those samples that have been completely approved will be listed in the Search Results window.

>>>> Button

Use this button to add all batches in the Search Results list to the Batches to Archive list.

>> Button

Highlight one or more samples in the Search Results list, then click the >> button to copy them to the list of Batches to Archive on the right.

<< Button

Use the << button to remove highlighted batches from the list of Batches to Archive.

<<<< Button

Use the << button to remove all batches from the list of Batches to Archive.

Batches to Archive

The Batches to Archive pane lists the batches you chose for archiving.

Archive File Information

This section lets you specify the name and path of the archive file.

The archive includes a header file consisting of the name of the person who performed the archive, the date and the database identifier (defined below). In addition, the ID and description of all archived samples are included for quick sample enumeration when the archive contains many files. If the header is not present, Apex-Alpha will detect that the archive is not valid.

Unique Identifier

A unique identifier from each database instance will be stored in the archive. When you try to restore the archive, the identifier in the archive file will be compared to the identifier in the database to make sure they match. If the two don't match, you will not be able to restore the archive. See *Restore Page* on page 147.

When the archive is created, it will store all of the information necessary to recreate the sample environment. In addition to the selected database records, the archive will contain:

- The cam file.
- The report file.
- The analysis sequence file.

- The nuclide library.
- The background subtraction file.

The analysis sequence file, nuclide library, and background subtraction files are included as backups. They will not normally be copied back during a restore operation unless the operation detects that one of the files is missing. In that case, the missing file will be restored. Otherwise, the existing version of the file will remain unaltered.

Browse

The **Browse** button lets you select where the archive is to be stored, as shown in the Location to the right of the button.

Archive Name

Enter the name of the archive file here. If the file name you specify is the name of an existing archive, the Selected Batches will be merged into the existing archive, overwriting any duplicate batches. This allows you to update the archive with batches that were restored and manipulated.

Archive Selected Batches

Click the **Archive Selected Batches** button to add the Batches to Archive to the file called Archive Name, which will be filed in the chosen Location.

Delete Batches After Archiving

If the **Delete Batches After Archiving** check box is selected, the archived batches will be deleted from the Sample Information Database when the archiving process has completed successfully.

Note: If the archive process fails for any reason, the Batches to Archive will be retained and the incomplete archive file will be deleted.

Restore Page

The Restore Page lets you search an archive for specified samples and select which of the found samples are to be restored to Sample Information Database.

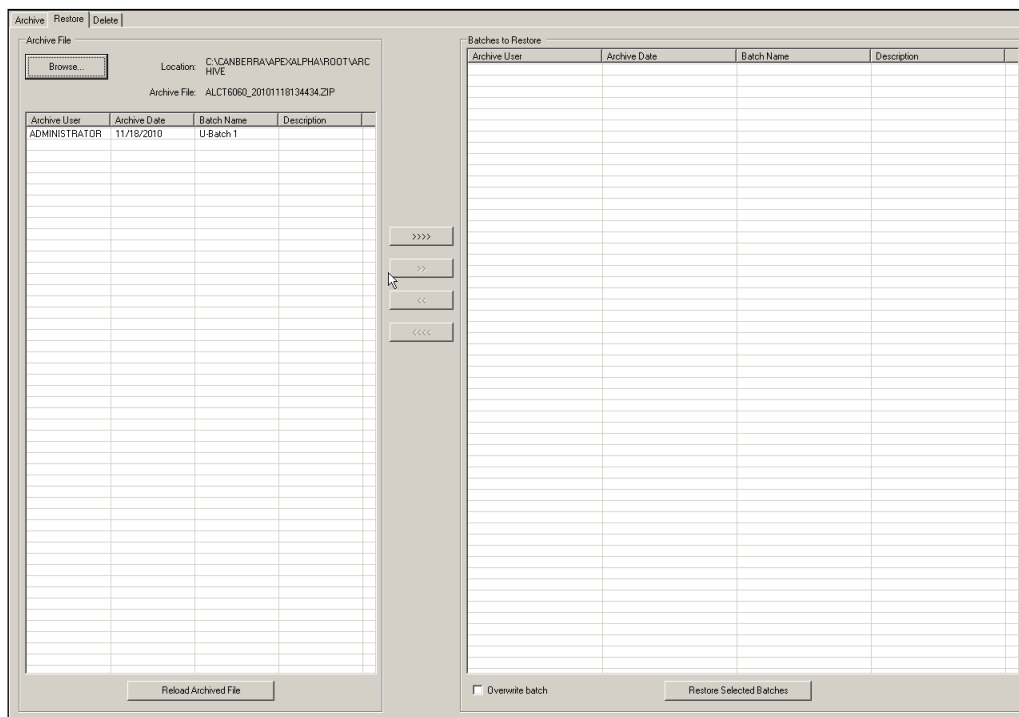


Figure 78: The Restore Page

Browse

Click the **Browse** button to choose the archive from which files are to be restored. The selected archive's path and name will be shown in the Archive File field to the left of the button.

Archive File

All of the selected archive's batches will be displayed in the Archive File list box.

>>>> Button

Use this button to add all batches in the Archive File list to the Batches to Restore list

>> Button

Highlight one or more samples in the Archive File list, then click the >> button to copy them to the list of Batches to Restore on the right.

<< Button

Use the << button to remove highlighted batches from the list of Batches to Restore.

<<<< Button

Use the << button to remove all batches from the list of Batches to Restore.

Restore Selected Batches

When the Batches to Restore list is complete, click the **Restore Selected Batches** button to copy the batches from the archive and restore them to the Sample Information Database. If a batch you are restoring was not deleted from the Sample Information Database when it was archived, you will be asked if you want to overwrite the Database's existing batch.

Overwrite Batch

If the **Overwrite Batches** check box is selected when the **Restore Selected Batches** button is clicked it will automatically overwrite any batches in the Sample Information Database that are also in the archive will be overwritten by the Batch in the archive.

Delete Page

The Delete Page lets you search the Sample Information Database for counted batches to be deleted from the database.

Archive | Restore | **Delete**

Batch Search

Batch ID: Sample Type:

Description: Geometry:

Batch State:

Procedures

☒ Select All Procedures

Procedure Name	Description	Geometry	Library	Analysis	Tracer Certificate
QA Calibration	Cal Check	Shell 3		ASF DL	
QA Background	Background Check			ASF DL	
QA PULSER Check	PULSER Check			ASF DL	
Americium	Americium Unknown...	Shell 3	AM.NLB	ROI/S...	Am243
Plutonium	Plutonium Unknown...	Shell 3	PU.NLB	ROI/S...	Pu242
Uranium	Uranium Unknown...	Shell 3	U.NLB	ROI/S...	U232
Thorium	Thorium Unknown...	Shell 3	TH.NLB	ROI/S...	Th229

Date/Time Range

☐ Use Date/Time Filter

After:

Before:

Restore Defaults | Search Batches

Search Results

Batch Name	Description	Procedure Name	Assay Date
U-Batch 2		Uranium	11/18/2010 1:47:34 PM
U-Batch 1		Uranium	11/18/2010 1:41:41 PM

Displaying batch search results for records 1 to 2

Batches to Delete

Batch Name	Description	Procedure Name	Assay Date
------------	-------------	----------------	------------

Delete Selected Batches

Figure 79: The Delete Page

Batch Search

The Batch Search section lets you limit the batch search by using specified filters.

Batch ID

Entering a **Batch ID** requests a search for a specific sample. If this field is blank all Batch IDs will be included.

Other Filters

Any combination of the other filters, Description, Sample Type, Geometry, Batch State, and Procedures, can be specified to search for batches matching the specified criteria.

All

If you don't want to limit a category, you can select **<Any>** to include all of that category's items in the search.

Date/Time Range

Select **Use Date/Time Filter** to find only those batches falling within the specified Before and After date and time range.

Note: Any change in the default range will be lost when you leave this page.

Procedures

You can select the **Select All Procedures** check box or can limit the search to batches that use a specific procedure.

Restore Defaults

Restores all filter settings to their default values.

Search Batches

When all search parameters have been specified, press the **Search Batches** button. The found batches will be listed in the Search Results window.

Search Results

This window displays all samples found by the Search Batches routine that match the selected filters.

Note: Only those samples that have been completely approved will be listed in the Search Results window.

>>>> Button

Use this button to add all batches in the Search Results list to the Batches to Delete list.

>> Button

Highlight one or more samples in the Search Results list, then click the >> button to copy them to the list of Batches to Delete on the right.

<< Button

Use the << button to remove highlighted samples from the list of Batches to Delete list.

<<<< Button

Use the << button to remove all batches from the list of Batches to Delete list.

Batches To Delete

The Batches to Delete list consists of the samples chosen for deletion. You may also expand the list of Batches using the Next and Previous Records , if appropriate.

Next Records

If the Search Now button generates more than 200 samples, the first 200 are presented.

Press the Next Records button to view the next group of samples (i.e., the next 200) which meet your search criteria.

Previous Records

If the Search Now button generates more than 200 samples, the **Previous Records** button can be pressed to view the previous group of 200 samples, which meet your search criteria.

Delete Selected Samples

When all desired samples have been added to the Batches to Delete list, click the **Delete Selected Batches** button to delete the samples from the Sample Information Database.

A. Software Installation

This appendix describes the Apex-Alpha software installation and setup process. Apex-Alpha can be installed and configured to run as a single-user installation or multi-user installation. There are different installation setup procedures that must be followed depending on what type of installation you have.

Single User

This is a stand-alone installation where the entire Apex-Alpha software package, called Apex-Alpha Desktop, and prerequisite software packages reside on a single computer. Apex-Alpha Desktop automatically installs Microsoft SQL Server 2017 R2 Express Edition. This database is compatible with SQL Server 2017.

Multi-User

Several computers perform different jobs in a multi-user installation. Client computers run the Apex-Alpha Client software, while a server computer runs the Apex-Alpha Server software. Additionally, SQL Server may or may not be installed on the server computer depending on the needs of the site.

- Client computers, using Apex-Alpha Client software, perform user-interface tasks.
- Server computers, using Apex-Alpha Server software, perform data acquisition and analysis tasks. Most installations will have a single server computer.
- A database server computer, using Microsoft SQL Server, hosts the Apex-Alpha database. The database server computer may be the same as the Apex-Alpha Server computer. SQL Server 2017 is supported.

The basic steps for installing Apex-Alpha are given here. If you are installing Apex-Alpha Desktop, you can skip sections that are for multi-user installations.

1. Determine what type of Apex-Alpha package you are installing on your network.
2. Determine what hardware and operating system software you need (refer to the *Requirements* on page 153).

3. Install prerequisite Genie™ 2000 software (refer to *Planning Your Installation* on page 152).
4. Determine what type of installation you need (for multi-user installations only) and whether or not you choose to use additional file servers for Apex-Alpha data files.
5. Install the Apex-Alpha Desktop, Client, or Server software on the desired computers.
6. Configure your installation for first use.

This appendix is intended as a guide for setting up Apex-Alpha systems. It is not intended to replace the vendor specific documentation for SQL Server.

You need only follow the steps outlined for the type of Apex-Alpha installation you will be performing. For example, if you are installing Apex-Alpha Desktop, you do not need to read the instructions in the Server or Client sections.

Planning Your Installation

One of the first steps in planning your installation is to determine the type of Apex-Alpha topology (arrangement of physical tiers) for your client and server computers. Remember that the underlying Apex-Alpha architecture is built upon a logical n-tier model so that the software can scale from a single machine up to several computers, depending on the environment.

Note: If you are installing Apex-Alpha Desktop, you can skip this section.

Choose the multi-user topology you are planning to install:

2-tier

A common installation that involves one or more Apex-Alpha Clients and a single Apex-Alpha Server, which hosts the database software and Apex-Alpha data files. Use this topology when you have a relatively small number of concurrent Apex-Alpha Clients and you expect your sample counting production activity to be low to moderate.

3 - tier

A typical three-tier installation that involves one or more Apex-Alpha Clients, a single Apex-Alpha Server, and an additional database server. Use this topology when you have higher numbers of concurrent Apex-Alpha Clients and you expect your sample counting production activity to be moderate to high. Also use this installation topology if your database must be located on another physical computer.

n-tier

Either 2-tier or 3-tier, but with Apex-Alpha data files located on one or more file servers in your network. Use this configuration if you want to separate your Apex-Alpha data files from your Apex-Alpha Server for reasons of fault-tolerance or if the data must be located on another physical machine or operating system platform.

Note: You can achieve better overall performance on server computers if you choose machines with multiple logical processors. Contact Microsoft for Windows licensing information with respect to multi-core or multi-processor machines.

Desktop/Client/Server Requirements

The following sections describe the minimum computer hardware and software requirements for Apex-Alpha Desktop, Client and Server installations.

Apex-Alpha Desktop or Server Hardware

- A network capable PC capable of running Windows 10 64-bit operating system or Window 2016/2019.
- For Desktop: 2 GB RAM (more recommended).
- For Server: 4 GB RAM (more recommended).
- Hard disk space required for typical installation: 900 MB w/o database. Recommended minimum free space before installation: 100 - 250 GB allowing for database.
- Hard disk space required for single storage, approximately 2 MB per sample.
- A DVD drive.
- An SVGA or higher-resolution adapter/monitor capable of 1024 x 768 or better screen resolution.
- A mouse or compatible pointing device.
- Access to a printer.

Apex-Alpha Client Hardware

- A network capable PC capable of running Windows 10 64-bit operating system.
- 2GB RAM (more recommended).
- Hard disk space required for typical installation: 900 MB w/o database. Recommended minimum free space before installation: 100 - 250 GB allowing for database.
- A DVD or CD-ROM drive.
- An SVGA or higher-resolution adapter/monitor capable of 1024 x 768 or better screen resolution.
- A mouse or compatible pointing device.
- Access to a printer.

Software Requirements

The following section describes the operating system and application software requirements for Apex-Alpha Desktop, Client and Server installations.

- For Desktop: Microsoft Windows 10 Build 1809 or later.
- For Server: Microsoft Windows Server 2016 (Build 1809 or later) Microsoft.
Microsoft Windows Server 2019 (Build 1903 or later) (64-bit).
- Model S500, S502 or S504 Genie 2000 Basic Spectroscopy Software, version 3.4.1 or higher.
- Model S505 Genie 2000 Quality Assurance Software, version 1.3 or higher.
- Model S506 Genie 2000 Interactive Peak Fit, version 1.4.1 or higher.
- Model S509 Genie 2000 Alpha Analysis, version 3.4.1 or higher.

Database Server Requirements

The following sections describe the hardware and software requirements for the Database Server.

Hardware Requirements

For database server computer requirements, refer to the documentation for Microsoft SQL Server 2017.

Software Requirements

Apex-Alpha supports SQL Server 2017 (recommended). For Apex-Alpha Server installations, you must have an existing SQL Server installation and a database container configured for use with Apex-Alpha. Installation guidelines for your database server can be found in *SQL Server Installation* on page 182.

Third-Party Software Firewall Issues

If you are a Windows Firewall user, Apex-Alpha setup automatically creates exceptions to facilitate normal system operation. For users of third-party software firewall solutions, please consult your documentation and add exceptions for the following applications to your firewall. If Genie 2000 or Apex-Alpha is not installed in the default locations, replace the paths listed below as necessary.

On a machine running Apex-Alpha Desktop

\Genie2K\ExeFiles\winvdm.exe
 \Canberra\ApexAlpha\ExeFiles\Canberra.ApexAlpha.PostProc.exe
 \Canberra\ApexAlpha\ExeFiles\Canberra.ApexAlpha.SystemStatus.exe
 \Canberra\ApexAlpha\ExeFiles\AlphaCount.exe

On a machine running Apex-Alpha Server

\Genie2K\ExeFiles\winvdm.exe
 \Canberra\ApexAlpha\ExeFiles\Canberra.ApexAlpha.PostProc.exe
 \Canberra\ApexAlpha\ExeFiles\Canberra.ApexAlpha.SystemStatus.exe
 \Canberra\ApexAlpha\ExeFiles\AlphaCount.exe
 \Canberra\ApexAlpha\ExeFiles\Canberra.ApexAlpha.ServiceManager.exe

On a machine running Apex-Alpha Client

\Genie2K\ExeFiles\winvdm.exe

\Canberra\ApexAlpha\ExeFiles\AlphaCount.exe

Installing Apex-Alpha Desktop

To install Apex-Alpha Desktop, perform the following steps:

1. Verify that the logged in Windows user is a local administrator or has domain administrator privileges before you begin the Apex Alpha Desktop installation.
2. Make sure you have the required minimum version of Windows and Windows service packs.
3. Stop all running applications.
4. Install the prerequisite Genie software:
 - S500, S502, or S504 Basic Spectroscopy Software
 - S505 QA Option
 - S506 Interactive Peak Fit
 - S509 Alpha Analysis
5. Place the Apex-Alpha Desktop Installation media in your DVD drive. If you have “Autorun” enabled, the installation process will start automatically. If you choose to run the installation manually, you can explore the contents of the DVD using Windows Explorer and select the Setup icon (**Setup.exe**) in the root folder.

You will see the “Browse Contents” as shown below, which provides an easy way of accessing the various features of the Apex-Alpha DVD.

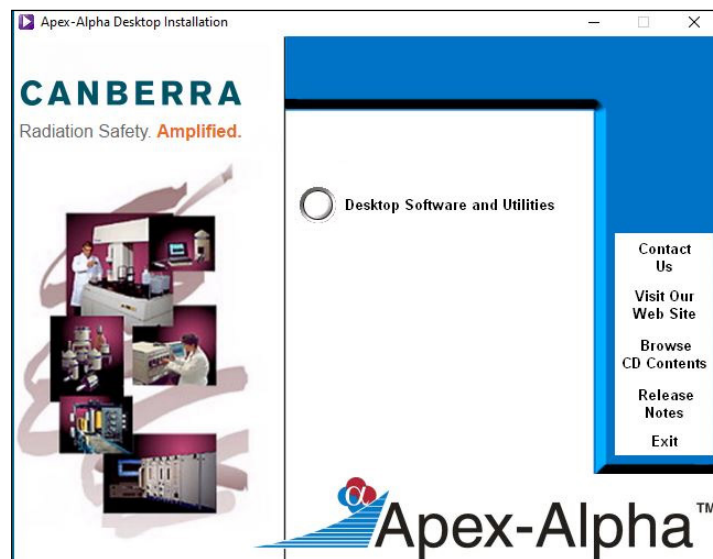
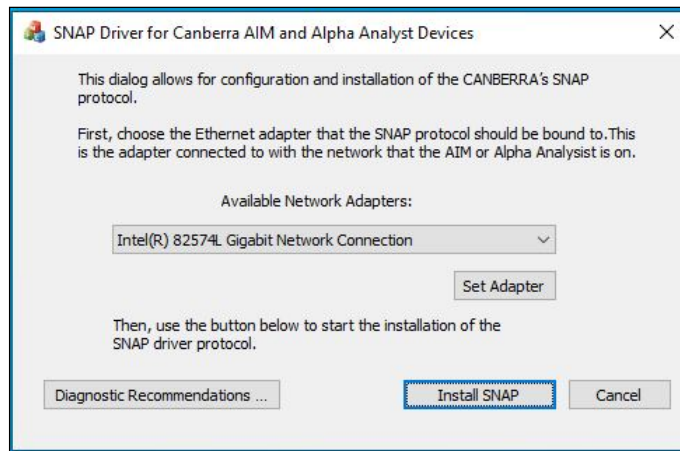


Figure 80: The Apex-Alpha Desktop Installer

6. Press the **Desktop Software and Utilities** button to start the Apex-Alpha Desktop installation. This installation uses a typical Windows Installer Wizard.
7. Apex-Alpha Desktop will automatically perform a check to verify all required Genie 2000 software is installed. If not found, an error message is displayed and you will need to exit the installation.
8. Next, Apex-Alpha displays the option to install the Snap Driver. This driver is used by Apex-Alpha to communicate with the alpha analyst.
9. Click on the **Yes** button to begin. The SNAP Driver installation screen is then displayed.



- a. For the available adapters, use the drop-down list and select the adapter needed to have the SNAP protocol be bound to.
 - b. Press **Set Adapter** button and then the **Install SNAP** button.
 - c. Next, you have the option to enable/disable the option to "Always trust software from Mirion Technologies (Canberra), Inc.". Select the check box and then click on the **Install** button.
10. After Snap driver is installed, if additional prerequisite items are installed automatically with no user interaction required.

Microsoft SQL Server 2017 Express (x64) installs Microsoft SQL Server 2017 with Cumulative update 13.

Microsoft SQL Server Management Studio 17 provides an interactive GUI for use with SQL server 2107.

The system may require rebooting after the SQL Server installation is complete, but you should not have to restart the Desktop Installer. It should restart and install Apex-Alpha automatically.

11. Once the prerequisites are installed, the Welcome screen is displayed. Press the **Next>>** button to start the Apex-Alpha installation. Follow the on screen instructions of the Windows Installer Wizard. Use the **<<Back** and **Next>>** buttons to navigate through the installation.

12. Select the **I agree** radio button to accept its license agreement. The End User License must be accepted to proceed with the installation.

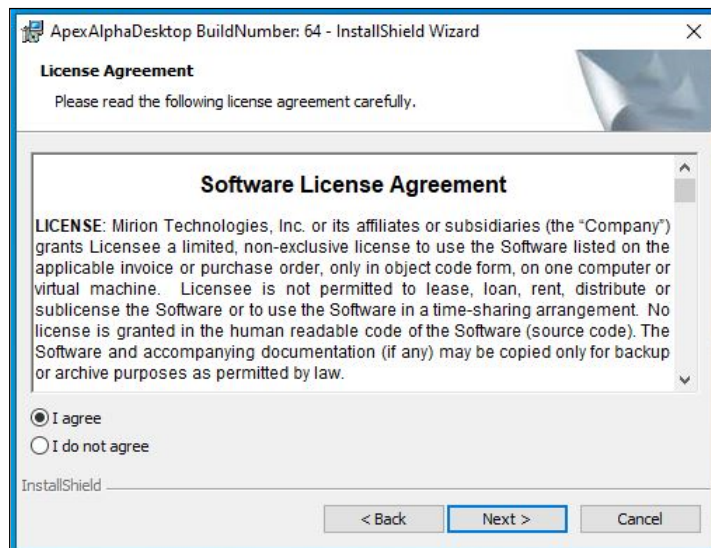


Figure 81: Accepting the License Agreement

13. Select the language for the installation. Note that this choice only affects Apex-Alpha. The language used by Genie-2000 components will be determined by the Windows region settings.

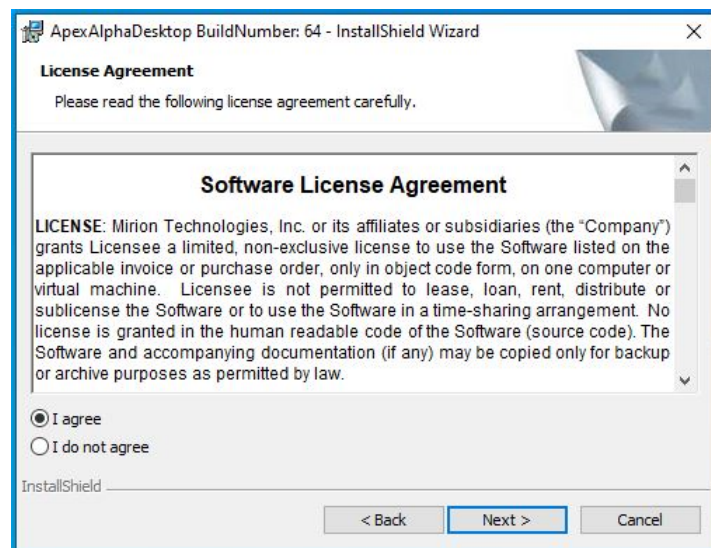
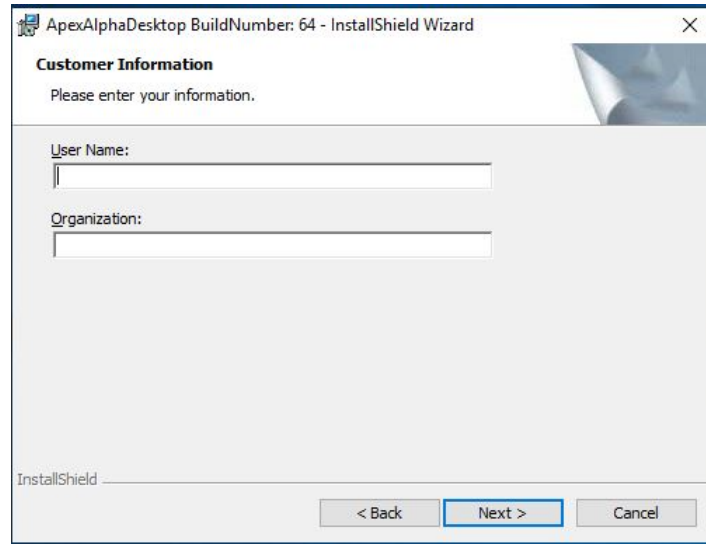


Figure 82: Selecting the Language

14. Enter your name and organization.

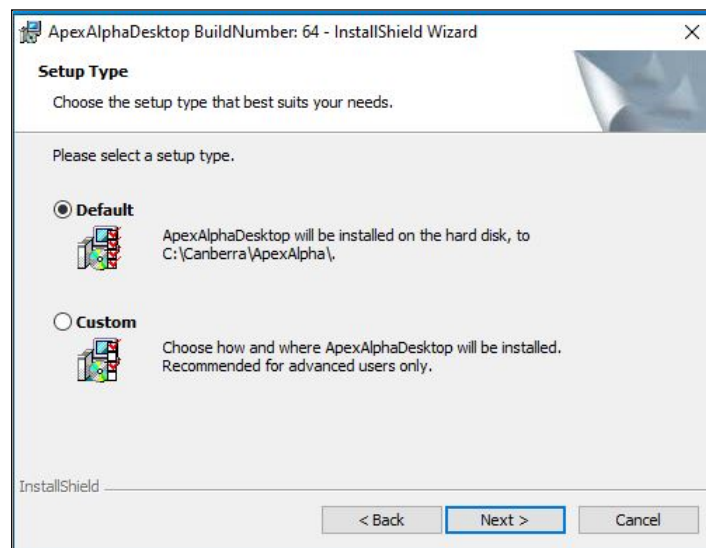


The screenshot shows a Windows-style dialog box titled "ApexAlphaDesktop BuildNumber: 64 - InstallShield Wizard". The main heading is "Customer Information" with the instruction "Please enter your information." Below this are two text input fields: "User Name:" and "Organization:". At the bottom left, the "InstallShield" logo is visible. At the bottom right, there are three buttons: "< Back", "Next >" (which is highlighted with a blue border), and "Cancel".

Figure 83: Entering the Customer Information

15. Next, the type of setup is selected. You can choose either a default installation or a custom installation.

If you selected the **Default** option, Apex-Alpha is installed to your hard drive. Click on **Next** and then **Install** to begin.



The screenshot shows a Windows-style dialog box titled "ApexAlphaDesktop BuildNumber: 64 - InstallShield Wizard". The main heading is "Setup Type" with the instruction "Choose the setup type that best suits your needs." Below this is the text "Please select a setup type." There are two radio button options: "Default" (which is selected) and "Custom". The "Default" option includes a small icon of a computer and the text "ApexAlphaDesktop will be installed on the hard disk, to C:\Canberra\ApexAlpha\." The "Custom" option includes a small icon of a computer and the text "Choose how and where ApexAlphaDesktop will be installed. Recommended for advanced users only." At the bottom left, the "InstallShield" logo is visible. At the bottom right, there are three buttons: "< Back", "Next >" (which is highlighted with a blue border), and "Cancel".

Figure 84: Select the Setup Installation Type

If you selected the **Custom** option, Apex-Alpha allows you to choose where to install the software and how to set up the database. Click on **Next** to continue.

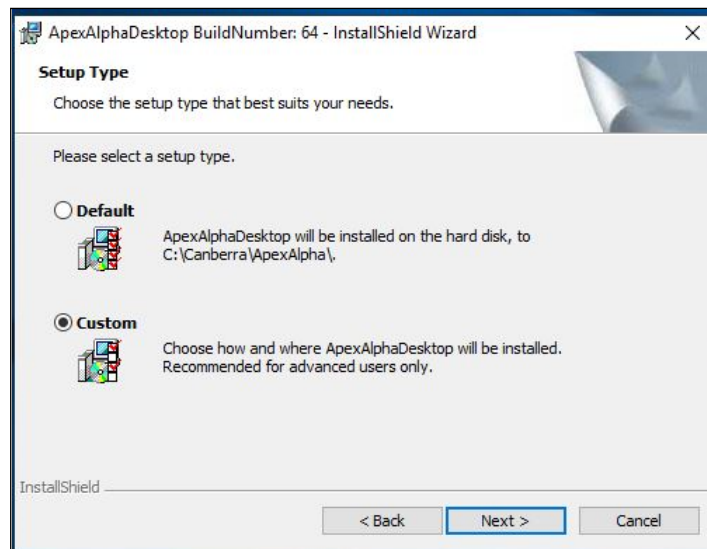


Figure 85: Select the Custom Setup Installation Type

- a. You will need to select the features to install.

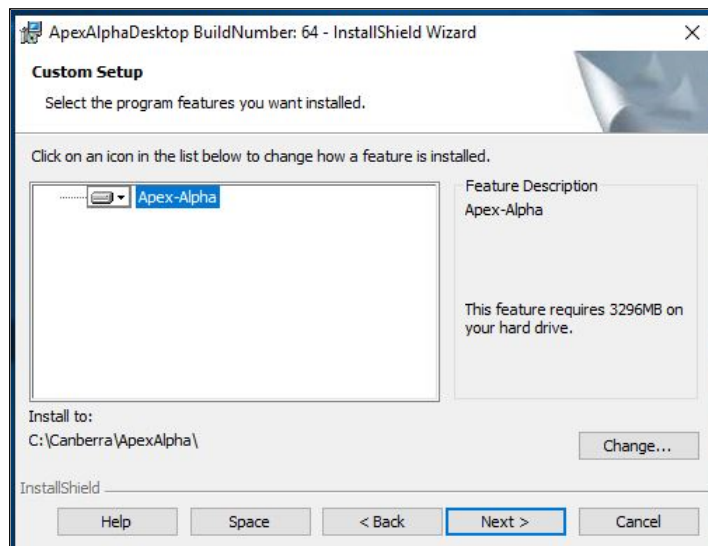


Figure 86: Selecting the Features to Install

- b. After you click on the **Next** button, the Enter Database Information screen is displayed. No information is required, click on the **Next** button to continue.

ApexAlphaDesktop BuildNumber: 64 - InstallShield Wizard

ApexAlphaDesktop - Please enter the database information needed to create the Apex-Alpha Database.

Database Name:

Data File
File Name:
File Path: ...
File Size: in MB
File Growth: in MB
Max Size: in MB

Index File
File Name:
File Path: ...
File Size: in MB
File Growth: in MB
Max Size: in MB

Log File
File Name:
File Path: ...
File Size: in MB
File Growth: in MB
Max Size: in MB

Apex-Alpha Database Backup
☒ Schedule Backup
Backup Directory: ...

InstallShield

< Back Next > Cancel

Figure 87: Creating an Apex-Alpha Database

- c. The Service Logon Information screen is now displayed. Enter a valid windows Domain\Username and Password.

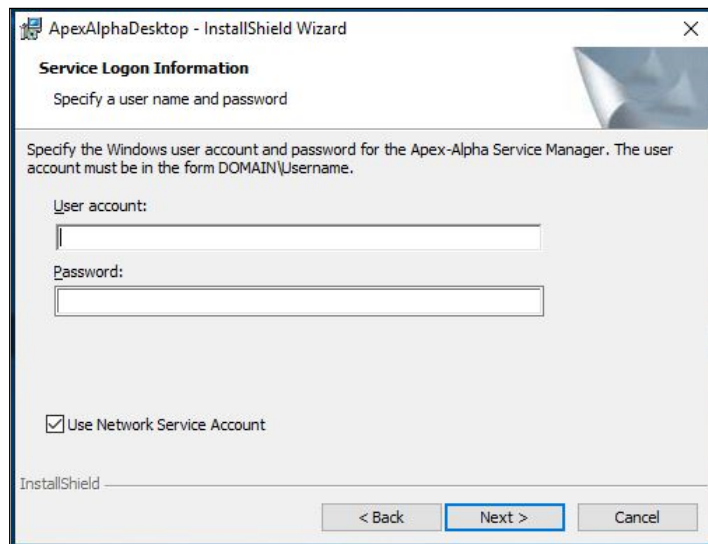


Figure 88: Entering the Apex-Alpha Database Name

- d. Click on the **Next** and then on the **Install** button to begin the installation.

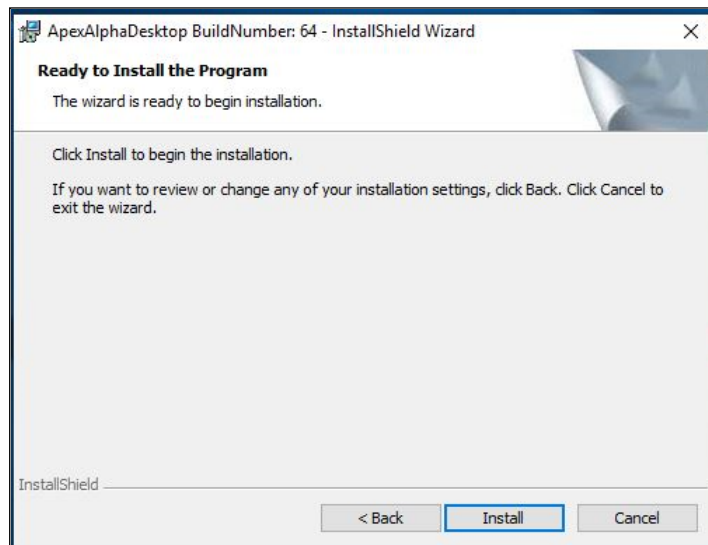


Figure 89: Beginning the Software Installation

16. Once the software has been installed, click **Finish**. The installation wizard will indicate that the computer must be rebooted. Click **Yes** to reboot immediately.

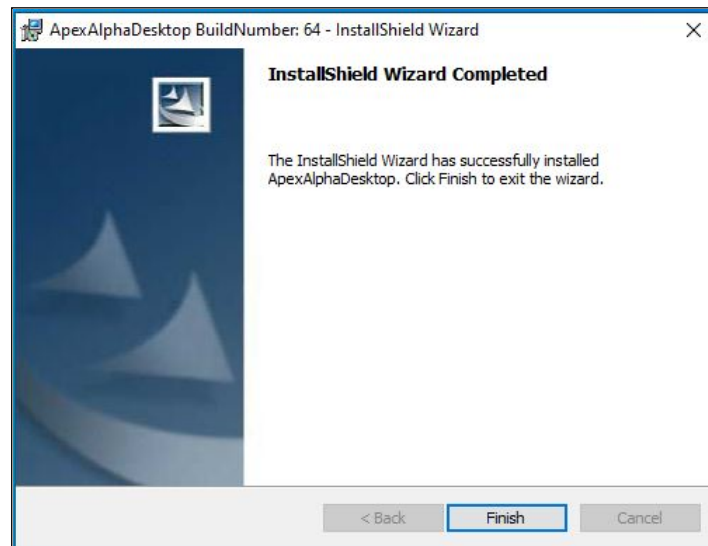


Figure 90: Completing the Installation

The installation places Apex-Alpha icons on the desktop and in the GENIE-2000 program group on the Windows Start menu.

It is recommended that Windows update be run at the end of the Apex-Alpha install to make sure you have the latest updates for SQL Server.

Configuring Apex-Alpha Desktop

The defaults applied during installation should be sufficient for most users. If you choose to change the defaults, consult your SQL Server documentation before making any changes. If you need to modify the application configuration after installing Apex-Alpha, use the Apex-Alpha Server Setup Utility. To start the utility, right-click on the System Status icon in the system tray and select Database Setup.



CAUTION:

The default password for the Administrator user is blank. For maximum security, the Administrator should change this password (see *New User/Edit User* on page 20) when installation is complete.

Database Page

The Database Page lets you change the database setup information.

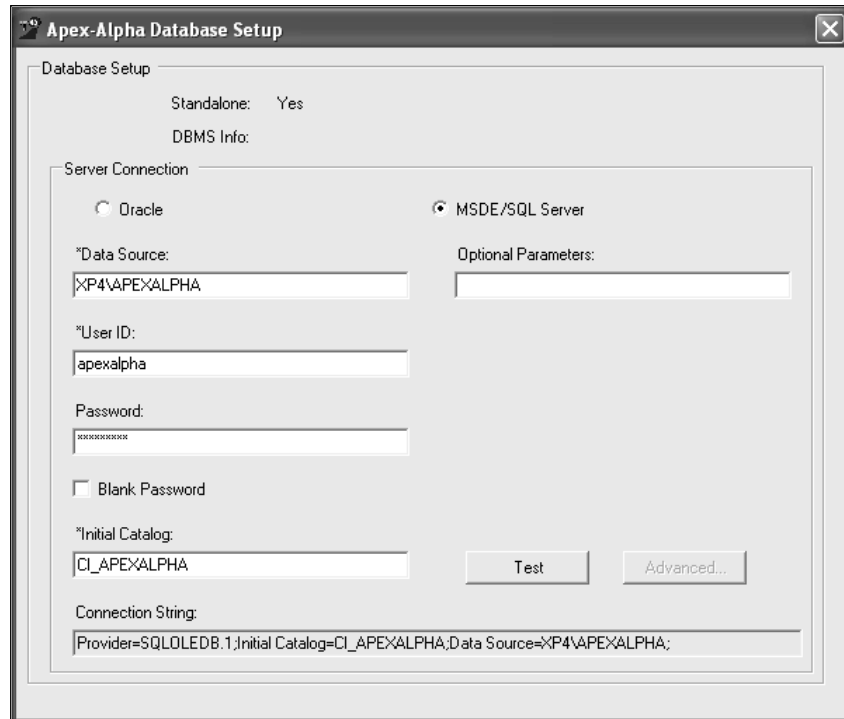


Figure 91: Server Database Page

Database Setup

Standalone: A value of *Yes* indicates this is a Desktop installation.

DBMS Info: This field will be updated to show the database version and driver information when you click the **Test** button.

Server Connection

Data Source: This field shows the name of the server database computer and the SQL Server instance name. After a desktop install this will be set to **< computer name>\APEXALPHA**.

Optional Parameters: Additional information that will be appended to the connection string.

User ID: Set to the name of the non-privileged Apex-Alpha user. Desktop installation automatically creates an “apexalpha” user for you.

Password: Set to the password of the non-privileged user.

Blank Password: Check this if your non-privileged user has a blank password.

Initial Catalog: This is the name of the SQL Server database Apex-Alpha will use.

Connection String: Shows the complete connection string that will be used to connect to the database.

Test

Allows you to verify that the database is configured properly.

Advanced

This option is not available.

Installing Apex-Alpha Server

The following sections describe how to install the Apex-Alpha Server.

SQL Server Configuration

An example installation is included in *SQL Server Installation* on page 182. You may customize this installation to meet your site specific needs.

Instance Requirements

Allow Triggers to Fire Others: True

Default connection options - no count: disabled

Database Requirements

Collation: Latin1_General_Bin

Recursive Triggers Enabled: False

Filegroups

Two filegroups must be created.

- Primary Filegroup. Contains all objects except non-clustered indexes.
- Index Filegroup. Contains non-clustered indexes.

Privileged User Requirements

Has the system administrator fixed database role.

Non Privileged User

Must be granted access to the Apex-Alpha database.

Apex-Alpha Server Installation

To install Apex-Alpha Server, perform the following steps:

1. Verify that the logged in Windows user is a local administrator or has domain administrator privileges before you the Apex-Alpha Installation.
2. Make sure that you have the required minimum version of Windows and Windows service packs.
3. Stop all running applications.
4. Install prerequisite Genie software:
 - S500, S502, or S504 Basic Spectroscopy
 - S505 QA Option
 - S506 Interactive Peak Fit
 - S509 Alpha Analysis
5. Place the Apex-Alpha Server/Client Installation media in your CD-ROM drive. If you have “Autorun” enabled, the installation process will start automatically. If you choose to run the installation manually, you can explore the contents of the CD using Windows Explorer and select the Setup icon (Setup.exe) in the root folder.

You will see the “Browse Contents”, which provides an easy way of accessing the various features of the Apex-Alpha DVD.

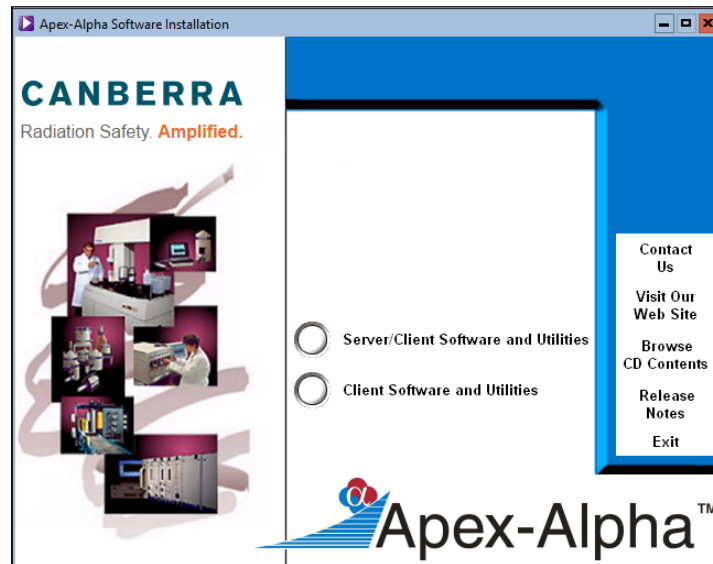
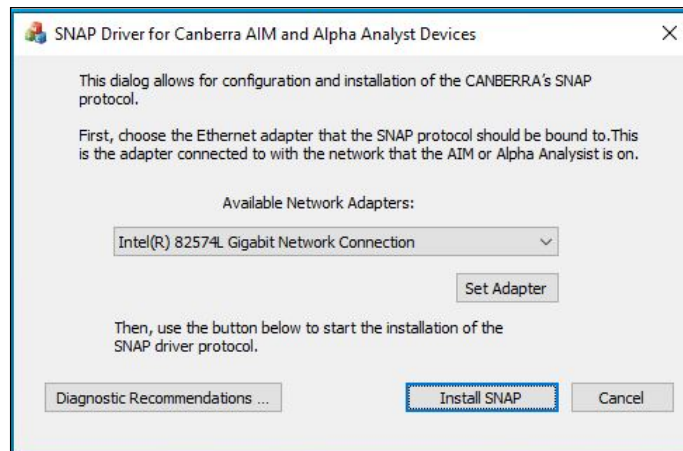


Figure 92: Apex-Alpha Client/Server Installer

6. Press the **Server/Client Software and Utilities** button to start the Apex-Alpha Server/Client installation. This installation uses a typical Windows Installer Wizard.
7. Apex-Alpha Server/Client will automatically perform a check to verify all required Genie 2000 software is installed. If not found, an error message is displayed and you will need to exit the installation.
8. Next, Apex-Alpha displays the option to install the Snap Driver. This driver is used by Apex-Alpha to communicate with the alpha analyst.

9. Click on the **Yes** button to begin. The SNAP Driver installation screen is then displayed.



- a. For the available adapters, use the drop-down list and select the adapter needed to have the SNAP protocol be bound to.
 - b. Press **Set Adapter** button and then the **Install SNAP** button.
 - c. Next, you have the option to enable/disable the option to "Always trust software from Mirion Technologies (Canberra), Inc.". Select the check box and then click on the **Install** button.
10. Once the prerequisites are installed, the Welcome screen is displayed. Press the **Next>>** button to start the Apex-Alpha installation. Follow the on screen instructions of the Windows Installer Wizard. Use the **<<Back** and **Next>>** buttons to navigate through the installation.

11. Select the **I agree** radio button to accept its license agreement. The End User License must be accepted to proceed with the installation.



Figure 93: Accepting the License Agreement

12. Select the language for the installation. Note that this choice only affects Apex-Alpha. The language used by Genie-2000 components will be determined by the Windows region settings.

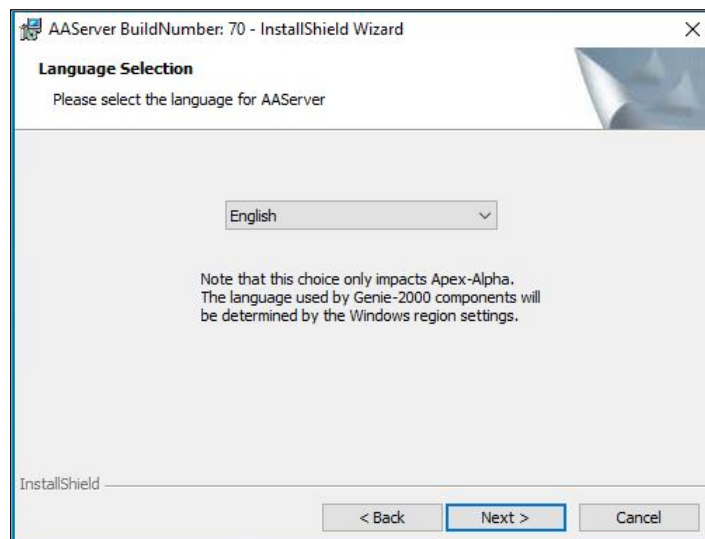


Figure 94: Selecting the Language

13. Select the VDM Network Card from the drop down list.

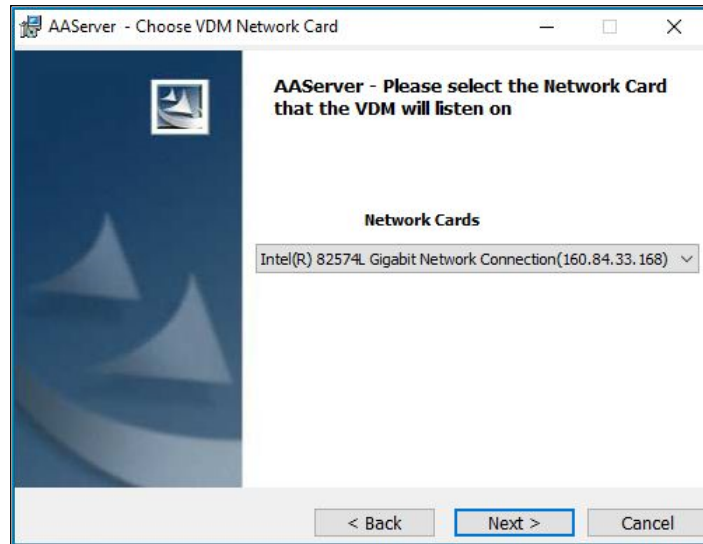


Figure 95: Selecting the Network Card

14. Enter your name and organization.

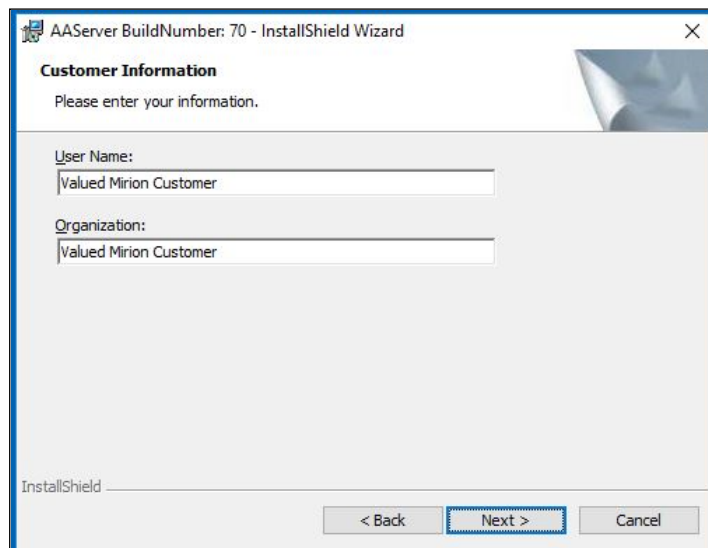


Figure 96: Entering the Customer Information

15. Next, the type of setup is selected. You can choose either a default installation or a custom installation.

If you selected the **Default** option, Apex-Alpha is installed to your hard drive. Click on **Next** and then **Install** to begin.

If you selected the **Custom** option, Apex-Alpha allows you to choose where to install the server. Click on **Next** to continue.

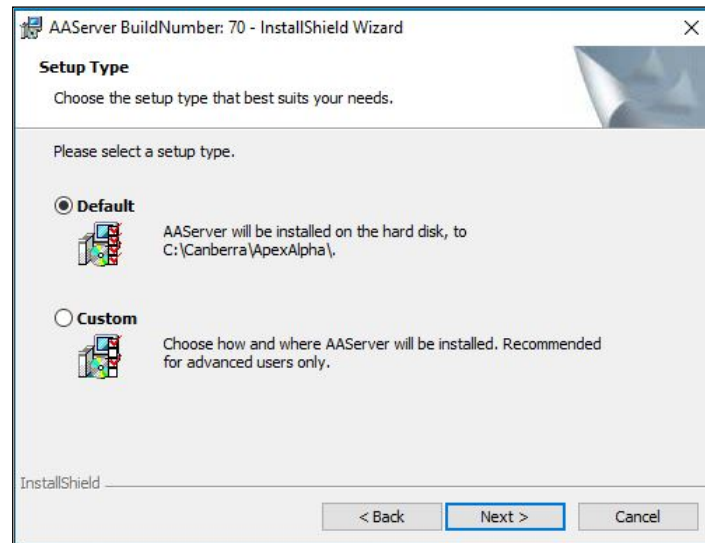


Figure 97: Selecting the Stup Type

- a. Enter the database specific information and then **Next** to continue.

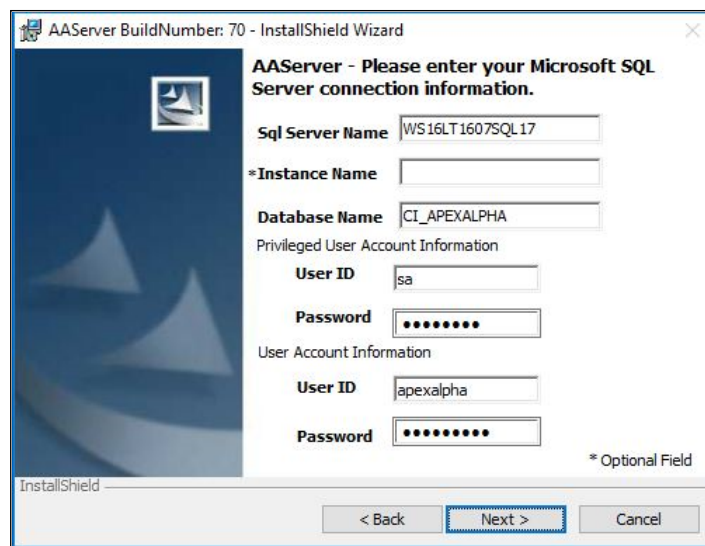


Figure 98: Entering Database Information

- b. Click on the **Next** and then on the **Install** button to begin the installation.

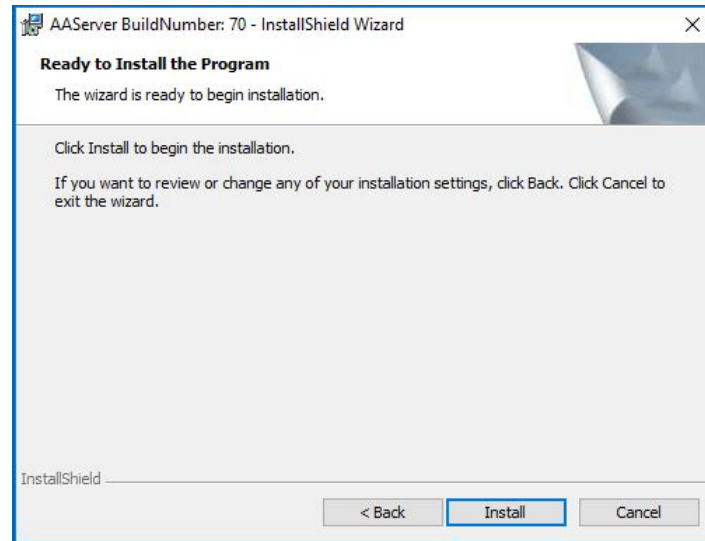


Figure 99: Beginning the Software Installation

16. Once the software has been installed, click **Finish**. The installation wizard will indicate that the computer must be rebooted. Click **Yes** to reboot immediately.

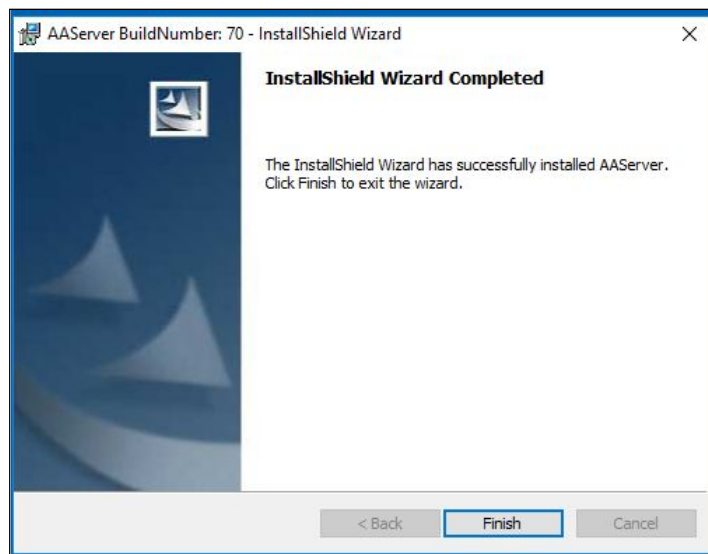


Figure 100: Completing the Installation

The installation places Apex-Alpha icons on the desktop and in the GENIE-2000 program group on the Windows Start menu.

Configuring Apex-Alpha Server

The defaults applied during installation should be sufficient for most users. If you choose to change the defaults, consult your SQL Server documentation before making any changes. If you need to modify the application configuration after installing Apex-Alpha, use the

Apex-Alpha Server Setup Utility. To start the utility, right-click on the System Status icon in the system tray and select Database Setup.



CAUTION: The default password for the Administrator user is blank. For maximum security, the Administrator should change this password (see *New User/Edit User* on page 20) when installation is complete.

Database Page

The Database Page lets you change the database setup information.

Apex-Alpha Database Setup

Database Setup

Standalone: No

DBMS Info:

Server Connection

☐ Oracle ☒ MSDE/SQL Server

*Data Source: XP1\APEXALPHA

*User ID: apexalpha

Password: [masked]

☐ Blank Password

*Initial Catalog: CL_APEXALPHA

Test Advanced...

Connection String: Provider=SQLOLEDB.1;Initial Catalog=CL_APEXALPHA;Data Source=XP1\APEXALPHA;

Figure 101: Server Database Page

Database Setup

Standalone: A value of *No* indicates this is a Server installation.

DBMS Info: This field will be updated to show the database version and driver information when you click the **Test** button.

Server Connection

Data Source: This field shows the name of the SQL Server instance.

Optional Parameters: Additional information that will be appended to the connection string.

User ID: Set to the name of the non-privileged Apex-Alpha user.

Password: Set to the password of the non-privileged user.

Blank Password: Check this if your non-privileged user has a blank password.

Initial Catalog: This is the name of the SQL Server database Apex-Alpha will use.

Connection String: Shows the complete connection string that will be used to connect to the database.

Test

Allows you to verify that the database is configured properly.

Advanced

This option is not available.

Installing Apex-Alpha Client

To install Apex-Alpha Client, perform the following steps:

1. You must be logged on to Windows as a local administrator or domain administrator before you begin the Apex-Alpha Installation.
2. Make sure you have the required minimum version of Windows and Windows service packs.
3. Stop all running applications.

4. Install the prerequisite Genie software:

S500, S502, or S504 Basic Spectroscopy Software
S505 QA Option
S506 Interactive Peak Fit
S509 Alpha Analysis

5. Place the Apex-Alpha Client/Server Installation media in your CD-ROM drive. If you have “Autorun” enabled, the installation process will start automatically. If you choose to run the installation manually, you can explore the contents of the CD using Windows Explorer and select the Setup icon (Setup.exe) in the root folder.

You will see the “Browse Contents”, which provides an easy way of accessing the various features of the Apex-Alpha DVD.

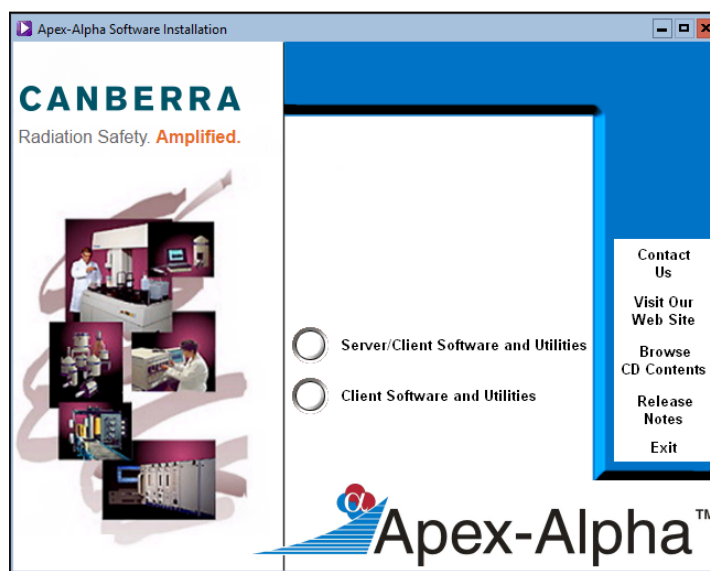
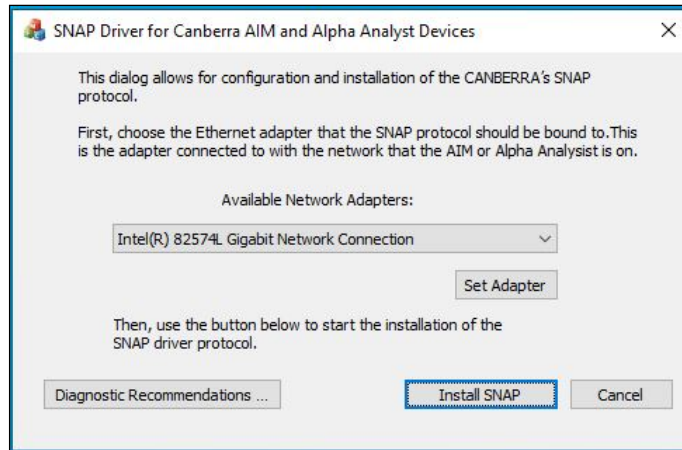


Figure 102: Apex-Alpha Client/Server Installer

6. Press the **Client Software and Utilities** button to start the Apex-Alpha Client installation. This installation uses a typical Windows Installer Wizard.
7. Apex-Alpha Client will automatically perform a check to verify all required Genie 2000 software is installed. If not found, an error message is displayed and you will need to exit the installation.
8. Next, Apex-Alpha displays the option to install the Snap Driver. This driver is used by Apex-Alpha to communicate with the alpha analyst.

9. Click on the **Yes** button to begin. The SNAP Driver installation screen is then displayed.



- a. For the available adapters, use the drop-down list and select the adapter needed to have the SNAP protocol be bound to.
 - b. Press **Set Adapter** button and then the **Install SNAP** button.
 - c. Next, you have the option to enable/disable the option to "Always trust software from Mirion Technologies (Canberra), Inc.". Select the check box and then click on the **Install** button.
10. Once the prerequisites are installed, the Welcome screen is displayed. Press the **Next>>** button to start the Apex-Alpha installation. Follow the on screen instructions of the Windows Installer Wizard. Use the **<<Back** and **Next>>** buttons to navigate through the installation.

11. Select the **I agree** radio button to accept its license agreement. The End User License must be accepted to proceed with the installation.



Figure 103: Accepting the License Agreement

12. Select the language for the installation. Note that this choice only affects Apex-Alpha. The language used by Genie-2000 components will be determined by the Windows region settings.

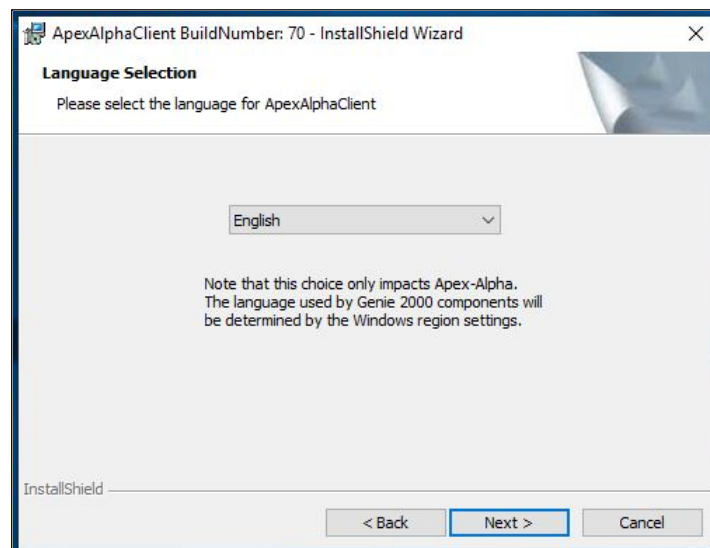


Figure 104: Selecting the Language

13. Select the VDM Network Card from the drop down list.

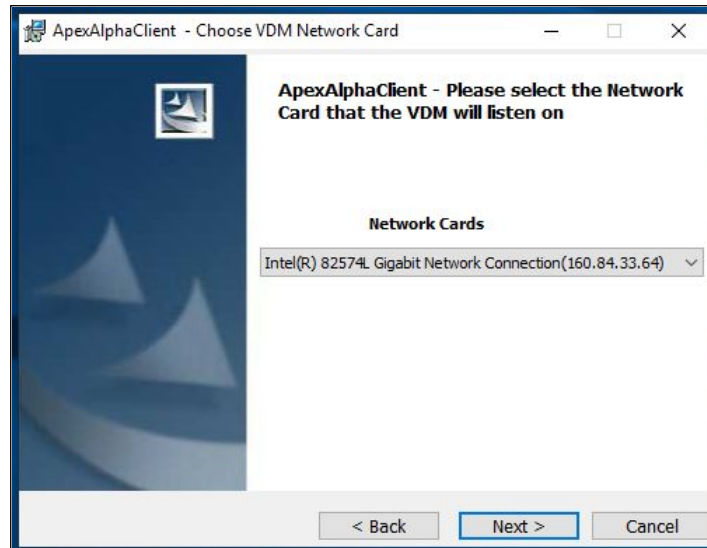


Figure 105: Selecting the Network Card

14. Enter your name and organization.

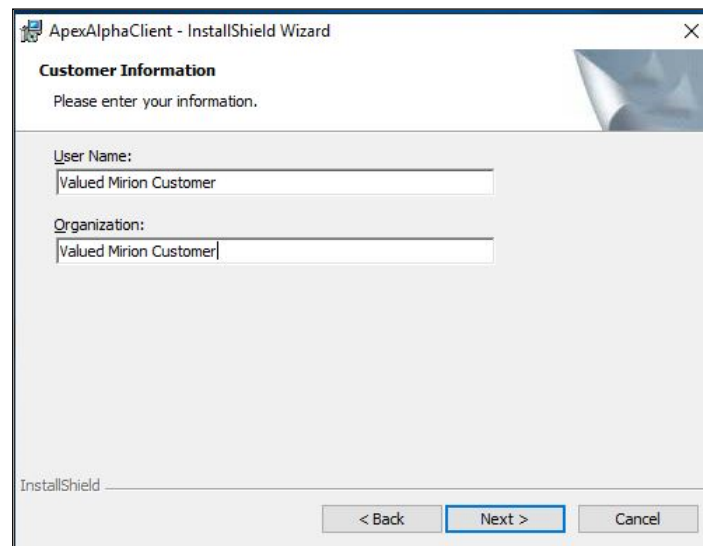


Figure 106: Entering Customer Information

15. Next, the type of setup is selected. You can choose either a default installation or a custom installation.

If you selected the **Default** option, Apex-Alpha is installed to your hard drive. Click on **Next** and then **Install** to begin.

If you selected the **Custom** option, Apex-Alpha allows you to choose where to install the client. Click on **Next** to continue.

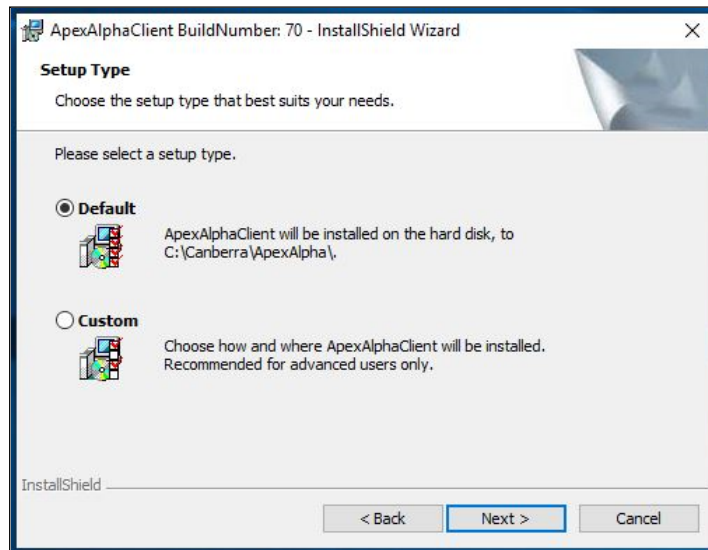


Figure 107: Choosing the Setup Type

- a. Enter the database specific information and then **Next** to continue.

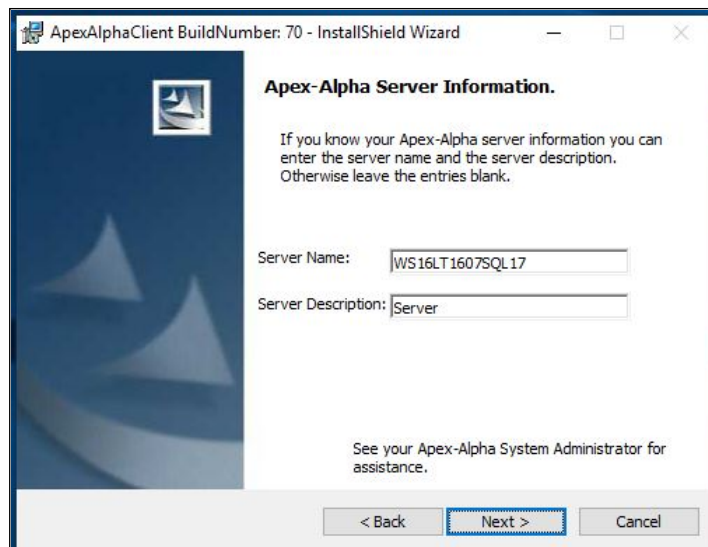


Figure 108: Entering Server Information

- b. Click on the **Next** and then on the **Install** button to begin the installation.

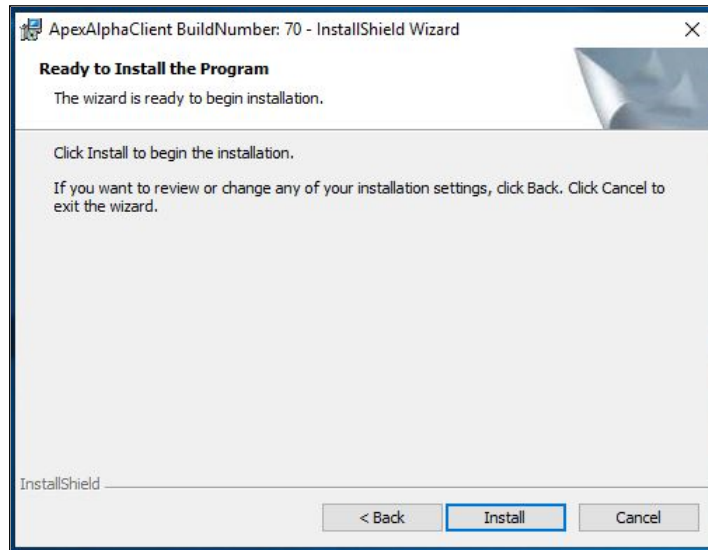


Figure 109: Beginning the Software Installation

16. Once the software has been installed, click **Finish**. The installation wizard will indicate that the computer must be rebooted. Click **Yes** to reboot immediately.

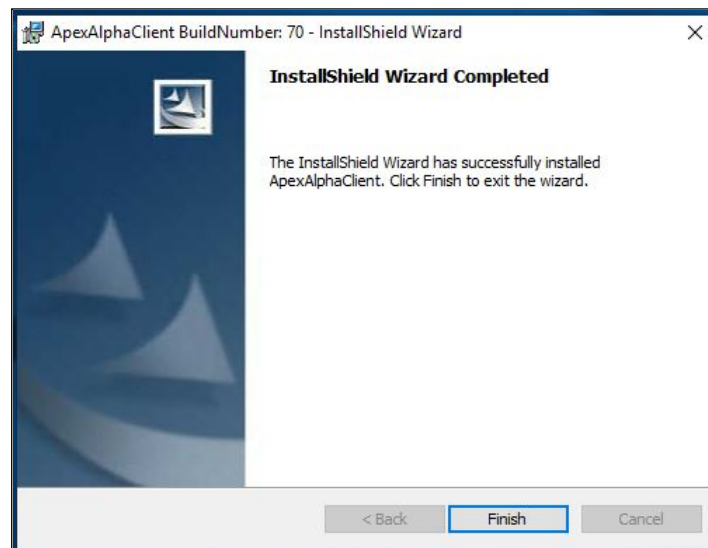


Figure 110: Completing the Installation

The installation places Apex-Alpha icons on the desktop and in the GENIE-2000 program group on the Windows Start menu.

SQL Server Installation

SQL Server installation for Apex-Alpha Server is comprised of two steps. First, the SQL Server software must be installed and configured on the database server machine. A suitable database container must then be created for use with Apex-Alpha.

Server Setup

For simplicity and repeatability, Mirion recommends that a configuration file be used to script the installation of SQL Server. An example configuration file has been provided on SQL server directory of the installation media.

If you have done a previous installation of SQL Server server, the configuration file can be found in the following directory:

```
<sql installation installation directory>\Setup bootstrap\log\<date of installation> \configurationfile.ini.
```

The installation can be launched using the following command:

```
setup.exe /configurationfile=configurationfile.ini
```

If you use the example configuration file, make sure you change the sa password to a password of your choice.

Database Creation

This section lists the minimum steps necessary to create a database in SQL Server 20017 for use with Apex-Alpha Server. These steps assume that you have already installed SQL Server.

1. Start the SQL Server Management Studio and connect to your SQL Server instance. If you created a **Named Instance** (see *Step 12 of Server Setup* on page 182) during SQL Server installation, be sure to include the instance name after the server name, separated by a backslash (e.g. MyServer\MyInstance). If you are running the Management Studio on the machine where SQL Server is installed, use Windows Authentication. Otherwise, use SQL Server Authentication and provide the system admin (sa) credentials that were specified when the SQL Server was installed.

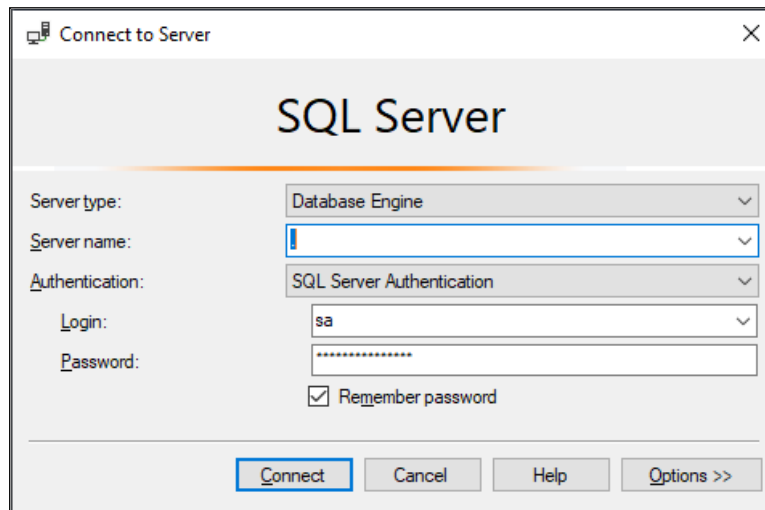


Figure 111: Microsoft SQL Server Management Studio

2. Once connected, the SQL Server should be listed in the Object Explorer pane. If the Object Explorer pane is not visible, press F8 or select Object Explorer from the View menu. If no SQL Servers are listed in Object Explorer, click **Connect** and select **Database Engine...** from the drop down menu.

Under the SQL Server item, expand the Security folder, then right click on the Logins folder and select **New Login...** from the context menu.

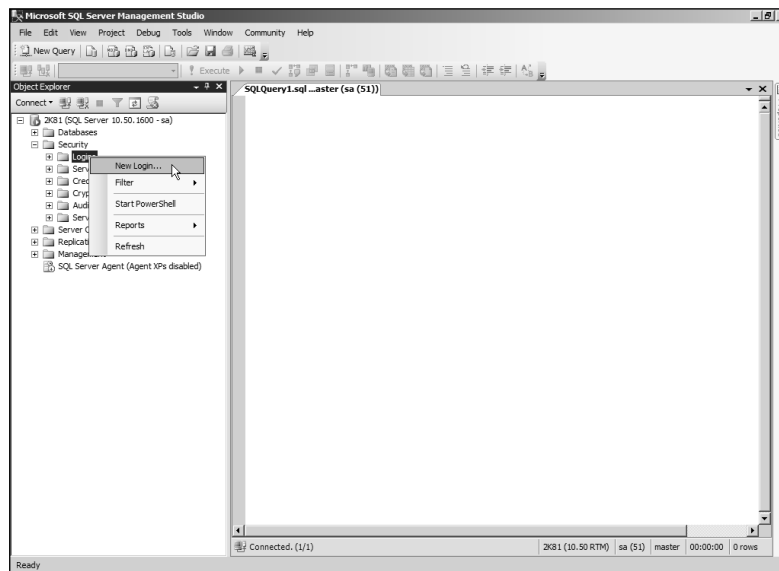


Figure 112: Creating a Login

- When the Login - New dialog appears, select the **General** page in the left pane. In the right pane, enter a login name (Mirion suggests “apexalpha”), then select the SQL Server authentication option and enter a password. Note that this login and password will be entered during the Apex-Alpha Server installation as the non-privileged user. Click **OK** to create the login.

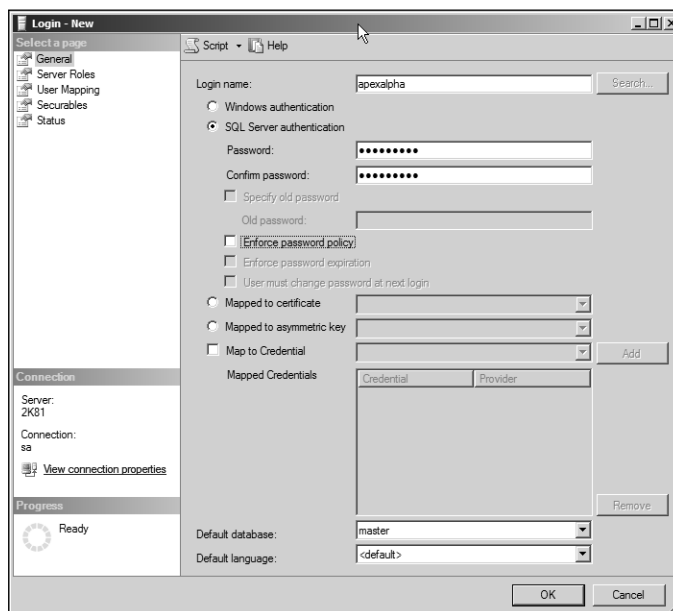


Figure 113: Entering the Login Name and Password

4. In the Object Explorer under the **SQL Server** item, right click on the **Database** folder and select **New Database...** from the context menu.

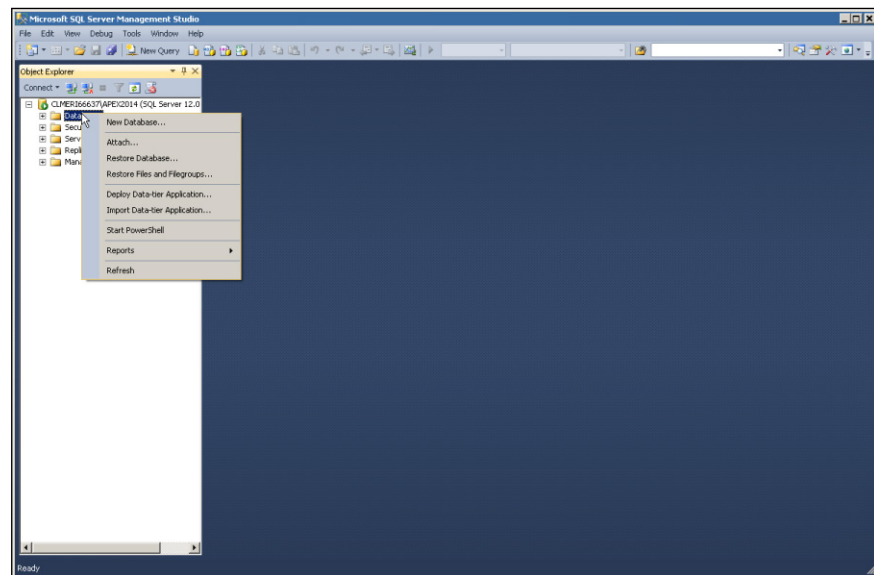


Figure 114: Creating a New Database

5. When the New Database dialog appears, select the General page in the left pane. In the right pane, enter a database name (Mirion suggests "CI_APEXALPHA").

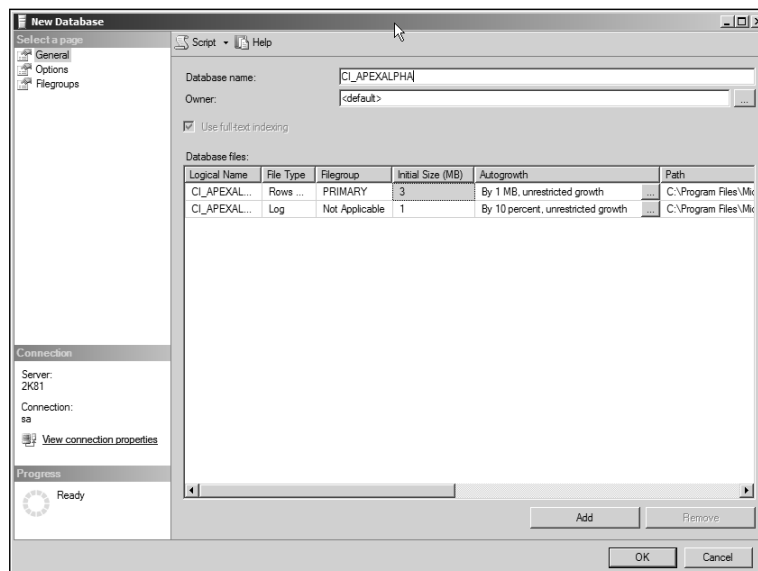


Figure 115: Entering the Database Name

6. Click the **Add** button beneath the Database files grid. A new row should appear in the grid. In the Logical Name cell for the new row, enter a name in the format MyDatabaseName_INDEX (e.g. “CI_APEXALPHA_INDEX”), then click the Filegroup cell for the new row and select <new filegroup>.

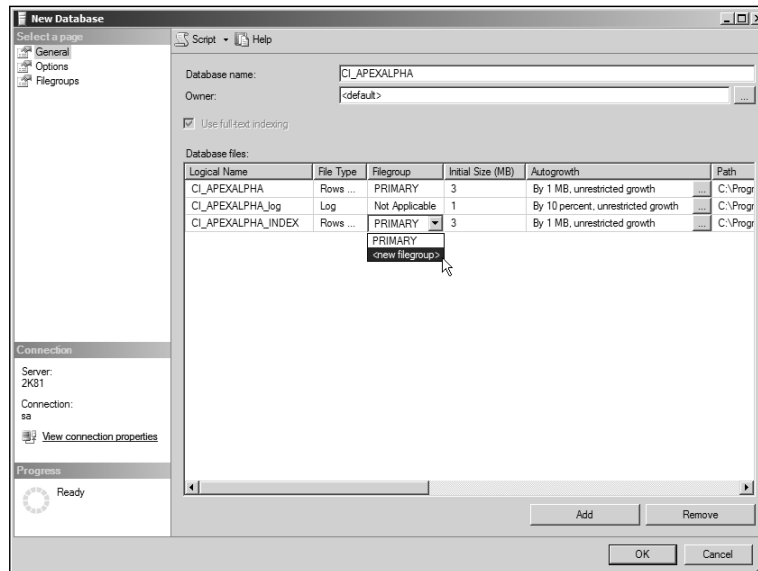


Figure 116: Adding an Index File

7. In the New Filegroup dialog, enter “INDEX_FILEGROUP” in the Name field and click **OK**. Back on the New Database dialog, you should see INDEX_FILEGROUP selected in the **Filegroup** column for the index file. Click **OK** to finish creating the Apex-Alpha database.

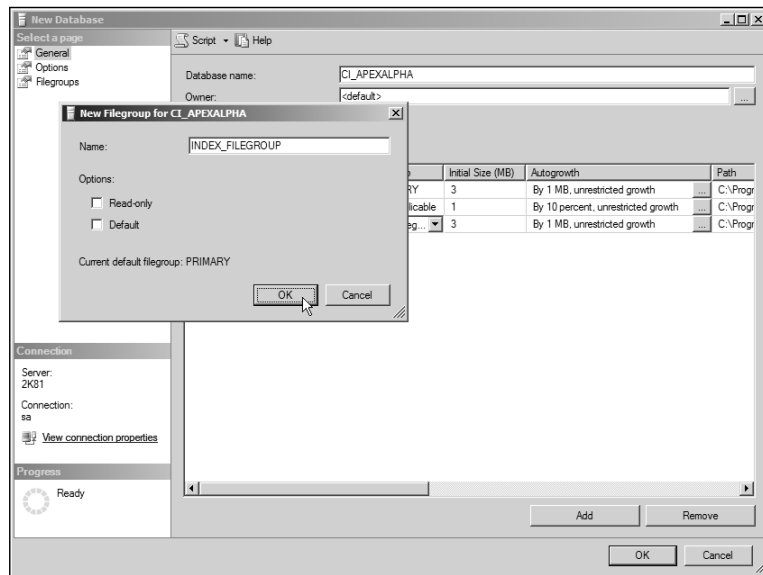


Figure 117: Entering the New Filegroup

8. In the **Object Explorer**, expand the Databases folder. The Apex-Alpha database should be listed. Expand that folder, expand the **Security** folder, then right-click on the **Schemas** item and select **New Schema...** from the context menu.

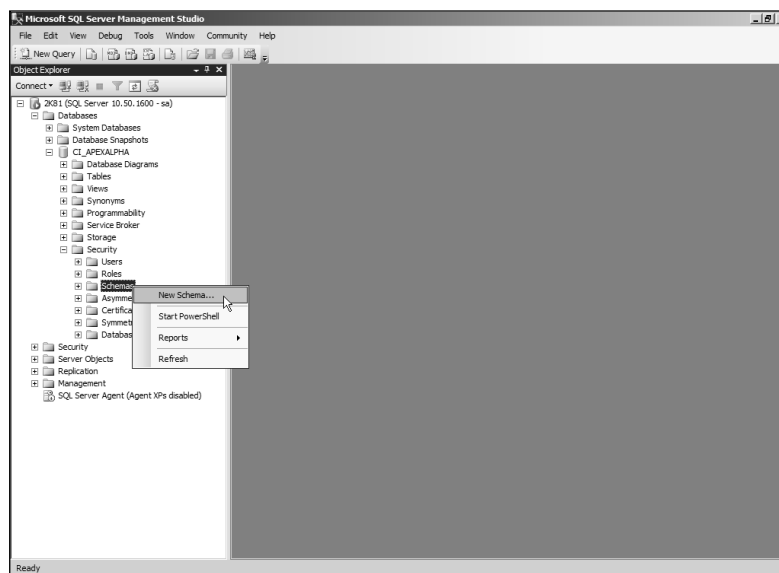


Figure 118: Creating a Schema

9. When the Schema - New dialog appears, enter “apexalpha” in the Schema name field. Leave the Schema owner field blank. Click **OK** to finish creating the schema.

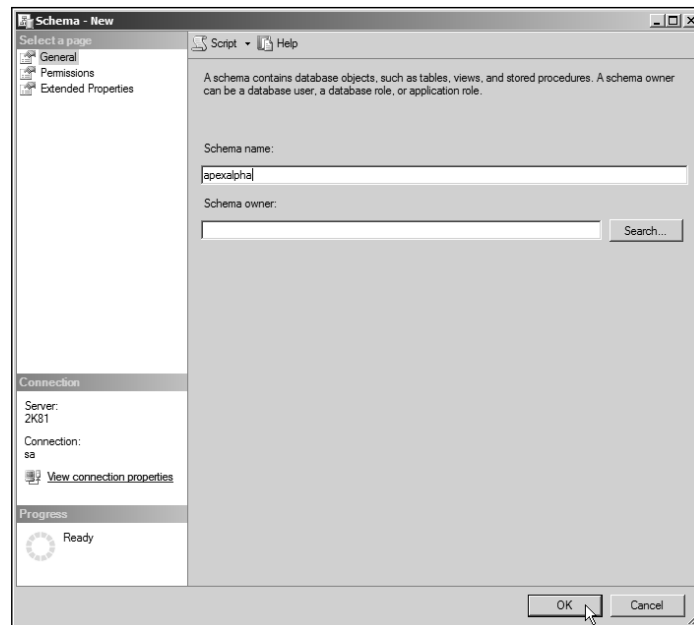


Figure 119: Entering the Schema Name

10. In the Object Explorer, right click the Users folder (under the Apex-Alpha database Security folder), then select **New User...** from the context menu.

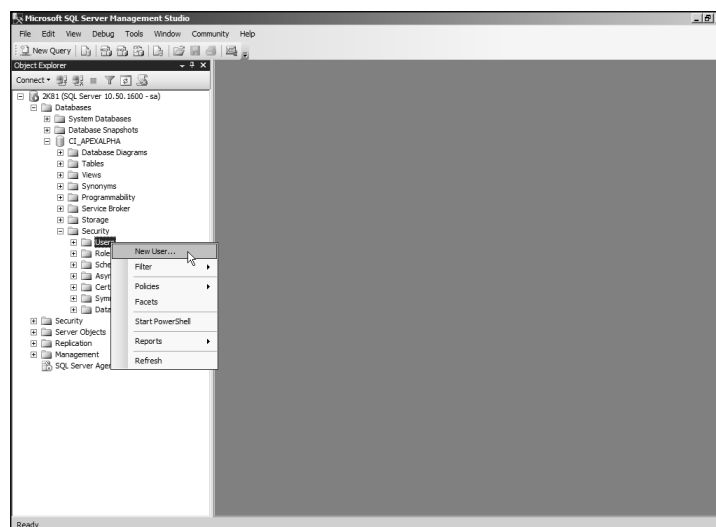


Figure 120: Creating a User

11. When the Database User - New dialog appears, enter the name of the login created in step #3 of this section in both **User name** and **Login name**, and enter “apexalpha” in the Default schema field. In the Database role membership list, check “db_owner”. Click **OK** to finish creating the database user.

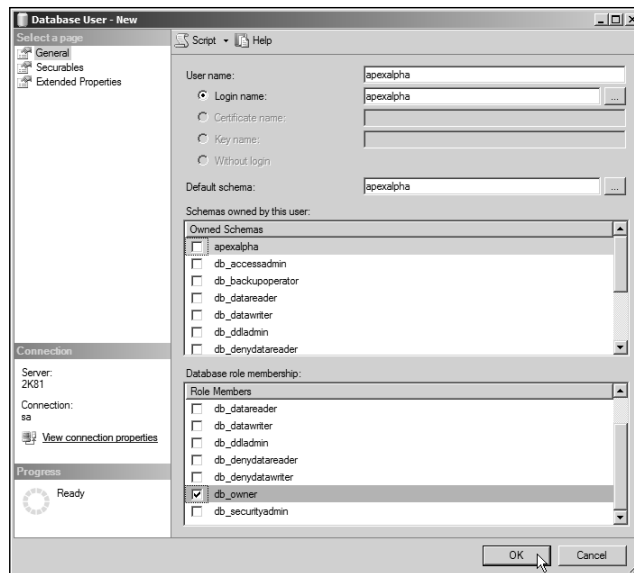


Figure 121: Entering the Database User

At this point, your database should be ready for use with Apex-Alpha.

Other Configuration Tasks

This section covers miscellaneous tasks that will need to be performed from time to time.

Importing Files From Alpha Analyst and AMS installations

Apex-Alpha can import files from both Alpha Analyst and AMS, allowing users of legacy systems to be up and running as quickly as possible. For Alpha Analyst, you can import energy calibrations, efficiency calibrations, background checks, system backgrounds, pulsers and calibration checks. For AMS, you can import only energy and efficiency calibrations.

Calibration and QA Files

In order to import calibrations and/or files into Apex-Alpha, they must be accessible from the Apex-Alpha workstation. There are three basic scenarios for importing calibration files.

1. Importing from Alpha Analyst where Apex-Alpha is installed on the same workstation as the Alpha Analyst software.
2. Importing from Alpha Analyst where Apex-Alpha is installed on a different workstation from the Alpha Analyst software.
3. Importing from AMS (only applies to calibration files, importing QA files from AMS is not supported).

The First Case

In the first case, Apex-Alpha will by default look in the correct directory for the chamber in question. For instance, if you were importing data for a chamber with serial number 06026946.A, Apex-Alpha would look in C:\AANALYST\06026946 (where C:\AANALYST is the Alpha Analyst install directory) for the files to import. It's important to note that under Alpha Analyst there is at most one current energy calibration file and one efficiency calibration file each geometry defined. If you're counting on shelf two, the files you would expect to see are EN00002.CAL and EF00002.CAL where the 2 indicates the shelf number.

When importing QA Files under Alpha Analyst, the expected files are Backgrnd.qaf for system backgrounds, BkgCheck.qaf for background checks, Calcheck.qaf for calibration checks and Pulser.qaf for pulser checks.

The Second Case

For the second case, where the Apex-Alpha workstation is different from the Alpha Analyst workstation, Apex-Alpha will look in the Genie 2000 install CAL file directory (i.e., C:\Genie2k\CALFILES) directory by default. In this case, the files need to be accessible to Apex-Alpha on a readable network resource for copying the files to Apex-Alpha workstation.

If you are copying files from a different workstation, it will be useful to put them in a place you can easily find them. One such place is under the Genie 2000 install CAL file directory, since this is the default location to search for calibration files. If Alpha Analyst software is not installed on the system, it will make the import process proceed more quickly.

In the figure below, each chamber's directory has been copied to the target system and the desired files can be located based on the chamber serial number, which corresponds to the folder name.

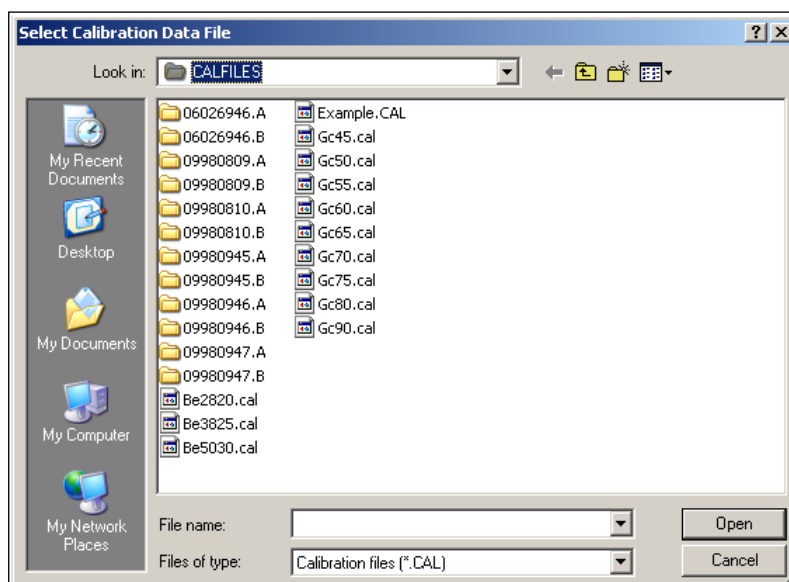


Figure 122: Calibration Import Example

The Third Case

Under AMS, a typical mechanism for importing samples is to FTP the files from the AMS system to the Apex-Alpha workstation then import them. In this case, it's useful to copy them to a sub-directory under the Genie CAL Files directory. If you are going to FTP the files, make sure you are in binary mode. On AMS, the typical path for the current calibration files is DKA0:[ALPHA.ALUSR.ARCHIVE.PRIME], this may vary by installation.

Other Files

It's also possible to import support files in from Alpha Analyst and AMS. In all the cases listed in the below, it's only necessary to put the desired files in the correct location and they will be immediately be available for use within the system. The table below summarizes the files and locations. In the table, \$Genie2k represents the Genie install path, by default this is c:\Genie2k, similarly for \$AlphaAnalyst.

Type\System	Alpha Analyst (typical path)	AMS (typical path)	Apex-Alpha
Library	\$Genie2k\CAMFILES	DKA0:[ALPHA.ALUS R.ARCHIVE.LIB]	\$ApexAlpha\Root\ Library
Certificate	\$Genie2k\CAMFILES	DKA0:[ALPHA.ALUS R.PRIME], Note you will need to change extension from .cer to .ctf	\$ApexAlpha\Root\ Certificates
Report Templates	\$AlphaAnalyst\TPLFILES	N/A	\$ApexAlpha\Root\ ReportTemplates
ASF	\$AlphaAnalyst\ASF	N/A	\$ApexAlpha\Root\ AnalysisSequence
ROI	\$Genie2k\CAMFILES	These are not usable directly, but since these are text files you can read the start and end energies and use as reference for creating new files in Apex-Alpha	\$ApexAlpha\Root\ ROI

File Replacement Policy

If you customize any of the standard Apex supplied distribution files, reinstalling or upgrading the system will overwrite the customized files. The following files will be replaced whenever the Apex application is reinstalled or upgraded:

Installldb.htm
 *.tpl
 ApexShare.dat
 ApexAlphasql.dat
 ApexAlphaComments.dat
 CI_AAI_TRANSLATION.txt
 Vbinstallldb.vbs



CAUTION: To avoid loss of your customized files, Mirion recommends that you back up the current files before reinstalling or upgrading the installation. The backups can then be used to restore the customized files.

Good operating practice requires that you back up your database and the Apex data tree before performing an upgrade so you can more easily recover from errors.

System Administration – Apex-Alpha vs. Database

The Apex-Alpha administrator is not necessarily the database administrator, but they can be the same person. These two people must work together to keep an Apex-Alpha database operating efficiently and properly, but the work they do differs greatly.

Duties of the Database Administrator

The database administrator is responsible for the maintenance of the database and the related software. This person does not need to know the workings of a laboratory, but must have a working knowledge of database software and how to maintain high performance for any database. The database administrator should also know how to set up a client PC on the network and how the connection is made from the computer to the database server. The database administrator must also know how to authorize a user access to the database.

Duties of the Apex-Alpha Administrator

The Apex-Alpha administrator is responsible for the setup and maintenance of the basic counting system parameters. This includes user security and all user accessible setup options. The administrator is also responsible for the initial setup of the system. This includes the site-specific information including items such as sample quantity units, report profiles, types of samples, types of procedures, QA policies, etc. The Apex-Alpha administrator is responsible for the information in the database and the organization of that information. The Apex-Alpha administrator must have a good overall view of how data will be used from each Apex-Alpha screen and how that data interrelates. Knowledge about how a laboratory functions is a must; knowledge of how a database operates is a plus, but not a necessity.

Authorizing Apex-Alpha Users

Although this topic is covered in more detail on the Security page in Apex-Alpha's Setup view, a brief description of Apex-Alpha user administration is covered here since it is so important to the proper operation of the Apex-Alpha system.

By default, when an Apex-Alpha desktop or server installation is completed, a single user “Administrator” in the “Administrator Group” is created. This user as a member of the administrator group has full privileges to perform any operation within Apex-Alpha.

In addition to changing the Administrator password, the administrator should set up security groups with the appropriate rights for different categories of users. By maintaining a secure system, modification of key settings by unauthorized users can be avoided.

To create user groups and change the rights assignments, use the Edit Group button on the *Security Setup Page* on page 18. Note that the administrator group is always granted all rights.

Change Password for the Apex-Alpha Service Manager

If you have to change the user or password for the Service Manager, the account information must be updated in the Services applet and the Component Services applet.

1. Click Start, and then select the Control Panel.
2. Double-click on the Administrative Tools.
3. Double-click on the Services icon.
4. Right-click on Apex-Alpha Service Manager then select Properties.
5. Click on the Log On tab. This will display the user selected for the Service Manager and allow you to change the user and password.
6. Click OK when you are done, then close the Services applet.
7. In Administrative Tools, double-click on the Component Services icon.

8. In the left-hand pane, expand Component Services | Computers | My Computer | DCOM Config. You should see an item under DCOM Config named AAPostProc (see the following figure).

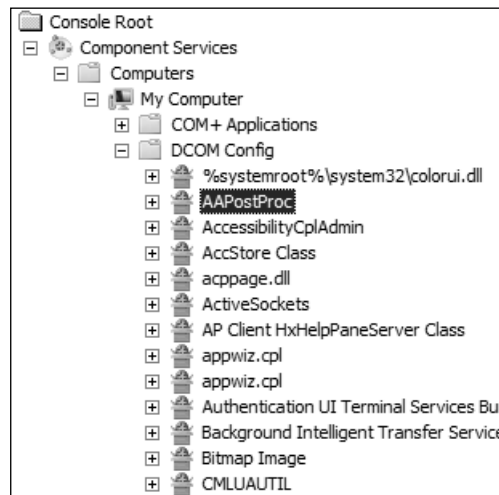


Figure 123: Component Services

9. Right-click on AAPostProc and select Properties.
10. Click on the Identity tab. This will display the user selected for the Service Manager and allow you to change the user and password.
11. Click **OK** when you are done, then close the Component Services applet.

A Summary of Apex-Alpha Rights

The following table lists all security rights and their descriptions, sorted by functional category.

Category	Privileges	Description
Calibration		
	Allow Energy Calibration	Can perform an energy calibration.
	Allow Efficiency Calibration	Can perform an energy calibration.
	Hardware Adjust	Can adjust programmable hardware devices from the calibration count tab.
Certificates		
	Certificate Editor	Can launch the Genie 2000 Certificate editor.
Data Review		
	Review Only	Can only view samples in data review (no edits).
	Review and Reanalyze	Can review and reanalyze samples in data review.
	Approve Sample	Can approve a sample in data review (first approval).
	Second Approve Sample	Can approve a sample in data review (second approval).
	Allow to Launch IPF	Can launch interactive peak fit in data review.
	Sample Information	Can edit the sample information in data review.
Chambers		
	Change Status	Can change chamber status between Online and Offline.
	Vacuum Control	Can change vacuum status between Hold, Pump and Vent.
Import/Export		
	Import Calibration/QA	Can import calibration and QA files.
Nuclide Library		
	Nuclide Library Editor	Can start the nuclide library editor.
Batches		
	Create Batches	Can create batches.
	Edit Batches	Can edit batches.
	Delete Batches	Can delete batches.
QA		

Category	Privileges	Description
	QA Calibration or Pulser Check	Can start a QA calibration or pulser check count.
	QA Edit	Can start the QA editor.
	QA Background or System Background Count	Can start a QA background or system background count.
Printing		
	Print Sample/Calibration Unapproved Results	Can print reports for unapproved samples and calibrations.
	Print Sample/Calibration Approved Results	Can print reports for approved samples and calibrations.
	View/Print Event Logs	Can print system event logs.
Sample Counting		
	Allow Sample Counting	Can start sample counts.
	Terminate Sample Counting	Can stop sample counts.
	Terminate Any Sample Counting	Can stop any sample counts.
System Setup		
	General Setup	Can access the setup tabs not explicitly protected.
	Display Group Management	Can access the display groups' setup.
	Geometry Editor	Can access the geometry editor.
	Analysis Sequence File Editor	Can access the analysis sequence file editor.
	Create/Edit Sample Types	Can create and edit sample types.
	Procedure Editor	Can access the procedure editor.
	Edit Display Defaults	Can edit display parameters.
Archive		
	Archive Batches	Can archive batches.
	Restore Archived Batches	Can restore archived batches to the database.
	Delete Batches	Can delete counted batches from the database.

Apex-Alpha Backup

To prevent data loss, you should back up your data frequently. This section describes the minimum steps necessary to accomplish a complete backup for Apex-Alpha. Please coordinate with your IT department to come up with a backup strategy that is right for your site.

Apex-Alpha Desktop

The following steps need to be performed.

1. Close the Apex-Alpha application.
2. Right click on the Apex-Alpha System Status icon in the system tray and select Stop Service from the context menu. The icon should change from green to red.
3. Back up the contents of the `Canberra\Apex-Alpha\Root` folder.
4. Back up the Apex-Alpha database as follows:
 - a. Start the SQL Server Management Studio (found in the Start Menu in the Microsoft SQL Server 2017 program group).
 - b. In the Connect to Server dialog, specify the Server name (typically `<computer name>\APEXALPHA`), select Windows Authentication, and click the **Connect** button.
 - c. In the Object Explorer, expand the Databases folder for the appropriate SQL Server instance. If the Object Explorer is not visible, press F8 or select Object Explorer from the View menu.
 - d. Right click on the node for the Apex-Alpha database (typically `CI_APEXALPHA`) and select **Backup...** from the Tasks menu. The Back Up Database dialog should appear.
 - e. In the Destination section, click the **Add...** button. The Select Backup Destination dialog should appear. Specify a backup file name and click **OK**.
 - f. On the Back Up Database dialog, click **OK**. The backup operation may take some time, depending on the size of the database and the speed of the computer. When the backup is complete, a notification dialog will appear. Click **OK** to finish.

Apex-Alpha Client/Server

The following steps need to be performed.

1. Close the Apex-Alpha application on the Apex-Alpha Server and any Apex-Alpha Client machines.
2. On the Apex-Alpha Server machine, right click on the Apex-Alpha System Status icon in the system tray and select Stop Service from the context menu. The icon should change from green to red.
3. Back up the contents of the **Canberra\Apex-Alpha\Root** folder. Note that in an n-tier configuration, this data will reside on a machine other than the Apex-Alpha Server.
4. Back up the Apex-Alpha database as follows:
 - a. Start the SQL Server Management Studio (found in the Start Menu in the Microsoft SQL Server 2017 program group).
 - b. In the Connect to Server dialog, specify the Server name and credentials. If you are running the Management Studio on the machine where SQL Server is installed, use Windows Authentication. If you are running Management Studio remotely, use SQL Server Authentication and provide the system admin (sa) credentials that were specified when the SQL Server was installed.
 - c. In the Object Explorer, expand the Databases folder for the appropriate SQL Server instance. If the Object Explorer is not visible, press F8 or select Object Explorer from the View menu.
 - d. Right click on the node for the Apex-Alpha database and select **Backup...** from the Tasks menu. The Back Up Database dialog should appear.
 - e. In the Destination section, click the **Add...** button. The Select Backup Destination dialog should appear. Specify a backup file name and click **OK**.
 - f. On the Back Up Database dialog, click **OK**. The backup operation may take some time, depending on the size of the database and the speed of the computer. When the backup is complete, a notification dialog will appear. Click **OK** to finish.

Database Installation Error Recovery

Due to the complexity of trying to perform database upgrades during an installation, unexpected errors may occur. To help recover from a database installation error, some basic utilities have been placed into the SQL directory under the Apex-Alpha installation folder. The main utility, `installdb.hta`, can be run from Internet Explorer. If you are encountering unrecoverable errors during the database portion of the Apex-Alpha installation, you can use this utility to diagnose the problem. Contact your local Customer Service for more details.

Note: On launching this utility, you may get the following error: “To help protect your security, Internet Explorer has restricted this file from show active content that could access your computer. Click here for Options.” If you receive this error, click and select “Allow blocked content”.

Most of these fields will be filled with default data based on the information entered during the Apex-Alpha Install.

ApexRoot – The default network share used by the Apex-Alpha application.

Database Type – The type of database, Oracle or SQL Server.

Database Instance – The SQL server instance name, or the Oracle TnsName name entered during installation.

Database Catalog (SQL server only) – The Apex-Alpha database name. This can be views through the `master.dbo.sysdatabases` table(sql server 2000) or `sys.sysdatabases` (sql server 2005) on SQL server.

Privileged User/Password – The privileged database user and password entered during the Apex Install.

Application User – The database user under which the Apex application will run after the install is successfully completed.

Sql File – This file is a script used to update the Apex database, the default location is `Canberra\ApexAlpha\Sql\ApexAlphasql.dat`.

Shared sql file – This file is a script used to update tables shared between Apex and Apex-Alpha. The default location is `Canberra\ApexAlpha\Sql\ApexShare.dat`

Index Tablespace (Oracle Only) – The install will place all databases indexes into this tablespace, as opposed to the user default tablespace.

After correcting the problem with the installation, click first on “Install shared tables” then on “Install or update schema”.

Database Tools for SQL Server 2017 Express Edition

If you are using the desktop version of Apex-Alpha with SQL Server 17 Express, a database management tool called **SQL Server Management Studio 17** can be used to access your database. Your local Customer Service may ask you to use this tool if you are having problems during the installation.

Migration of Apex-Alpha to a New Computer

Apex-Alpha provides a migration tool to help you with the steps needed to migrate an existing Server or Desktop installation to a new computer. The tool is located in the migration folder on the installation media for either Desktop or Client Server. To get help for the migration, click on the help.htm file located in the folder.

B. Hardware Setup

After the software is installed, the next step is to use the MCA Input Definition (MID) Editor to create a hardware configuration for operation through Apex-Alpha. This appendix contains two examples, the first of which highlights the steps needed to set up Alpha Analyst chambers and a second definition consisting of multiplexed manual spectrometers connected via an AIM module. In addition, a complete listing of the Alpha Analyst's self-tests and diagnostics is provided here.

Defining the Hardware Configuration

To open the MID Editor from the Windows Start Menu, select **Programs | Genie 2000 | MCA Input Definition Editor**.

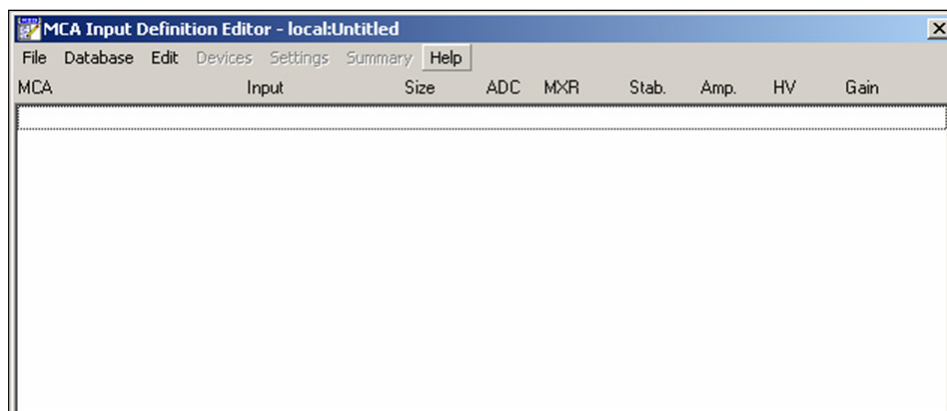


Figure 124: The MID Input Definition Editor

For a more detailed discussion of the MID Editor, refer to the “MCA Input Definition” chapter in your *Genie 2000 Operations Manual*.

Adding the MCAs

To add the Alpha Analyst MCA, select **Edit | Add MCA...** to bring up the screen shown below, which lists all MCAs that can be configured.

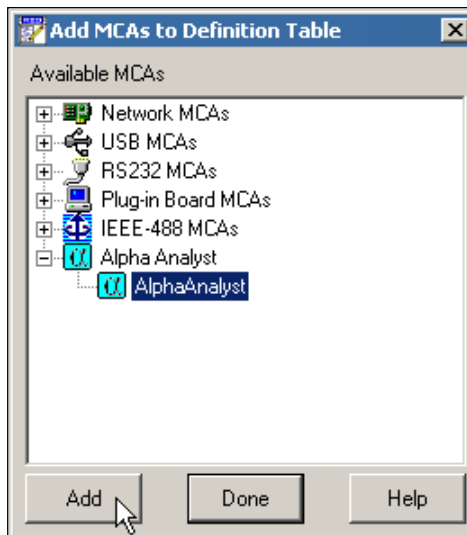


Figure 125: The Add MCA Dialog

1. To add the Alpha Analyst, highlight the “Alpha Analyst” node, then press the Add button. This will add the Alpha Analyst selection to the MID editor screen.
2. To add an MCA associated with a manual spectrometer configuration, highlight the appropriate device type (such as AIM or S100), then click the **Add** button. This will add the selected MCA to the MID editor screen.
3. Click the **Done** button to accept the addition and return to the MID Editor window.

Alpha Analyst Device Parameters

In the MID Editor screen, highlight the name of the MCA or the Spectrometer Input you want to define, **A_1_1A** in this example, then select **Devices | MCA** to see the MCA screen. The following paragraphs describe how to set the Device Setup parameters for the selected MCA or Spectrometer Input.

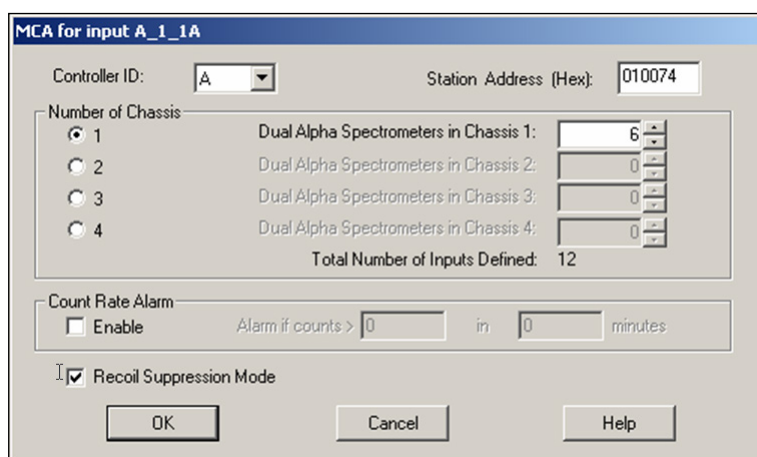


Figure 126: The Device Setup Dialog

Controller ID

Label the first controller in a system as “Controller ID: A”. Each controller can operate a maximum of 48 spectrometers.

Station Address

This network address is the hexadecimal code found on the rear panel of the Alpha Analyst Controller next to the Ethernet connectors. Type in the Station Address for the ‘A’ Controller.

Number of Chassis

A chassis is a bank of detectors that have a common power supply. A maximum of 12 inputs can be connected and up to four (4) banks can be operated by the controller. For this example we are using one chassis containing six dual alpha spectrometers for a total of 12 inputs.

Number of Dual Spectrometers

Use the adjustment arrows to define the number of dual spectrometers / inputs within a chassis.

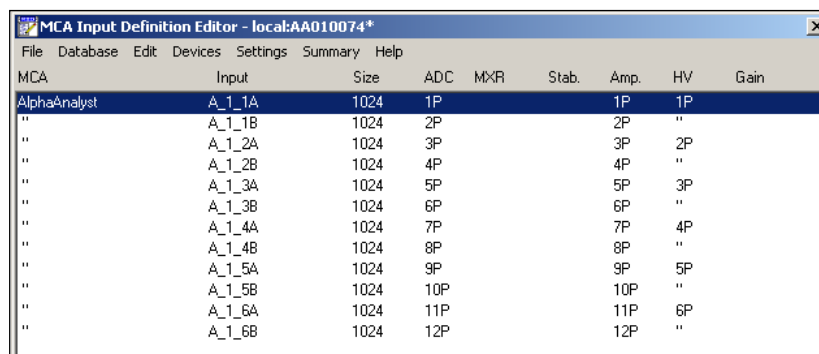
Count Rate Alarm

This parameter sets a global count rate alarm. The initial count rate is monitored each time an acquisition begins.

Recoil Suppression Mode

To enable recoil suppression mode for this controller, select the checkbox. Use of this feature is highly recommended to minimize detector contamination.

Press **OK** to accept your entries and add the inputs to the MID Editor window list. The figure below lists six pairs of Spectrometers Inputs for the MCA we called chassis A.



The screenshot shows the 'MCA Input Definition Editor' window for 'local:AA010074*'. It contains a table with columns: MCA, Input, Size, ADC, MXR, Stab., Amp., HV, and Gain. The table lists 12 input pairs for 'AlphaAnalyst'.

MCA	Input	Size	ADC	MXR	Stab.	Amp.	HV	Gain
AlphaAnalyst	A_1_1A	1024	1P			1P	1P	
"	A_1_1B	1024	2P			2P	"	
"	A_1_2A	1024	3P			3P	2P	
"	A_1_2B	1024	4P			4P	"	
"	A_1_3A	1024	5P			5P	3P	
"	A_1_3B	1024	6P			6P	"	
"	A_1_4A	1024	7P			7P	4P	
"	A_1_4B	1024	8P			8P	"	
"	A_1_5A	1024	9P			9P	5P	
"	A_1_5B	1024	10P			10P	"	
"	A_1_6A	1024	11P			11P	6P	
"	A_1_6B	1024	12P			12P	"	

Setting Each Input's Parameters

Each pair of spectrometer inputs needs to be set up, but you can save some time and effort if they are all to use the same parameters. We can establish the settings for one input of one dual spectrometer, then copy these settings to all other spectrometers, using the “Apply to All” feature described in the following paragraphs.

In the example described in the following paragraphs, we are going to prepare the instrument for a typical alpha spectroscopy application with an energy range of 3.5 - 6.5 MeV, in 1024 channels with recoil suppression set at $16\mu\text{g}/\text{cm}^2$. Parameter settings for several other energies and ranges are listed in Table 1.

Table 1 Optional Alpha Analyst Setups							
Low Energy (MeV)	High Energy (MeV)	Energy Range (MeV)	Res. (keV/Chan.)	ADC Conv. Gain	ADC Offset	Amplifier Gain*	No. of Input Chan.
1.0	8.0	7.0	6.8	1024	−146	1.00	1024
2.0	7.0	5.0	4.9	1024	−410	1.40	1024
2.0	8.0	6.0	5.9	1024	−341	1.17	1024
2.0	9.0	7.0	6.8	1024	−293	1.00	1024
2.5	8.5	6.0	5.9	1024	−427	1.17	1024
2.5	9.0	6.5	6.4	1024	−394	1.08	1024
2.5	9.5	7.0	6.8	1024	−366	1.00	1024
3.0	6.5	3.5	3.4	2048	−878	1.00	1024
3.0	10.0	7.0	6.8	1024	−439	1.00	1024
3.5	6.5	3.0	5.9	1024	−597	1.17	512

Table 1 Optional Alpha Analyst Setups							
Low Energy (MeV)	High Energy (MeV)	Energy Range (MeV)	Res. (keV/Chan.)	ADC Conv. Gain	ADC Offset	Amplifier Gain*	No. of Input Chan.
3.5	6.5	3.0	3.0	2048	−1195	1.17	1024
3.5	7.0	3.5	6.8	1024	−512	1.00	512
3.5	7.0	3.5	3.4	2048	−1024	1.00	1024

*The amplifier gain setting is the sum of Amplifier Fine Gain and S-Fine Gain

The ADC Settings

Select **Settings | ADC** to display the “ADC” screen. In this example, we are going to prepare the instrument for a typical alpha spectroscopy application with 1024 channels in each spectrum, with a nominal spectral region from 3.5 to 6.5 MeV, and having an energy resolution of approximately 3 keV per channel.

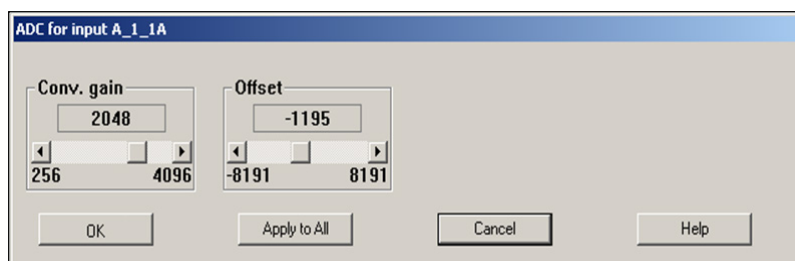


Figure 127: Setting the ADC

1. Set the ADC Conversion Gain to 2048.
2. Set the ADC Offset to −1195.
3. Click the **Apply to All** button to copy these settings to all inputs.

The Amplifier Settings

Select **Settings | AMP** to display the “Amplifier” screen.

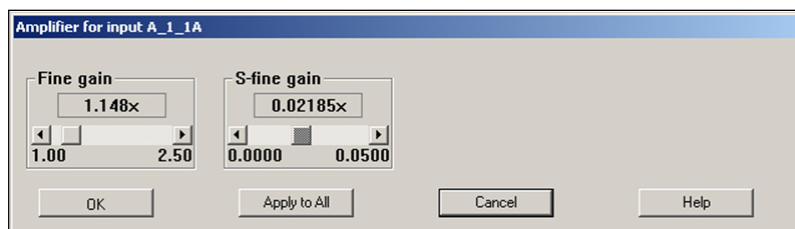


Figure 128: Setting the Amplifier

1. Set the Amplifier Fine Gain to about 1.148.
2. Set the Super Fine Gain (S-Fine Gain) to about 0.02185.
3. Click the **Apply to All** button to copy these settings to all inputs.

The HVPS Settings

Select **Settings | HVPS** to display the “High Voltage Supply” screen.

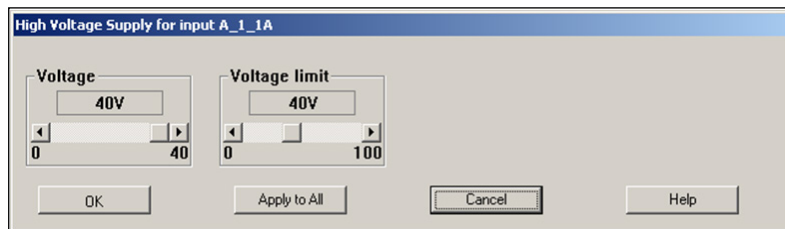


Figure 129: Setting the HVPS

1. Set the Voltage Limit to the *maximum* allowable voltage for your PIPS detectors (typically 100 volts, but for the correct voltage, please refer to the Data Sheet sent with each detector).
2. Set the Voltage setting to the *working* voltage for your detectors (typically 40 volts, but for the correct voltage, please refer to the Data Sheet sent with each detector), typically 40 volts for PIPS alpha detectors).
3. Click the **Apply to All** button only if all the detectors in your instrument can operate with the same working voltage, otherwise you will need to set each dual spectrometer individually.

The Input Settings

Select **Settings | Input** to display the “Define Input” screen.

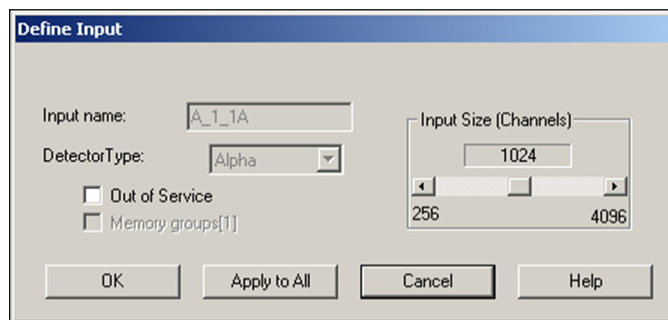


Figure 130: Defining the MCA Input

1. Set the Number of Channels to 1024, then click the **Apply to All** button to copy these settings to all inputs.
2. The **Out of Service** check box is used only if the chosen input is not available for use, such as when a dual alpha spectrometer has been removed for repairs or maintenance but you still want to use the rest of your instrument as defined.

You would also use this function if your Alpha Analyst has been configured with less than the full complement of dual alpha spectrometers and they are not installed sequentially in the chassis. For instance, if your spectrometers were in positions 1, 2, 5 and 6, you would place 3 and 4 out of service.

An Out of Service input has an asterisk next to its ID in the MID Editor's list.

The Vacuum Settings

Select **Settings | Vacuum** to display the screen for either the Low Vacuum Mode or the Recoil Suppression Mode. Note that all of a Controller's inputs must use the same mode; they cannot be mixed.

1. For the **Low Vacuum Mode**, set the "Acquire On" threshold for the chosen spectrometer input. When the chamber pressure has been pumped down to this level, data acquisition will start.

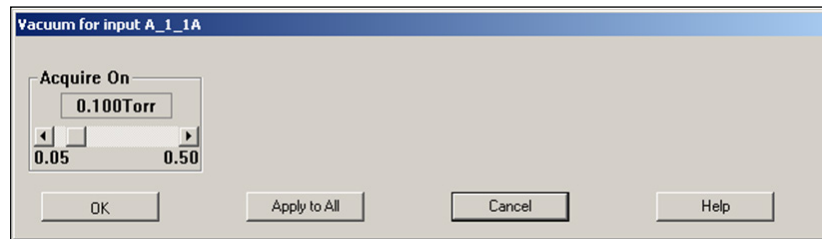


Figure 131: Setting the Vacuum Level

2. Click the **Apply to All** button, if applicable to all chambers, or set each dual alpha spectrometer individually.

3. For the **Recoil Suppression Mode**, set the Air Thickness for the chosen spectrometer. The Alpha Analyst will use the Air Thickness setting and the sample-to-detector Distance parameter, entered in the Geometry Editor, to automatically regulate the chamber pressure.

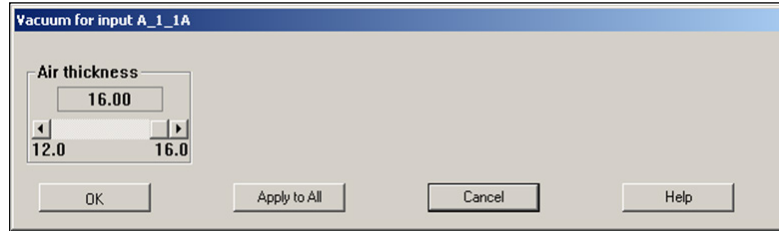


Figure 132: Setting the Recoil Suppression Mode

4. Click the **Apply to All** button, if applicable to all chambers, or set each dual spectrometer individually. Remember that the air thickness will be the same for both chambers in a dual alpha spectrometer.

Manual Spectrometer Device Parameters

The following example explains the setup procedure for an 8-input manual alpha spectrometer system, such as the Model 7401 Alpha Spectrometer, connected to a Model 556 AIM (Acquisition Interface Module) via an Model 8224 Analog Multiplexer, Model 554 RPI (Remote Parallel Interface), and Model 8701 ADC, all operating in the independent start/stop mode. To address your specific configuration requirements, follow this example and refer to the “MCA Input Definition” chapter in the *Genie 2000 Operations Manual*. The resultant spectral display will have a nominal region of 3.4 to 6.4 MeV, with an energy resolution of approximately 3 keV/channel.

MCA Setup

In the MID editor screen, highlight the name of the MCA or the spectrometer input you want to define, DET01 in this example. The following paragraphs describe how to set the Device Setup parameters for the selected MCA or Spectrometer inputs.

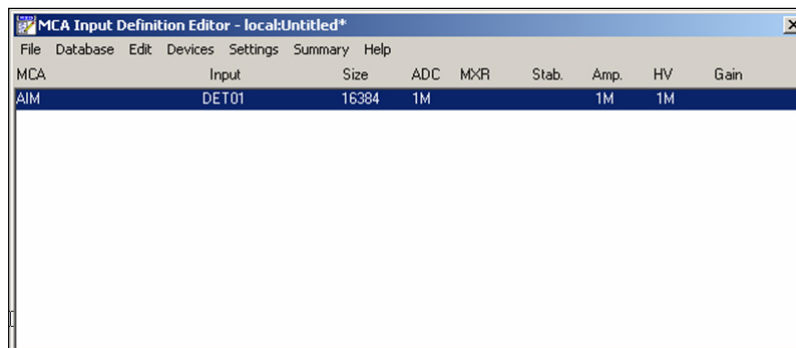


Figure 133: Setting Up the MCA

Select **Devices | MCA** from the MID Editor's main menu to show the "MCA" screen. This screen is used to define the amount of MCA memory required, the number of ADCs connected to the AIM, and the Ethernet address of the AIM.

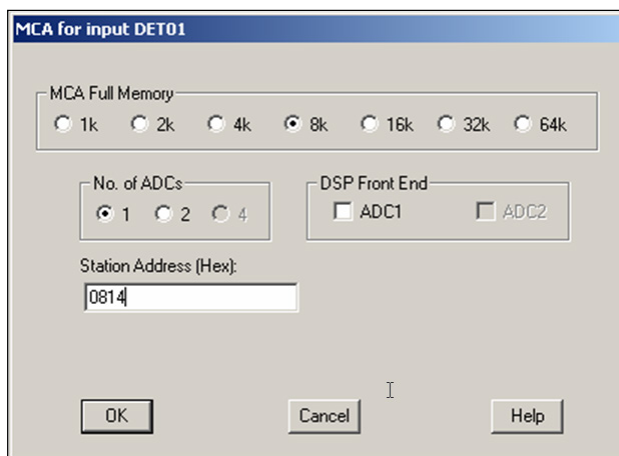


Figure 134: Assigning the MCA's Memory

The required amount of memory will be equal to the selected number of inputs times the number of channels per input; in this example, 8 inputs x 1024 channels per input = 8K of memory.

The number of ADCs will be one (1) and the AIM address will be the 3-digit alphanumeric ID on the front panel of the module. When the information is correct, press OK to return to the main MID editor menu.

The ADC Settings

The next step is to define the ADC for the spectrometer inputs. Select **Devices | ADC** from the MID Editor's main menu to see the "ADCt" screen. In this example we chose a Manual ADC device driver and Mixer/Router. Since the Model 8701 is a manual ADC, its front panel controls will need to be set manually. This example defines an nominal spectral range of 3.4 to 6.4 MeV with the settings as follows:

1. Set the ADC Conversion gain to 2048.
2. Set the ADC Offset to -1152 ($1024 + 128$).

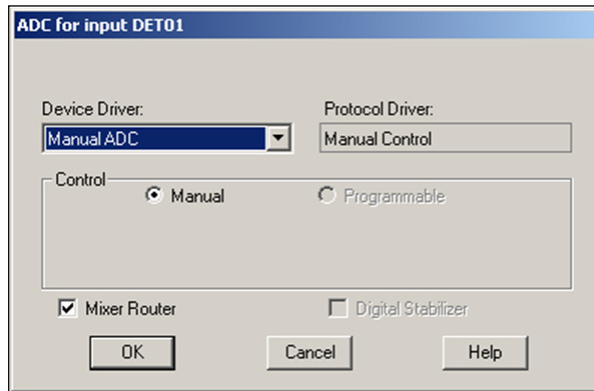


Figure 135: Defining the ADC

The Multiplexer Settings

Now that you have indicated the ADC is connected to a multiplexer, this selection becomes available on the Devices menu. Select **Devices | MXR** to set up the multiplexer inputs. The figure below shows the proper settings for this example.

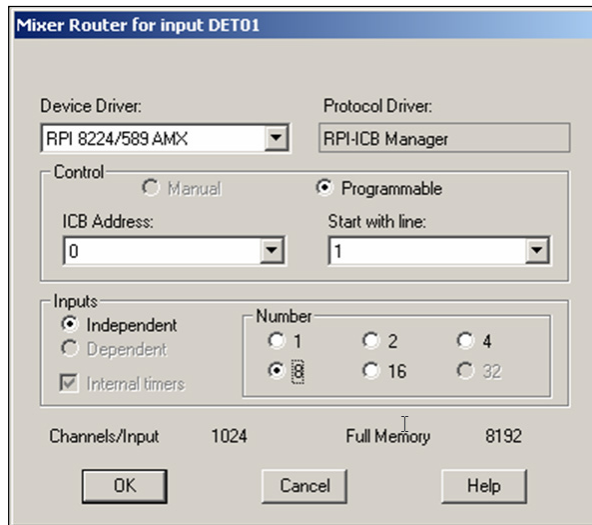


Figure 136: Setting Up the MXR Inputs

Note that when the number of inputs is changed, the Channels/Input value automatically changes based on the full memory allocation you made in the MCA setup screen. Select **OK** when completed. The additional number of inputs defined will be created and the MID editor main menu will now look like the following figure.

MCA Input Definition Editor - local:Untitled*									
File	Database	Edit	Devices	Settings	Summary	Help			
MCA	Input	Size	ADC	MXR	Stab.	Amp.	HV	Gain	
AIM	DET01	1024	1M	1-1P		1M	1M		
"	DET02	1024	"	1-2P		2M	2M		
"	DET03	1024	"	1-3P		3M	3M		
"	DET04	1024	"	1-4P		4M	4M		
"	DET05	1024	"	1-5P		5M	5M		
"	DET06	1024	"	1-6P		6M	6M		
"	DET07	1024	"	1-7P		7M	7M		
"	DET08	1024	"	1-8P		8M	8M		

Figure 137: Additional MXR Inputs Defined

Input Settings

To define the individual detector input, highlight DET01 and select **Settings | Input** from the MID Editor's main menu to display the "Define Input" screen. Select a detector type of "Alpha" and an Input Size of 1024 channels, then select **Apply to All**. The selected settings will be copied to all of the detector configurations displayed in the MID editor.

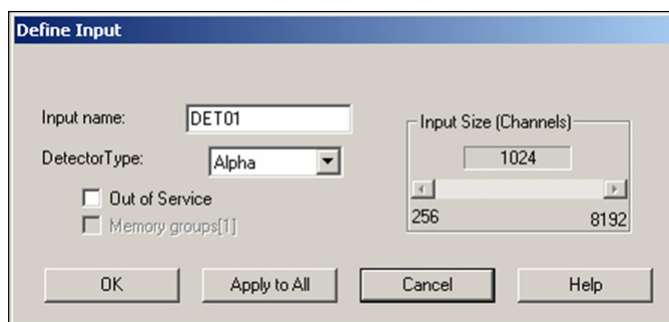


Figure 138: Setting an Individual Input

Saving the File

When you are satisfied with your settings, Select **File | Save As** to display the Save As dialog box shown.

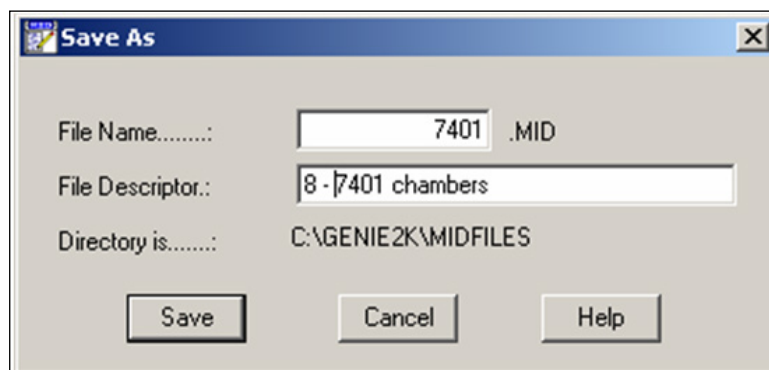


Figure 139: Saving Your File

Type in the file name and fill in the file descriptor, then select Save to save the file.

Loading the File into the Runtime Database

To complete the setup and make it available for the Alpha Analyst, you must load the instrument definition into the Runtime Database.

1. Select **Database | Load to** to display the list box, shown below. This list contains all of the MID files that are available on your Genie-2000 system, so it's important to select the one defined for the Alpha Analyst.

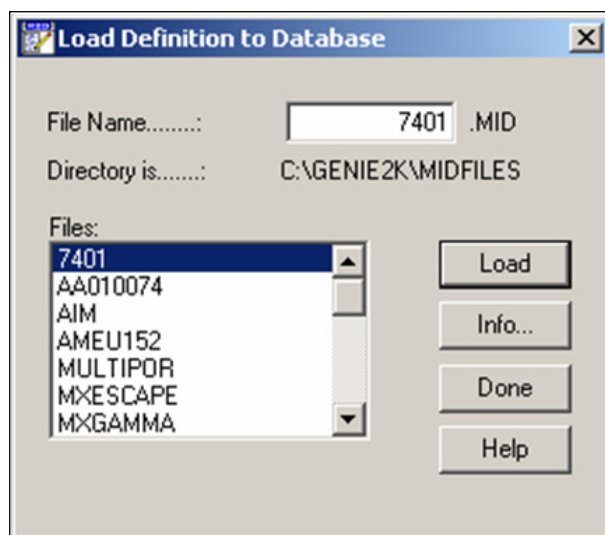


Figure 140: Loading to the Runtime Database

2. Choose the file for the Alpha Analyst, then select Load.
3. Close the MID Editor. You are now ready to use your Alpha Analyst.

Adjusting the MCA Settings

Though it is possible to change individual spectrometer settings through Genie-2000's MCA Adjust Menu, this is best left to a local Customer Service Engineer or to an experienced Genie-2000 user.

Alpha Analyst Self-Test and Diagnostic Features

The Alpha Analyst has a number of self-checking functions that assure reliable operation over long periods of time. However, if a problem develops, there are diagnostic features that help locate the problem and provide the tools to be certain that the system is restored to proper operation, resulting in less downtime.

Communication Checks

All communication over the Ethernet between the Alpha Analyst and its host computer conforms to the ANSI/IEEE 802.2 Local Area Network Specification. This hardware and software protocol has rigorous requirements to ensure accurate data flow over your network.

A proprietary communication protocol is used between the Alpha Analyst System Controller and the attached Dual Alpha Spectrometers. It is built upon the widely used RS-485 hardware standard. All communication packets sent over this network use parity, checksums and byte counts for error checks.

Power On Sequence

When power is first applied to the instrument each Dual Alpha Spectrometer and the Controller go through an initialization step followed by self-check diagnostics. Communication is then established between the Controller and all Dual Alpha Spectrometers attached to it. Communication between the host computer and the Alpha Analyst begins when the instrument is selected with the “Change Instrument” command in the user interface

During the initialization sequence the LEDs on the Controller and the Dual Alpha Spectrometers will initially blink at a high rate. During the self-tests the Fault LED on the Controller will be ON continuously, then blink slowly (approximately once per second) until communication is established; it will then go OFF. After the Power On self-checks, the Fault LED on a Dual Alpha Spectrometers will be lighted only if there is a vacuum gauge failure or, if in the recoil suppression mode, the vacuum level falls below the tolerance of the recoil suppression range.

The results of the self-check diagnostics can be viewed using the ^D command through the Diagnostic Port described below.

Diagnostic Connector

This section and Table 2 describe signals, pinouts and protocol for the Alpha Analyst Controller’s RS-232 Diagnostic Function.

A rear panel 9-pin male D-type connector on the Controller supports a standard RS-232 interface that can be connected directly to a terminal or to a computer’s communication port.

Table 2 RS-232 Connector Pinout

Pin	Signal	Description
1	—	No Connection
2	TX	Transmit Data Out
3	RX	Receive Data In
4	—	No Connection
5	Gnd	Ground
6	—	No Connection
7	RTS	Request to Send In (No Function)
8	CTS	Clear to Send Out - Space (High)

9	—	No Connection
Shield	Gnd	Ground

Communication Protocol

Table 3 lists the <Ctrl>XXX commands supported by the Interface. The command mode is normally not active and must be enabled by sending the ASCII string:

```
<Esc><Esc>^UASCDEBON3F
```

The response is:

```
ASCII Command Set ENABLED
```

The Diagnostic Interface defaults to a transmission rate of 19.2 kbps with a word size of 8 data bits, No parity and 1 Stop bit. The interface can operate at rates of 1200, 9600, 38 400, 57 600 or 115 200. To set the rate, repeatedly send, at the desired baud rate, the command string that enables communication from the interface as a Synchronizing string until a proper response is transmitted from the Controller; this new transmission rate will be in effect until power is cycled or the string is sent at a different rate.

<Esc> is the Escape character and ^ corresponds to the <Ctrl> function for the U character. To disable the diagnostic, send the ASCII string:

```
^UASCDEBOF37
```

The response is:

```
ASCII Command Set DISABLED
```

Table 3 ASCII Command Set Available Through the Diagnostic Port

CTRL_A	Help screen
CTRL_D	Diagnostic Results
CTRL_E	Erase Local Screen
CTRL-F	Disable Host Comm. view, CTRL-N to enable
CTRL_H	Help screen
CTRL_L	Display Communication Registers
CTRL-N	Enable Host Comm. view, CTRL-F to disable
CTRL_P	Run all power-up diagnostics (Note: Will disrupt host communication)
CTRL_Q	Display controller flash header
CTRL_S	Display current ownership

CTRL_V	Display Application Revision Levels
CTRL_Z	Reset Communication Counters and faults

NOTE The following commands were provided for Engineering development only; their use may cause unpredictable results.

CTRL_G	Brief summary of on-line inputs' status
CTRL_I	Toggle Acquisition command view
CTRL_J	Toggle Input Comm. view
CTRL_R	Toggle between VR- and non-VR-Mode
CTRL_T	Enable valve monitor, CTRL-W to disable
CTRL_U	Command Mode
CTRL_W	Disable valve monitor, CTRL-T to enable
CTRL_X	Toggle Multicast Reception
CTRL_Y	Synch Character (echoes ^Y)

Commands and Responses

The following subsections include a brief description of and the typical response for each of the supported commands.

CTRL_A/CTRL_H - Help Screen

Table 4 Help Display

CTRL_A	Help screen
CTRL_D	Diagnostic Results
CTRL_E	Erase Local Screen
CTRL-F	Disable Host Comm. view, CTRL-N to enable
CTRL-G	Brief summary of on-line inputs status*
CTRL_H	Help screen
CTRL_I	Toggle Acquisition command view*
CTRL_J	Toggle Input Comm. view*

Table 4 Help Display

CTRL_L	Display Communication Registers
CTRL-N	Enable Host Comm. view, CTRL-F to disable
CTRL_P	Run all power-up diagnostics (Note: Will disrupt host communication)
CTRL_Q	Display controller flash header Toggle between VR- and non-VR-Mode (and rescan of* Inputs)
CTRL_S	Display current ownership
CTRL_T	Enable valve monitor, CTRL_W to disable (use with* external utility)
CTRL_U	Command Mode* Supported variations of CTRL_U command: ^UASCDEBON3F Enables ASCII Command mode ^UASCDEBOF37 Disables ASCII Command mode
CTRL_V	Display Application Revision Levels
CTRL_W	Disable valve monitor, CTRL_T to enable*
CTRL_X	Toggle Multicast Reception*
CTRL_Y	Synch Character (echoes ^Y)*
CTRL_Z	Reset Communication Counters and faults
*Reserved	

CTRL_D - Display Diagnostic Results

This command shows the results of the latest diagnostic test. This is always performed when power is turned ON and can also be executed by the <Ctrl> P (^P) command. This command should not be given while the host computer is controlling the system. References to Input is synonymous with Dual Alpha Spectrometer. The Input numbers are 1 through 24 corresponding to Chassis 1 through 4 and Dual Alpha Spectrometer 1 through 6 in a Chassis; for example, Input 1 = Chassis 1 Slot 1, and Input 15 = Chassis 3 slot 3.

Brief Description of the Diagnostics

Controller ROM Diagnostics

This test is performed in the bootstrap code in PROM. The flash EEPROM's application sectors are tested for their validation bits and checksums.

Controller RAM Diagnostics

The Ethernet controller's (SNIC) data buffer and ADC's data memory are tested using a basic read-complement-write algorithm. The value displayed is the address (Hex) where the testing stopped. In case of Fail the value represents the failing address. In case of Pass it represents the total amount of RAM.

Controller SNIC LB1-LB3 Diagnostics

These are the Ethernet Interface's (SNIC) Loopback tests levels 1 through 3. Each test verifies that the test packet is sent and received error free. The text adjacent to the LB3 result is the Ethernet hardware being used (Thinwire or AUI).

Controller UART1 and UART2 LB Diagnostics

Loopback test for UART number 1 (communication port to Dual Alpha Spectrometers) and UART number 2 (Diagnostic port). The test places the UART in loopback mode then using both transmit and receive interrupts it verifies the proper transmission and reception of 80 characters.

Controller RAMPS Diagnostics

RAM power supply status. This test is reporting the state of the backup-power supply fail bit (PCS1-D2), where 1= Fail, 0= Pass. In case of fail the ADC data and time are reset at power-up.

Controller EXTPS Diagnostics

External power supply status. This test is reporting the state of the External Power Supply bit (PCS1-D6), where 1= Pass, 0= Fail.

Controller TIMERS Diagnostics

This test is verifying that the timers for chassis number 1, number 2, and number 3 are properly inserting time events into the ADC FIFO, and that the proper number of events have occurred. The test resets the FIFO register then waits for 1.0 seconds, registering all time events into the appropriate counters. The test verifies that each counter has 100 (64h) counts ± 3 . Chassis number 4 is handled by the timer in the microprocessor and is not included in this test. The fourth word verifies proper operation of three timers in the microprocessor chip; a response of "0AAA" is successful.

Controller's SUSPend Counter

This value represents the number of times the Input (Dual Alpha Spectrometer) has suspended the acquisition because its vacuum pressure value exceeded the acquisition limit. Must be reset using CTRL_Z.

Controller's HOLD Counter

This counter can be used to verify the integrity of Dual Alpha Spectrometer seals. The value represents how long the vacuum has been in the Acquire region since the Dual Alpha Spectrometer was last placed into HOLD. The upper vacuum limit is set in the MID editor as the Vacuum Acquire On setting. This counter's value is reset when HOLD is asserted and then incremented until the vacuum pressure rises to the upper vacuum limit. The counter registers in units of $256 \times 33.33 \text{ ms}$ (8.53 s).

Input ROM Diagnostic

This test recalculates the Dual Alpha Spectrometer main program's sector checksum in flash EEPROM and checks it against the stored value.

Input RAM Diagnostic

This test performs a basic read-complement-write check on the entire 256 byte memory array that resides within the processor chip of each Dual Alpha Spectrometer.

Input ADCA and ADCB Diagnostic

Here the SPI dual ADC (gauge ADC [ADCA] and the processor reference ADC [ADCB]) are tested to make sure they can each complete a conversion within 500 ms. If at any point the conversion takes longer than 500 ms that ADC will be dismissed from further usage and the diagnostic error will be set. If an error is found the failing Input will not be available to the Host computer; the Fault LED will blink. The Diagnostic result can be displayed through the Diagnostic port.

Input BIAS Diagnostic

This test verifies proper detector setting and monitoring. The detector's 12-bit bias DAC is set to 19510 representing 5.00 volts. Bias is then turned on and analog channel AN3 is read. Since AN3's full range is 0 through 117.90 V, a value of 11 is expected from AN3. The test verifies that AN3 reads 11 ± 1 .

Note: This test restores the on/off state of the bias supply but not the original value.

Input PREF Diagnostic

This test verifies the processor reference voltage by first calibrating then reading the 12-bit VREF ADC. A value of 2.000 V $\pm 1\%$ is expected. The test always recalibrates the ADC for usage by the gauge.

Input GREF Diagnostic

This test verifies the gauge reference voltage by reading analog channel AN4. A value of 2.500 V $\pm 1\%$ is expected.

Input ± 15 , +5 Diagnostic

This test checks for proper voltage readings from the power-supply monitors AN5, AN6, and AN7. All voltages are checked for $\pm 5\%$ tolerance. Equations used are as follows:

$$V+15 = 3.938 * AN5 \text{ (3.810 V is nominal)}$$

$$V+5 = 1.249 * AN6 \text{ (4.004 V is nominal)}$$

$$V-15 = AN7 * 2.656 - V+15 * 1.656$$

Input GTBL and GPAR Diagnostics

The GTBL diagnostic calculates the checksum of the gauge table and verifies it against the stored value. The GPAR checks for programmed values for both the gauge gain and offsets, as well as a non-zero gain. If an error is found the failing Input will not be available to the host computer; the Fault LED will blink. The Diagnostic result can be displayed through the Diagnostic port.

Input EEPR Diagnostic

This test verifies those values held in EEPROM as being in the proper range. These are used by the valve control algorithms for valve timing. If the test finds inconsistency in the values, it reinitializes them to default values and sets the diagnostic error.

Table 5 Typical Readout where P= Pass, F= Fail

Controller Diagnostic Results

ROM:	P
RAM:	P 80000000
SNIC LB1:	P
SNIC LB2:	P
SNIC LB3:	P ThinNet
UART1 LB:	P
UART2 LB:	P
RAMPS:	P
EXTPS:	P
TIMERS:	P 0064 0065 0065 0AAA

Input Diagnostic Results

INP#	00000000011111111122222
Diag	123456789012345678901234
+++++	_____
ROM:	P.....
RAM:	P.....
ADCA:	P.....
ADCB:	P.....
BIAS:	P.....

PREF:	P.....
GRES	P.....
+15V:	P.....
-15V:	P.....
+5V:	P.....
GTBL:	P.....
GPAR:	P.....
EEPR:	P.....

Other Counters

INP#	SERIA L#	SUSP	HOLD
01:	123408 95	0007	0000

CTRL E - Erase screen

Erases local screen

CTRL_F - Host communication view OFF **CTRL_N - Host communication view ON**

This function can monitor Ethernet communication on all recognized commands between the Host and the Controller. This is not normally desirable to have this monitor enabled because it does delay responses to the Host, but it may be useful to view this for diagnostic purposes. RX is the received command and TX is the response by the Controller.

Table 6 Typical Readout of Host Communication

Host Comm. View Enabled

RX:

[illegible]

TX:

```
FFFE5A00AA0004005B040000AF0001FA0045AAA030000AF0A81F26603AF01
00000200000000000000202020202020201D0000000000000000001013400000
```

RX:

210240000100AF000000AA00040056040029AAA030000AF1181F26603AF0100
0004000000000000000000000000000000000000000000000000000000000000

TX:

```
FFFE5A00AA00040056040000AF0001FA0045AAA030000AF1181F26603AF01
00000200000000000000020202020202020201D000000000000000000010134000000
```

Host Comm. View Disabled

CTRL_L - View Communication Registers

It can be useful to display a snapshot of the counters associated with the Ethernet and Dual Alpha Spectrometer communication. The ^L command provides this capability. From the values presented a network manager can get a measure of network utilization and overall Ethernet operation of the Controller. These counters are cleared at power ON and by the ^Z command.

The first registers listed are the Ethernet Interface's (SNIC) registers or similar registers maintained by the Alpha Analyst Controller's microprocessor for the SNIC.

COL: Represents the number of network collisions.

ABT: Represents the number of times 16 consecutive transmissions each resulted in a collision.

CRS: Represents the number of times carrier is lost during transmission of a packet. Transmission is not aborted on loss of carrier.

FU: Represents the number of times the SNIC cannot gain access to the Controller's data bus before its transmit FIFO empties. Transmission of the packet will be aborted on each occurrence.

CDH: Represents the number of times the SNIC detected a failure of the Ethernet transceiver to transmit a collision signal after the transmission of a packet. This so-called Collision Detect Heartbeat signal is expected during the first 6.4 ms of the Interframe gap.

OWC: Represents the number of times a collision occurred after a slot time (51.2 ms).

CRC: Represents the number of times a packet was received with CRC or Frame Alignment error.

FAE: Represents the number of times a packet was received with both CRC and Frame Alignment errors.

FO: Represents the number of times the receive FIFO was not serviced causing overflow during reception. Reception of the packet was aborted.

MPA: Represents the number of times a packet intended for this address cannot be accepted because there was a lack of memory available for buffers or there is some other breakdown in the controller's internal communication.

OVW: Represents the number of times the receive buffer storage has reached its limit.

CNT: Represents the number of times any of the counters used to keep the network statistics reach overflow.

PKT: Represents the total number of messages that were received and processed.

The following are registers monitoring the operation of the Controller as well as its communication with the Dual Alpha Spectrometers.

TIM: Represents the time in 0.01 s resolution since the controller has been on.

FFU: Represents the number of times the ADC FIFO-FULL indication has been detected.

HFU: Represents the number of times the ADC FIFO-HALF-FULL interrupt has occurred.

TPE: Represents the number of errors detected while communicating with the Input.

TPR: Represents the maximum number of retries necessary to obtain a successful response from an Input.

TPZ: Represents the type of the last Input communication error that was encountered.

Table 7 Typical Readout of Communication Registers

Diagnostic Monitor

COL:	0000
ABT:	0000
CRS:	0000
FU:	0000
CDH:	0000
OWC:	0000
CRC:	0000
FAE:	0000
FO:	0000
MPA:	0000
OVW:	0000
CNT:	0000
PKT:	00000000
TIM:	00568D93
FFU:	0000
HFU:	0000
TPE:	0000
TPR:	0000
TPZ:	0000

CTRL_P - Execute all Diagnostics

This command executes both the controller's and each Dual Alpha Spectrometer's power-up diagnostics. Using CTRL_D the diagnostic results can be examined.

Note: This command should not be used while the instrument is on-line with the Host computer because the Host communication will not be honored during diagnostics and all parameters will be initialized.

Table 8 Readout of Execute Diagnostic Command

Controller Diagnostics

Powers...

Memory...

Timers...

UART 1...

UART 2...

Ethrn...

TSR: 03

RSR: 01

ISR: 02

Input Diagnostics

INP#: 01,

CTRL_Q - Display Controller Flash Header

This command displays the contents of the Controller's EEPROM that are loaded at the factory during configuration and test. This includes the programmed Ethernet address, serial number, ADC parameters, etc. A typical readout is shown in Table 9.

Table 9 Readout of Flash Header

Controller Parameters

EthAdrs: 0000AF0001FA
 EthFlag: FF
 Serial#: 06951234 FFFFFFFF
 Revs: FF FF FF FF
 AdcGain: 0C92
 AdcOffs: 07E0
 AdcLLD: 019A
 AdcULD: 0FFF
 Vals: FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
 Extra: FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF

CTRL_S - Display Module Ownership

If the Controller has been put in use by the Host computer, the Ethernet owner Id and Name are displayed by this command.

Module Owned: YES

Id: AA0004001904

Name: 2020202020202020

CTRL_V - Display Application Revision Levels

This command reports the application revision level for the controller and for each on-line Dual Alpha Spectrometer.

Table 10 Typical Readout of Firmware Versions

Application Version Level

Controller: 34

INP#	SERIAL#	VER#
01:	12340895	0023
02:	12350895	0023
03:	12360895	0023

CTRL_Z - Reset Diagnostic counters

This command resets all CTRL_L registers (with the exception of the time register) and FAULT LEDs. The response to this command is:

Diagnostic Counters Reset

Specifications

You can obtain a copy of the Alpha Analyst Integrated Alpha Spectrometer Super Spec Sheet located on Mirion Technologies' website.

C. Algorithms

This appendix describes how the calculations used by the Apex-Alpha Alpha Spectroscopy Software Suite are performed. Calculations performed by the Model S500 Genie 2000 Spectroscopy Software and the Model S509 Alpha Spectroscopy Option are documented in the *Genie Algorithms* chapter of the *Genie 2000 Customization Tools Manual*.

Normalized Absolute Difference

$$\text{NAD} = \frac{|S - D|}{\sqrt{\sigma_s^2 + \sigma_d^2}}$$

where

ND = Normalized absolute difference,

S = Sample result,

D = Duplicate result,

σ_s = Sample uncertainty,

σ_d = Duplicate uncertainty

Relative Error Ratio

$$\text{RER} = \frac{|S - D|}{\sqrt{2\sigma_s^2 + 2\sigma_d^2}}$$

where

S = Sample result,

D = Duplicate result,

σ_s = Sample uncertainty,

σ_d = Duplicate uncertainty

Relative Percent Difference

$$RPD = 100 \cdot \frac{|S - D|}{(S + D)/2}$$

where

RPD = Relative percent difference,

S = Sample result,

D = Duplicate result.

Matrix Spike

$$MSS\%R = \frac{100 \cdot (SSR - SR)}{SA}$$

where

SSR = Sample spike result,

SR = Sample result,

SA = Spike added.

$$SA = \frac{E \cdot V_c \cdot K}{Cf \cdot Q}$$

where

E = Activity concentration,

V_c = Volume of the control added to aliquot,

Cf = Conversion factor from Bq to mCi,

Q = Sample quantity,

K = Decay correction for control isotope.

where

$$K = e^{-\log(2) \cdot \Delta t / t_{1/2}}$$

and

$$\Delta t = \text{Sample Time} - \text{Certificate Time.}$$

If Sample Time is not specified by the user then Acquisition Time is used.

Correction Factors

Systematic Error: The systematic error value is passed to Genie algorithms to propagate systematic error. The value is stored in the parameter CAM_F_SSYSERR.

Random Error: The random error value is passed to Genie algorithms to propagate random error. The value is stored in the parameter CAM_F_SSYSTERR.

Generic Multiplier and Generic Divisor

These values are factored into the weighted mean activity result by applying them to the sample amount SQUANT in Genie. In this way errors are propagated correctly in the activity calculation.

$$s = \frac{(S \cdot y)}{(Q \cdot z)}$$

where

s = specific activity with correction factors applied,

S = total sample activity,

Q = sample quantity,

y = the multiplicative factor (generic x),

z = division factor (generic 1/x),

To work correctly with Genie algorithms, the factors are combined and stored in one CAM parameter, SQUANT.

$$\text{SQUANT} = \frac{(Q \cdot z)}{y}$$

Now

$$s = \frac{S}{\text{SQUANT}}$$

The original sample quantity, Q, is stored in CAM_F_SSP2,

The original sample quantity multiplication factor, y, is stored in CAM_F_SSP3,

The original sample quantity division factor, z, is stored in CAM_F_SSP4.

Control Recovery

The Control Recovery algorithm calculates the chemical recovery of a control sample. The Control Recovery engine allows up to three nuclides identified in a control certificate to be matched against results for NID.

It performs the following calculation for each nuclide:

$$C = A / A_c$$

where

A = activity of nuclide

A_c = certified activity of nuclide

$$A_c = (E * V_c) / (Cf * Q * K)$$

Here

E = Activity concentration from the certificate

V_c = Volume of the control added to aliquot

Cf = conversion factor from Bq to uCi

Q = sample quantity

K = decay correction for control isotope

The expression for the uncertainty σ_C in the recovery fraction σ_C is:

$$\sigma_C^2 = C^2 \left\{ \frac{\sigma_A^2}{A^2} + \frac{\sigma_{Ac}^2}{A_c^2} + \frac{\sigma_{V_c}^2}{V_c^2} + \frac{\sigma_D^2}{D^2} - \frac{\sigma_Q^2}{Q^2} \right\}$$

σ_A is the uncertainty of activity of nuclide line.

σ_{V_c} is the uncertainty of nuclide emission rate.

The percentage value of nuclide emission rate uncertainty in certificate file is σ_{Ac} / A_c .

σ_{V_c} is the uncertainty of control volume. Currently there is no such user input in control recovery setup dialog box. Since there is no CAM parameter for σ_{V_c} and it is not a big contributor to the total uncertainty, σ_{V_c} will be set to zero.

D is control isotope decay correction factor calculated as:

$$D = e^{-\ln(2) \cdot t_d / t_{1/2}}$$

Uncertainty contribution from D is calculated as:

$$\frac{\sigma_D^2}{D^2} = \left(\frac{\ln(2)}{t_{1/2}} \right)^2 \left\{ \left(\frac{t_d}{t_{1/2}} \right)^2 \sigma_{t_{1/2}}^2 + \sigma_{t_d}^2 \right\}$$

σ_{td} will be set to 0. Other values are same as those in control isotope decay correction factor calculation.

Q is user entered sample quantity.

σ_Q is user entered sample uncertainty.

The results, noted as C and σ_C above, is stored in CAM Parameters as shown in the table below along with the nuclide name.

CAM_F_NCLCTRLRECOV	Control recovery value 1
CAM_F_NCLCTLRECOV2	Control recovery value 2
CAM_F_NCLCTLRECOV3	Control recovery value 3
CAM_G_NCLCTRLRCVU1	Control recovery value uncertainty 1
CAM_G_NCLCTRLRCVU2	Control recovery value uncertainty 2
CAM_G_NCLCTRLRCVU3	Control recovery value uncertainty 3
CAM_T_NCLCNTROLS1	Control recovery nuclide name 1
CAM_T_NCLCNTROLS2	Control recovery nuclide name 2
CAM_T_NCLCNTROLS3	Control recovery nuclide name 3

D. Installing a Null Printer

Follow these steps to add a NULL printer to your Apex-Alpha system (under Windows 7).

1. Select your computer's Start button.
2. Select Control Panel.
3. Select Devices and Printers.
4. In Printer Tasks, select “Add a local printer”.

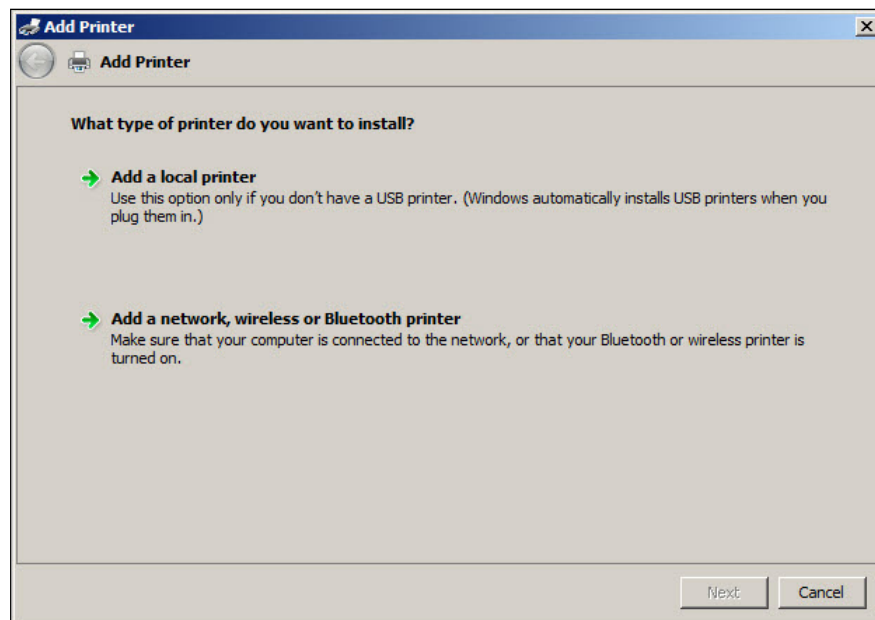


Figure 141: The Add Printer Wizard

5. Choose “Create a new port”. For the Type of port, choose Local Port. Select **Next**.

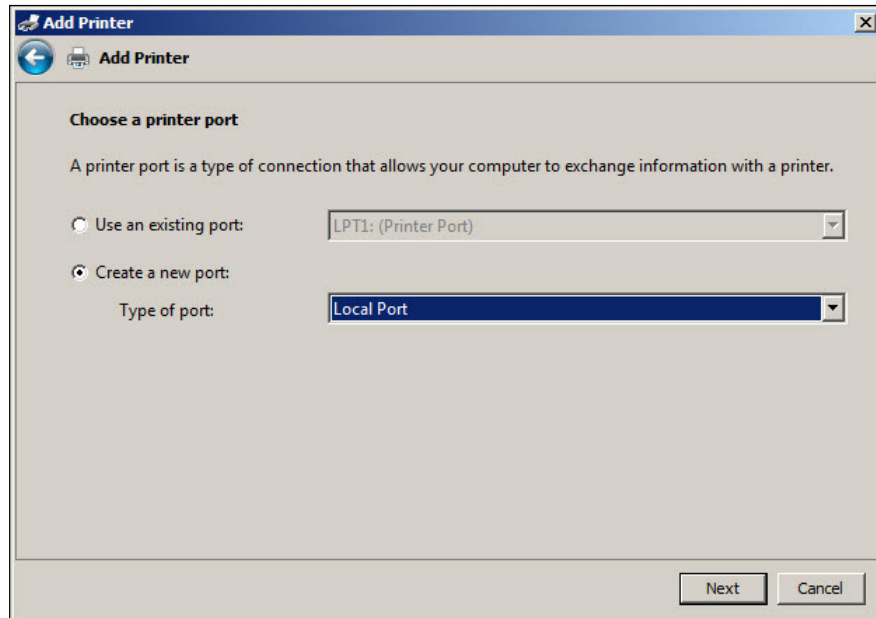


Figure 142: Select Local Printer

6. For the port name enter NUL:. Be sure to append a colon (:) to the printer name. This will create a printer that does not print anywhere. Select **OK**.



Figure 143: Create a New Port

7. Choose a printer driver. For example, **HP LaserJet 52000 Series PCL 5**. Select **Next**.

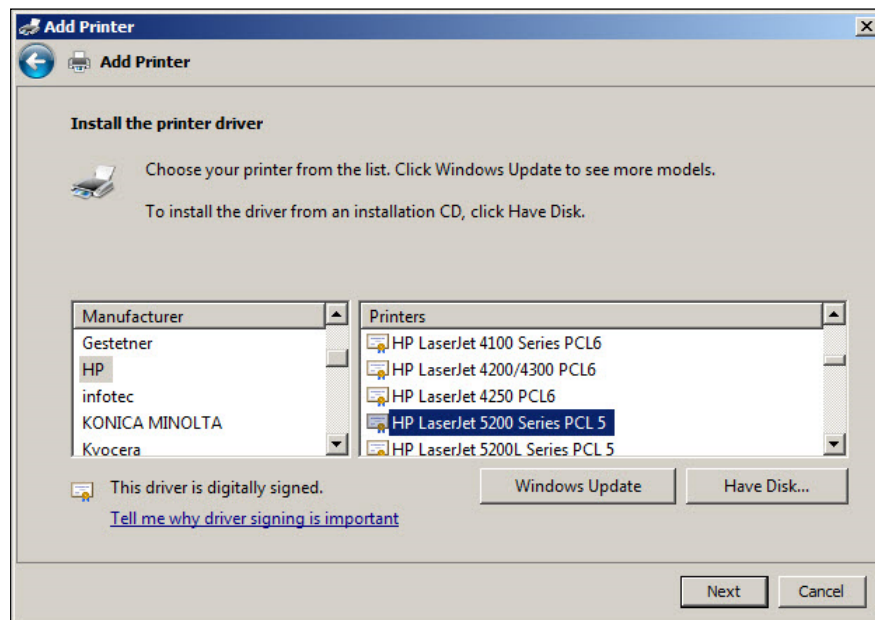


Figure 144: Naming the New Port

8. Enter a name for printer. Select **Next**.

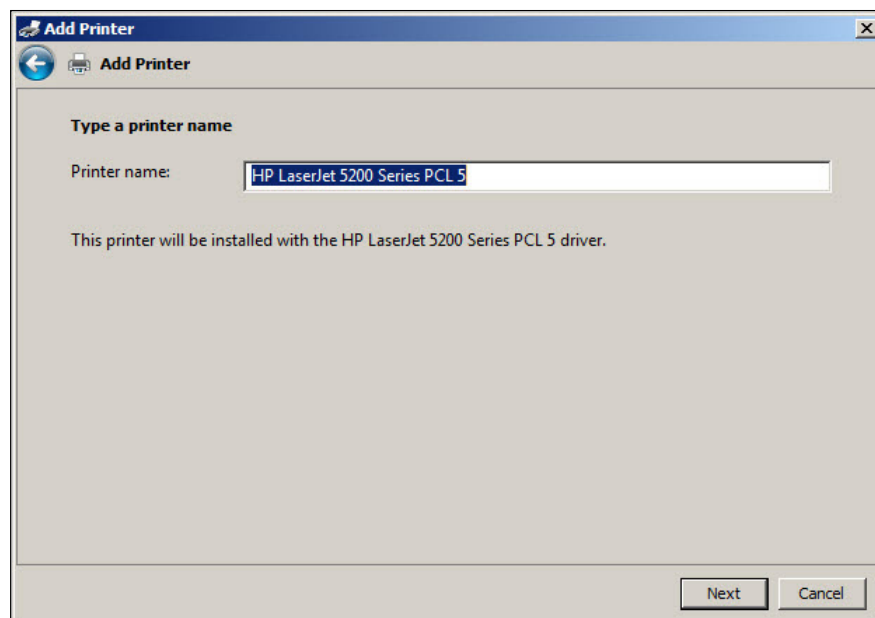


Figure 145: Choose a Printer Driver

9. Choose “Do not share this printer”. Select **Next**.

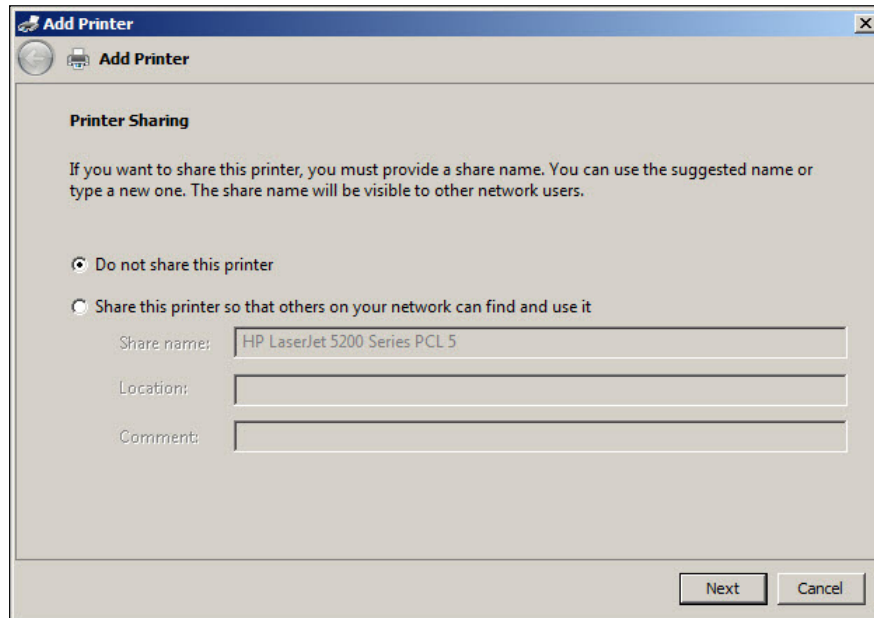


Figure 146: Name Your Printer

10. Select the “Set as the default printer” checkbox.

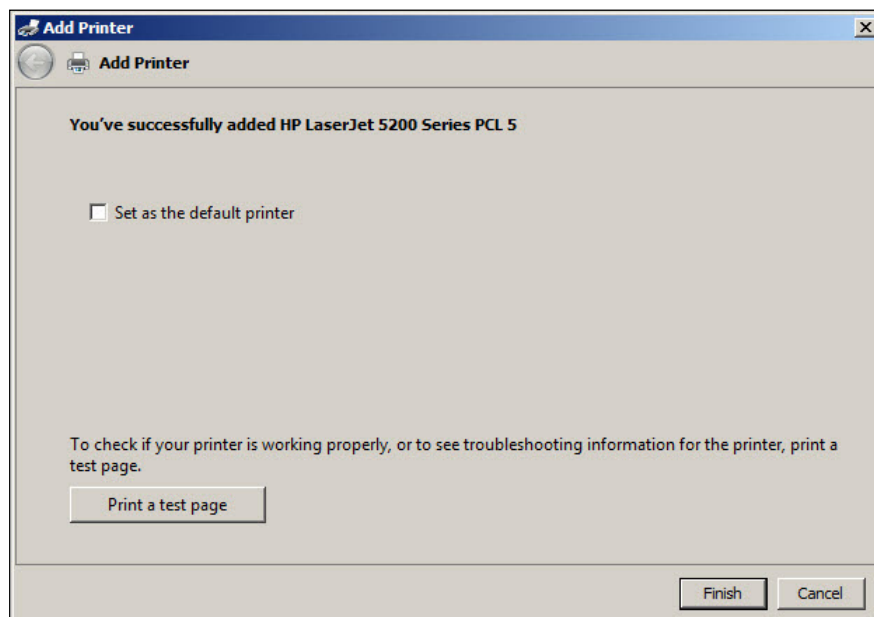


Figure 147: Don't Share This Printer

11. Click on the **Print a test page** button. The test page will now be sent to the null printer. Although nothing will print, you should not see any errors in the system tray.
12. Select **Finish**. This completes the Null Printer installation.

E. LIMS Integration

This appendix describes the setup and use of Apex-Alpha LIMS Integration.

Security Recommendations

To ensure the integrity of the Apex-Alpha database, it is highly recommended that a limited user (other than the “apexalpha”) be created to populate the staging tables. For most scenarios, the user should belong to a role with SELECT and INSERT permissions on the staging tables and SELECT permissions on the output view. By using a limited user, the possibility of inadvertent data loss is minimized. See your SQL administrator or IT manager for more information.

Staging Tables

Batches may be imported into Apex-Alpha via the staging tables, CI_AAM_IMPORTBATCH and CI_AAM_IMPORTSAMPLE.

CI_AAM_IMPORTBATCH		
Column	Required	Description/Notes
IMPORTBATCH_ID	n/a	Record identity column
IMPORTBATCH_NAME	Yes	Unique Batch ID from LIMS
IMPORTBATCH_PROCEDUREID	Yes*	The procedure used to count the batch. This defines what element (U, Pu, Th, etc.), ROIs and other counting parameters are used. *The user must populate one and only one of these fields.
IMPORTBATCH_PROCEDURENAME	Yes*	
IMPORTBATCH_USERID	No*	The Apex-Alpha login context for the imported batch. If neither field is populated, the Administrator will be used. *The user may populate one or neither of these fields.
IMPORTBATCH_USERNAME	No*	
IMPORTBATCH_STATE	Yes	Possible values are: amDefined = 0 - Batch is created/defined amQueued = 1 - Batch is ready for chamber assignment
IMPORTBATCH_DUPLICATEEQUATION	Yes	Possible values are: amRPD = 0 (default) - Relative Percent Difference amRER = 1 - Relative Error Ratio amNAD = 2 - Normalized Absolute Difference This is only used if “duplicate” samples are included in the batch.

CI_AAM_IMPORTBATCH		
Column	Required	Description/Notes
IMPORTBATCH_DESCRIPTION	No	Batch Description
IMPORTBATCH_DATECREATED	n/a	The date & time that the record is inserted
IMPORTBATCH_DATEPROCESSED	n/a	Populated when the batch is processed
IMPORTBATCH_STAGINGSTATE	Yes	Possible values are: Incomplete = 0, New = 1, ImportSucceeded = 2, Error = 3 New records should be inserted with 1. The importer will change the value to 2 or 3 when the record is processed.

CI_AAM_IMPORTSAMPLE		
Column	Required	Description/Notes
IMPORTSAMPLEID	n/a	Record identity column
IMPORTSAMPLE_NAME	Yes	Unique Sample ID from LIMS
IMPORTSAMPLE_BATCHNAME	Yes	Unique Batch ID of the batch to which this sample belongs
IMPORTSAMPLE_TYPE	Yes	Possible values are: Unknown = 0, Spike = 1, Duplicate = 2, LaboratoryControl = 3, TracerBlank = 4
IMPORTSAMPLE_QTY	Yes	Sample Aliquot Amount
IMPORTSAMPLE_QTY_UNCERTAINTY	Yes	Uncertainty in Sample Aliquot Amount
IMPORTSAMPLE_QTY_MMNT_UNITID	Yes*	Sample Quantity Units (mL, L, grams, etc) *The user must populate one and only one of these fields.
IMPORTSAMPLE_QTY_MMNT_UNITNAME	Yes*	
IMPORTSAMPLE_SHAREID	No*	ID of a shared sample entry. If this field is populated, it is a foreign key to the CI_SHL_SAMPLESHARE table. *The user may populate one or neither of these fields.
IMPORTSAMPLE_SHARENAME	No*	
IMPORTSAMPLE_CUSTOMERID	No*	ID of the customer to which this sample belongs. This ID is a foreign key to the CI_SHL_CUSTOMER table. *The user may populate one or neither of these fields. See further note below table.
IMPORTSAMPLE_CUSTOMENAME	No*	

CI_AAM_IMPORTSAMPLE		
Column	Required	Description/Notes
IMPORTSAMPLEID	n/a	Record identity column
IMPORTSAMPLE_POSITION	No	If populated, the values in this field must be unique for all samples within a batch.
IMPORTSAMPLE_MATRIXID	No*	Sample Matrix (soil, water, etc.) *The user may populate one or neither of these fields.
IMPORTSAMPLE_MATRIXNAME	No*	
IMPORTSAMPLE_TRACER_QTY	No	Tracer Amount
IMPORTSAMPLE_CONTROL_QTY	Yes	Control Amount
IMPORTSAMPLE_DESCRIPTION	No	Sample Description
IMPORTSAMPLE_REFUNK_SAMPLENAME	No	This is the reference sample used for calculating duplicate difference, for instance. It is required for samples of IMPORTSAMPLE_TYPE Spike or Duplicate, and must reference an Unknown sample from the same batch.
IMPORTSAMPLE_RECVRY_FCTR	No	External recovery for sample (> 0 and < 1.5). Only used if tracerless efficiency used.
IMPORTSAMPLE_RECVRY_FCTR_ERROR	No	Error associated with External recovery
IMPORTSAMPLE_SYSTEMATIC_ERROR	Yes	The systematic error value is passed to Genie algorithms to propagate systematic error.
IMPORTSAMPLE_RANDOM_ERROR	Yes	The random error value is passed to Genie algorithms to propagate random error.
IMPORTSAMPLE_DATE	No	Sample Date used for decay corrections, will default to current date at time of import.
IMPORTSAMPLE_GENERIC_MULT	Yes	Value factored into the weighted mean activity result as a multiplier.
IMPORTSAMPLE_GENERIC_DIVISOR	Yes	Value factored into the weighted mean activity result as a divisor.
IMPORTSAMPLE_USER_SAMPTYPEID	No*	ID of the customer to which this sample belongs. This ID is a foreign key to the CI_AAS_SAMPLE_TYPE table. *The user may populate one or neither of these fields. See further note below table.
IMPORTSAMPLE_USER_SAMPTYPENAME	No*	
IMPORTSAMPLE_STAGINGSTATE	Yes	Possible values are: Incomplete = 0, New = 1, ImportSucceeded = 2, Error = 3 New records should be inserted with 1. The importer will change the value to 2 or 3 when

CI_AAM_IMPORTSAMPLE		
Column	Required	Description/Notes
IMPORTSAMPLEID	n/a	Record identity column
		the record is processed.

Only one of the fields

IMPORTSAMPLE_CUSTOMERID,

IMPORTSAMPLE_CUSTOMENAME,

IMPORTSAMPLE_USER_SAMPTYPEID,

IMPORTSAMPLE_USER_SAMPTYPENAME

may be populated for a given record.

There are many ways the staging tables can be populated, including Integration Services, DTS packages, Visual Basic, or VBScript. However this is accomplished, it is recommended that to ensure data integrity and reliable imports, INSERTs to the staging tables should be done atomically via a database transaction.

Configuration

To enable LIMS Integration, right-click on the **Service Manager** icon in the system tray and select the **Enable LIMS Integration** option from the context menu. When LIMS Integration is enabled, a check mark will appear next to the menu option.

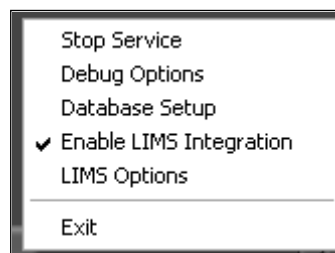


Figure 148: Service Context Menu

To adjust how often the staging tables are checked for new records, right-click on the **Service Manager** icon in the system tray and select **LIMS Options** from the context menu. The LIMS Options dialog will appear.

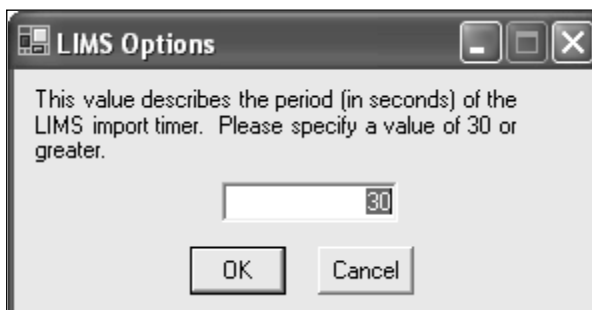


Figure 149: LIMS Options Dialog

Enter the number of seconds desired and click **OK** to close the dialog

Logging

Entries for the following events are created in the Apex-Alpha Event Log:

Import Start - occurs when LIMS Integration is enabled.

Import Stop - occurs when LIMS Integration is disabled.

Batch Import Success - batch import success (one event item per batch).

Batch Import Failed - batch import failure (one event item per batch).

See the *Event Log* on page 136 for more information.

In addition, after a batch has been imported, the `IMPORTBATCH_DATEPROCESSED` column will reflect the date and time when the batch was processed, and the `IMPORTBATCH_STAGINGSTATE` column will indicate whether or not the import succeeded.

Output View

The following example view is provided to retrieve data from Apex-Alpha for propagation back to LIMS. This can be used as a basis for the creation of custom view(s) as needed.

CI_AAV_SAMPLE_RESULTS		
Column	Nullable	Description/Notes
SAMPLENAME	No	Same as IMPORTSAMPLE_NAME
SAMPLE_DESCRIPTION	Yes	Same as IMPORTSAMPLE_DESCRIPTION
CAMFILENAME	Yes	Fully qualified path to associated CAM file for approved analysis.
APPROVED_ANALYSISID	Yes	Analysis ID for the approved sample analysis. Will be null if no approved analysis.
BATCH_NAME	No	Same as IMPORTSAMPLE_BATCHNAME
GEO_NAME	Yes	Name of geometry used to count sample.
PROC_NAME	No	Name of procedure used to count sample.
CHAMBERNAME	Yes	User friendly name of chamber sample counted on.
REMOTENAME	Yes	Detector ID of chamber sample counted on.
AA_CHAMBER_SERIAL_NUMBER	Yes	Serial number of chamber sample was counted on.
DETECTOR_SERIAL_NUMBER	Yes	Serial number of detector sample was counted on.
SAMPLESTATE	No	Possible values are: Defined = 0, Assigned = 1, Counting = 2, CountError = 3 Counted = 4, Analyzing = 5, AnalysisError = 6, Pending1stReview = 7, Pending2ndReview = 8, DoneApproved = 9, DoneRejected = 10
SAMPLESTATETEXT	No	Text version of the sample state.
ROIFILE	Yes	Fully qualified path for ROI file used in counting.
BACKGROUND_FILE	Yes	Fully qualified path for background file used in background subtraction.
BACKGROUND_NAME	Yes	Name of the sample used as background (this is the name of the sample that produced the background file).

CI_AAV_SAMPLE_RESULTS		
Column	Nullable	Description/Notes
REAGENT_BLANK_FILE	Yes	Fully qualified path for reagent file used in reagent correction.
REAGEANT_BLANK_NAME	Yes	Name of the sample used as reagent blank (this is the name of the sample that produced the reagent blank file).
SAMPLE_QTY	No	Sample Quantity (in terms of Sample Quantity Units).
SAMPLE_QTY_UNCERTAINTY	No	Sample Quantity Uncertainty (in terms of Sample Quantity Units).
SAMPLE_QTY_MEASUREMENTUNITID	No	ID of specified sample units.
SAMP_MMNT_NAME	No	Text value for sample units.
ASTIME	Yes	Sample Count Time
SAMPLE_DATE	Yes	User Specified sample collection time.
EREAL	Yes	Elapsed Real Time
ELIVE	Yes	Elapsed Live Time
LIBRARYFILE	Yes	Fully qualified path for library file used in NID.
TRACER_CERT_NAME	Yes	Fully qualified path for tracer certificate file used in tracer based activity calculation.
TRACER_QTY	Yes	Tracer quantity in mL.
SAMPLE_RECOVERY_FACTOR	Yes	External recovery factor, only valid if tracerless activity calculation used.
SAMPLE_RECOVERY_FACTOR_ERROR	Yes	External recovery factor error, only valid if tracerless activity calculation used.
PSEFF	Yes	Effective Efficiency (Eff*Chem Yield).
PSEFERR	Yes	Effective Efficiency Error
PSCHEMYIELD		Chemical Yield
PSDCHEMYIELD		Chemical Yield Error
DCALTIME		Efficiency calibration date/time.
AVRGEFF		Average efficiency.

CI_AAV_SAMPLE_RESULTS		
Column	Nullable	Description/Notes
AVRGEFFERR		Average efficiency error.
CONTROL_CERT_NAME		User specified name for control certificate.
CONTROL_CERT_CTF_FILE		Fully qualified path for control certificate file used in control recover and matrix spike recovery.
TOLERANCE		Peak search tolerance in either keV or FWHM depending on whether or not variable tolerance used. If variable tolerance used value will be in FWHM, if not it will be in keV
TOLERANCE_UNIT		Tolerance unit (see above).
ECOFFSET		Energy calibration offset in keV.
ECSLOPE		Energy calibration slope in keV/channel.
ECALTIME		Energy calibration date/time.
CNVGAIN		Conversion gain.
FWHMOFF		FWHM offset.
CITAIL1		Tail coefficient.
SYSTEMATIC_ERROR		User specified systematic error.
RANDOM_ERROR		User specified random error.
GENERIC_MULTIPLIER		User specified generic multiplier.
GENERIC_DIVISOR		User specified generic divisor.
FIRSTAPPROVALUSER		Name of first approver.
APPROVAL1_DATE		Date of first approval.
SECONDAPPROVALUSER		Name of second approver.
APPROVAL2_DATE		Date of second approval.
DUPLICATE_EQUATION		Duplicate equation used one of RPD = 0, //relative percent difference RER = 1, //error ratio NAD = 2 //normalized absolute difference

CI_AAV_SAMPLE_RESULTS		
Column	Nullable	Description/Notes
NCLOSRELDIF		Duplicate difference.
NCLCTRLRECOV		Control recovery.
NCLNAME		Nuclide name.
NCLWTMEAN		Weighted mean activity.
NCLWTMERR		Weighted mean activity error.
NCLWTMEANERR_PERCENT		Weighted mean activity percent error.
ACTIVITY_MMNT_NAME		Activity units.
NCLMDA		MDA for this nuclide.
NCLMDAERR		MDA error for this nuclide.
NCLMDAERR_PERCENT		MDA error percent for this nuclide.
PSENERGY		Peak energy.
PSAREA		Peak area.
PSCERR		% Error in area and counts/sec.
PSAMBBACK		Ambient background for this peak.
PSRBACK		Reagent background for this peak.
PSFWHM		FWHM in keV for this peak.
PSPTRACERPK		Is tracer peak (1 = yes, 0 = no).

F. Planning Forms

Apex-Alpha Group Security Rights

Security Rights	Group 1 Rights	Group 2 Rights	Group 3 Rights	Group 4 Rights
Calibration				
Allow Energy Calibration				
Allow Efficiency Calibration				
Hardware Adjust				
Certificates				
Certificate Editor				
Data Review				
Review Only				
Review and Reanalyze				
Approve Sample				
Second Approve Sample				
Allow Launch IPF From Data Review				
Sample Information				
Chambers				
Change Status				
Vacuum Control				
Import / Export				
Import Calibration / QA				
Nuclide Library				
Nuclide Library Editor				
Batches				
Create Batches				
Edit Batches				
Delete Batches				
QA				
QA Calibration or Pulser Check				
QA Edit				

Security Rights	Group 1 Rights	Group 2 Rights	Group 3 Rights	Group 4 Rights
QA Background or System Bkg				
Manual QA				
Printing				
Print Sample / Calibration Unapproved Results				
Print Sample / Calibration Approved Results				
View / Print Event Logs				
Sample Counting				
Allow Sample Counting				
Terminate Sample Count				
Terminate Any Sample Count				
System Setup				
General Setup				
Display Group Management				
Analysis Sequence File Editor				
Create / Edit Sample Types				
Procedure Editor				
Edit Display Defaults				
Archival				
Archive Batches				
Restore Archived Batches				
Delete Batches				

Sample Units

[illegible]

Base units for weight is Kg.

Base units for volume is Liters.

Matrix Type

List the different forms of matrices desired to count and/or track within QA functions. Typical examples are water and soil.

[illegible]

Devices

Device Name:					
Remote Workstation Name:					
Device Address:					
Device Type:					
Controlling Workstation:					
Chamber Name	Remote Name	Chamber Serial #	Detector Serial #	Import Calibrations?	Import QA

Note: Once a Genie 2000 detector has been defined for use in Apex-Alpha, the name you assigned to it in Genie 2000 cannot be changed

The computer name must be 8 characters or less.

Display Groups

Display Group Name: _____

Chamber	Device	Input Name

Display Group Name: _____

Chamber	Device	Input Name

Certificates

Name	Tracer	QC	Calibrations	Import

Name must be unique.

All other boxes should be checked if they apply to that certificate.

Libraries

Library Name: _____

Isotope	Half Life	Energy KeV	Abundance (%)	Key Line? (Y/N)

Library Name: _____

Isotope	Half Life	Energy KeV	Abundance (%)	Key Line? (Y/N)

Library Name: _____

Isotope	Half Life	Energy KeV	Abundance (%)	Key Line? (Y/N)

Isotope	Half Life	Energy KeV	Abundance (%)	Key Line? (Y/N)

Note: Library name is used when identifying “Element”.

Counting Geometries

Alpha Analyst ID: _____

[illegible]

Note: Vacuum mode can be with recoil suppression or without.

Elements

Enter the name of the tracer, LCS, Nuclide Library, and Matrix associated with the Element Name. Remember not all procedures may use each of the variables. Only indicate on this form those used.

[illegible]

Region of Interest (ROI) Creation

ROI Name must be unique for each element, isotope start and end channel, and tracer combination.

Typically, the tracer peak will be a different region “Type: to delineate visually as the tracer peak”.

The different region types are defined as:

- Type 1: Non interfered with library peaks
- Type 2: Non interfered with unknown peaks
- Type 3: Interfered with library peaks
- Type 4: Interfered with unknown peaks.

ROI File Name: _____

Isotope	Start Energy	End Energy	Region Type (1,2,3, or 4)	Tracer (Yes)

ROI File Name: _____

Isotope	Start Energy	End Energy	Region Type (1,2,3, or 4)	Tracer (Yes)

ROI / Sum Directed Parameter Setup

All fields need simply a check mark if they apply to the set except for the Parameter Set ID and ROI file name

ROI/Sum directed Analysis Parameter Sets		#1 Set	#2 Set	#3 Set	#4 Set
	Parameter Set ID				
	ROI File Name				
Peak Search Parameters (MEV)					
	Energy or				
	FWHM				
Peak Area Parameters					
	95% Critical level Test				
	Rejected Zero Area Peaks				
Activity Calculation					
	Tracer or				
	Tracerless				
Decay Correct During Count					
	Off				
	On				
Interferences					
	None or				
	Tracer Blank				
MDA Calculation					
	Off				
	Curie				
	KTA				
	Other				
MDA Constants					
	Add				
	Multiply				
	Confidence Factor				

ROI File Type = 1,2,3,

Procedure Setup

Procedure ID: _____
 Procedure Description: _____

Geometry		
Element		
	Tracer Solution Cert.	
	LCS / Spike Cert.	
	Nuclide Library	
	Matrix	
ROI Sum Directed		
ASF Directed		
Count Time		
	Tracer Peak Area (Y/N)	
Report Options		
	Report Profiles	
	Section Name	
	Activity Units	
	Error Multiplier	
Print Options		
	Select Printer	
	No. of Copies	
	Auto Print Report	
	Print Spectral Plot	
	Print Channel / Count Report	

QA Procedures

Procedure ID: _____

Description: _____

Geometry: _____

ROI Sum Directed or ASF Directed: _____

Parameter Name	Energy	Unit Conversion	– Sigma Test	User Driven Test	Upper Boundary	Lower Boundary	Trend Test

Procedure ID: _____

Description: _____

Geometry: _____

ROI Sum Directed or ASF Directed: _____

Parameter Name	Energy	Unit Conversion	– Sigma Test	User Driven Test	Upper Boundary	Lower Boundary	Trend Test

Procedure ID: _____

Description: _____

Geometry: _____

ROI Sum Directed or ASF Directed: _____

Parameter Name	Energy	Unit Conversion	– Sigma Test	User Driven Test	Upper Boundary	Lower Boundary	Trend Test

Sample Types

Sample Type: _____
Sample Type Description: _____
Project ID : _____
Contact Name : _____
Organization : _____
Telephone : _____
Email Address: _____
Special Requirements: _____

Sample Type: _____
Sample Type Description: _____
Project ID : _____
Contact Name : _____
Organization : _____
Telephone : _____
Email Address: _____
Special Requirements: _____

Sample Type: _____
Sample Type Description: _____
Project ID : _____
Contact Name : _____
Organization : _____
Telephone : _____
Email Address: _____
Special Requirements: _____

Sample Type: _____
Sample Type Description: _____
Project ID : _____
Contact Name : _____
Organization : _____
Telephone : _____
Email Address: _____
Special Requirements: _____

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