GVAutomationPack

GammaVision Productivity Add-On

Version 1.4

Software User's Manual

Advanced Measurement Technology, Inc.
a/k/a ORTEC®, a subsidiary of Ametek®, Inc.

WARRANTY

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INSTANT INSTALLATION

Insert the GVAutomationPack CD-ROM and the setup process should automatically begin. If the program does not automatically start, then run the setup program from the installation CD. (i.e. D:\GVAutomationPackInstall.exe)

NOTE: If GVAutomationPack is supplied with the full version of Global Value then run the installation program from the GVAutomationPack subdirectory on the Global Value installation disk.

Use of the default installation directory is recommended because the examples and templates loaded during installation refer to this directory. If a different directory is selected, then the path to the Sample Defaults Files (SDF) and Job Templates must be modified in the Counting Sequence Setup described in Section 4.

1. PROCESS OVERVIEW

GVAutomationPack is a utility program that operates in conjunction with GammaVision to provide a simple interface for data entry and sample analysis. It can be used for relatively straightforward analysis routines, including operation of an Automatic Sample Changer (ASC), or any of the robust automation features available within GammaVision or Global Value. This section provides an overview of how these features are related and implemented.

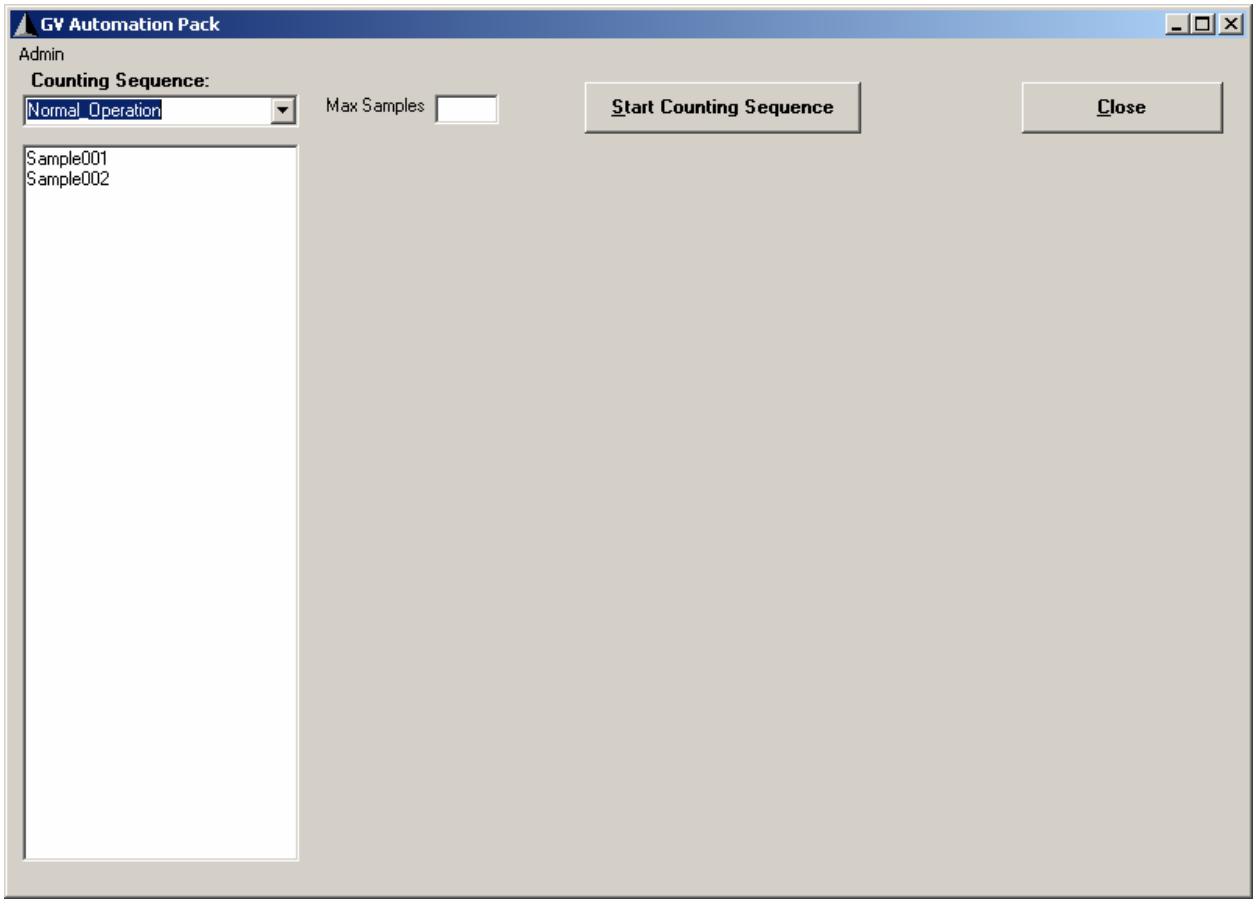

Figure 1.1, GV Automation Pack Main Screen

In GVAutomationPack the highest level component is the **Counting Sequence**. Each Counting Sequence consists of a series of "routines" which can be defined as individual samples, automation functions, etc. (see Fig. 1.1). In this example, the Counting Sequence "Normal_Operation" has two routines in the list called Sample001 and Sample002.

Selecting each of the list items will display the data entry fields specified for that item in the Counting Sequence Setup (see Section 4). This method allows the administrator to specify which fields are displayed for Operator input for each sample while specifying static entries for fields only available to the administrator. Figure 1.2 shows the Operator input fields for Sample001 and Sample002 respectively.

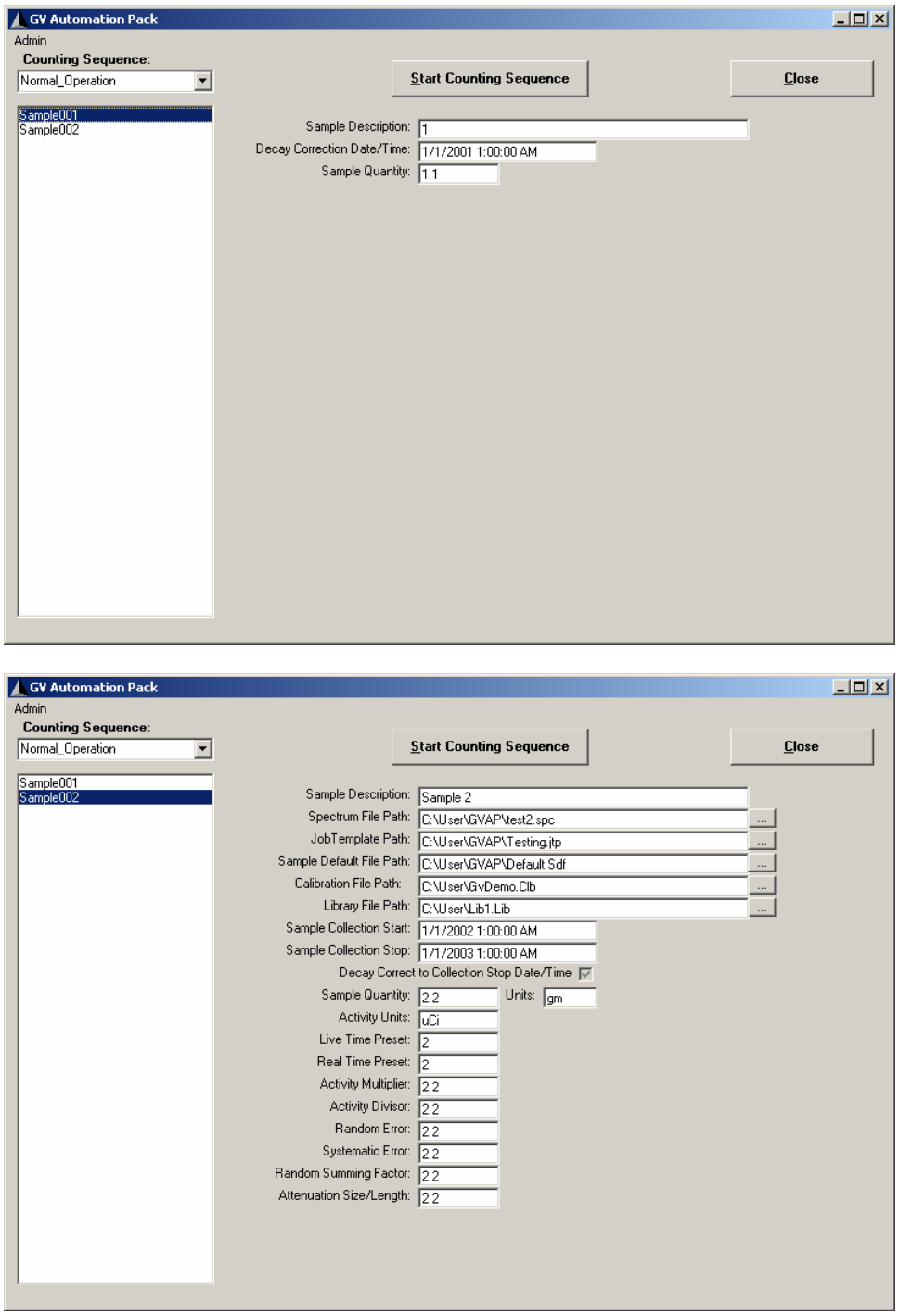

Figure 1.2, Data Entry Fields

After data entry is completed for each item in the list, clicking on the **Start Counting Sequence** button creates Job Files for each list item and then launches GammaVision to execute the Jobs. Creating the Job Files requires three key components defined for each item: a Job Template, a Sample Default File (SDF), and a list of analysis parameters set in GVAutomationPack fields. The Sample Description and a Spectrum File Name can also be specified and applied during the Job File process.

The Job run by GammaVision is identical to the Job Template specified for the list item except that special code parameters are replaced with valid Job commands to set the Sample Description, update the SDF file with analysis parameters specified in GVAutomationPack fields, and set the spectrum file name. The special code parameters and Job commands are discussed in more detail in Appendix A and the GammaVision Manual.

The SDF contains numerous parameters used for spectrum analysis. Most of these parameters are predefined for a particular type of sample, however it is useful to modify some of these parameters during the analysis process or define them in a common interface to minimize the number of SDF files to manage. The parameters that can be modified and applied during execution of the Job file using GVAutomationPack are discussed in Section 4, Counting Sequence Setup. The utility used to update the SDF file is discussed in more detail in Appendix B.

2. GETTING STARTED

GVAutomationPack is a powerful automation utility that requires very little setup to get started, particularly if GammaVision has already been in use. The overall process is described as follows:

1) Create SDFs in GammaVision to define analysis parameters. (Refer to GammaVision Manual)
2) Create Job Templates. (Refer to Appendix A and the GammaVision Manual)
3) Define Initialization Parameters. (Refer to Section 3)
4) Setup Counting Sequences. (Refer to Section 4)
5) Run the Counting Sequence to verify performance.

3. INITIALIZATION PARAMETERS SETUP

Initialization Parameters are sensitive program settings that are password protected. When selecting **Admin\Initialization Parameters Setup** from the menu, a prompt for a password will be displayed. The default password is “admin” and may be changed after entering a valid password. After entering a valid password, the **Initialization Parameter Editor** will be displayed as shown in Fig. 3.1. The fields on this editor define where integrated program files are located, the prefix for items in a sequence list, and the Administrator password.

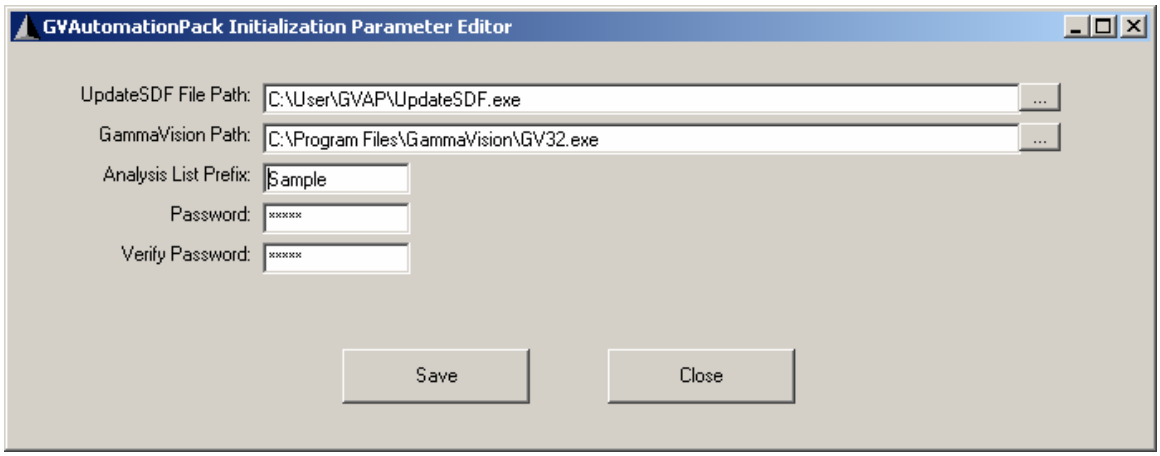

Figure 3.1, Initialization Parameter Editor

UpdateSDF File Path: The UpdateSDF program, which is described in detail in Appendix B, is installed in the same directory as GVAutomationPack. If the default directory is used during installation, the file path will not need to be changed. If a different installation directory was used, then select the search button to open a browse dialog and locate the program “UpdateSDF.exe”. When saving changes, a validation is performed to ensure that the file exists in the specified path.

GammaVision Path: GVAutomationPack is an add-on product that launches GammaVision to run automation routines, analyze spectra, and generate reports. As such, GVAutomationPack must know where to find the GammaVision program (GV32.exe). If the default directory was used during installation of GammaVision, the file path will not need to be changed. If a different installation directory was used, then

select the search button to open a browse dialog and locate the program “GV32.exe”. When saving changes, a validation is performed to ensure that the file exists in the specified path.

Analysis List Prefix: This field defines the names of the Counting Sequence List items. Each item is listed as the Analysis List Prefix followed by the list item number formatted to three digits (i.e. Sample001).

Password / **Verify Password:** These fields are used to modify the Administrator password and must be identical. The text is displayed as a series of “*” to hide the underlying characters.

4. COUNTING SEQUENCE SETUP

A Counting Sequence is a set of automation and analysis instructions that are passed to GammaVision for execution. The instructions are defined by Job File Templates and Sample Default Files which are further described in Appendix A and the GammaVision Software Manual. Each list item in the sequence can be a fully functional analysis routine for individual samples or individual instructions that can be combined to form a single analysis routine.

When selecting **Admin\Setup Counting Sequence** from the menu, a prompt for a password will be displayed. The default password is "admin" and may be changed using the **Initialization Parameter Editor**. After entering a valid password, the **Counting Sequence Setup** window shown in Fig. 4.1 will open.

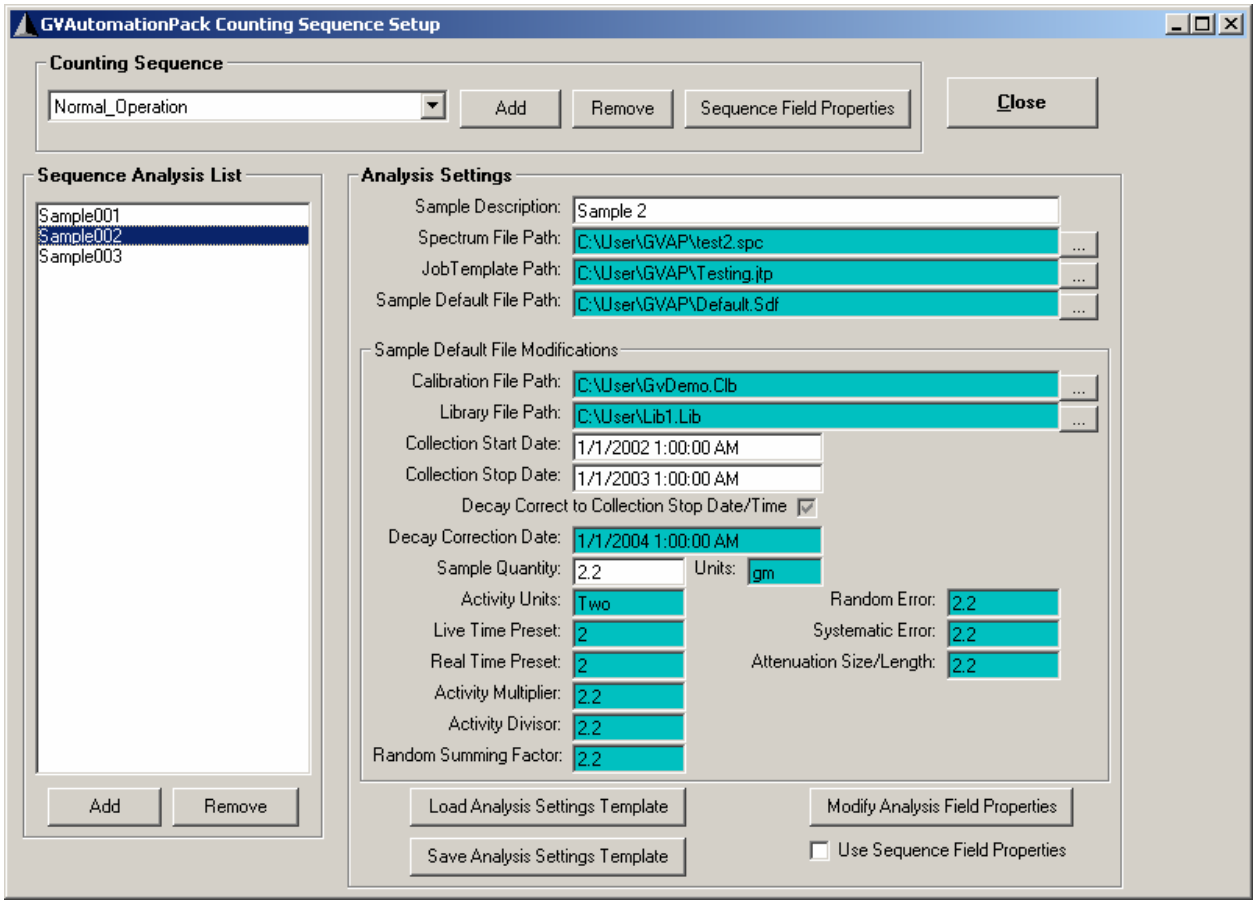

Figure 4.1, Counting Sequence Setup

The Counting Sequence Setup window is laid out in three component sections: Counting Sequence, Sequence Analysis List, and Analysis Settings. The highest level component is the Counting Sequence. Each Counting Sequence contains a list of process items to perform (Sequence Analysis List) when this sequence is executed. The specific actions to perform for each list item are defined in the Analysis Settings.

NOTE: All changes described below are automatically saved in a database.

- **Counting Sequence** section

In this section, new sequences can be **Add**ed or **Remove**d using the associated buttons. The administrator can also define which fields are visible to the analyst by setting the **Sequence Field Properties** as shown in Figure 4.2. Only those fields selected will be accessible by the analyst; all other fields are hidden on the main analysis screen. In the Counting Sequence Setup window however, the fields hidden from the analyst are highlighted in teal. These fields are accessible to the administrator to allow setting certain parameters in advance and protecting them from changes by the Operator.

The "Auto Set Decay Correction to Sample Collection Stop" option automatically sets the Decay Correction Date/Time to match the Sample Collection Stop Date/Time. This option requires the Sample Collection field to be visible to the analyst, but the Decay Correction field may be hidden to simplify the analysis interface. Select **Save** to apply changes to the selected Counting Sequence or Close to discard changes.

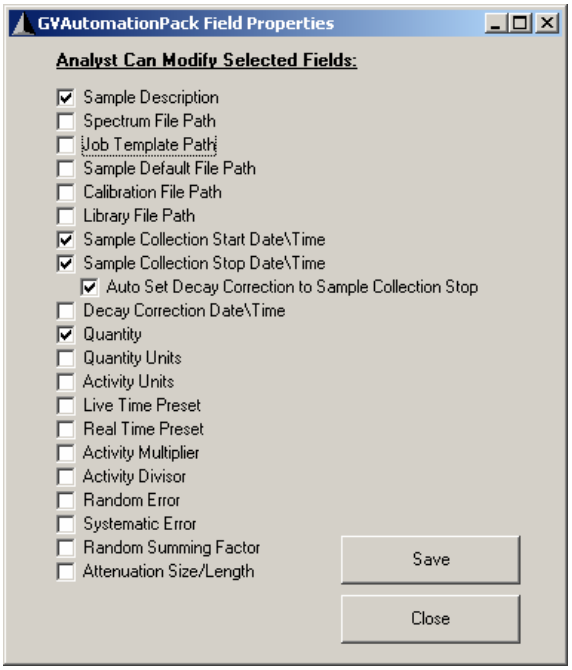

Figure 4.2 Field Properties

- **Sequence Analysis List** section

List items are **Add**ed or **Remov**ed from this list in a First-In, Last-Out order regardless of which item is selected. New items are appended to the bottom of the list with the name “Prefix000”, where Prefix is defined on the Initialization Parameter Editor and 000 is the sequential number of the item in the list. When removing list items, the last item on the list is always removed regardless of which one is selected.

- **Analysis Settings** section

Analysis Settings are simply a list of parameters that define what happens when each list item is executed. Fields highlighted in a teal color will not be visible by the analyst. By default, these field properties are determined by the field properties set for the Counting Sequence. However, the field properties can be modified for each list item independently. This may be necessary, for instance, when running a QC check in a specified location of an automatic sample changer tray. In this case, it may not be desirable to allow the analyst to modify the Decay Correction Date/Time as is normally allowed for samples. To set the Field Properties for a specific list item, uncheck “Use Sequence Field Properties” for that item as shown in Fig. 4.3. This will enable the Modify Analysis Field Properties button, which is used to access the Field Properties window shown in Fig. 4.2. Any changes made to the Field Properties are retained for the selected list item only. To change the list item’s field properties back to the Sequence defaults, simply recheck “Use Sequence Field Properties”.

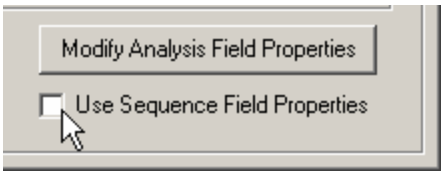

Figure 4.3, Use Sequence Field Properties

With the exception of the Job Template Path and the Sample Defaults File Path, all fields in the Analysis Settings section are optional. The Job Template contains the instructions that will be carried out when this list item is executed in GammaVision and is described further in Appendix A. The Sample Defaults File defines a set of analysis parameters and is described in detail in the GammaVision manual.

After establishing Sample Defaults Files in GammaVision, certain parameters will inevitably require changes during routine sample analysis. Most commonly these parameters will be the sample times and quantities. Simple changes to Preset times,

analysis units, calibrations, libraries, etc. may also be defined for each item in the list to avoid having to generate several Sample Defaults Files for minor changes.

Any changes to parameters in the "Sample Default File Modifications" section are permanently stored in the Sample Default File. Therefore, these changes will be used for subsequent analyses until changes are updated through execution of another list item, or the SDF is manually edited within GammaVision. Consequently, some of these parameters should either be specified in different SDFs and not modified using GVAutomationPack or explicitly set for each list item to ensure that the correct parameters are always used. If a parameter value is left blank, then no changes to that parameter are made in the SDF file. Also note that corrections for Sample Collection and Decay Correction are only performed if these options are checked in the SDF regardless of the date/time fields used in GVAutomationPack.

To simplify the process of defining Analysis Settings for multiple list items, the settings can be **Save**d as templates and then **Load**ed for use in any list item by using the buttons at the bottom of the Analysis Settings section. A dialog box as shown in Fig. 4.4 will be displayed to Open or Save the template file (.gva). By default these files are stored in the same directory as GVAutomationPack.

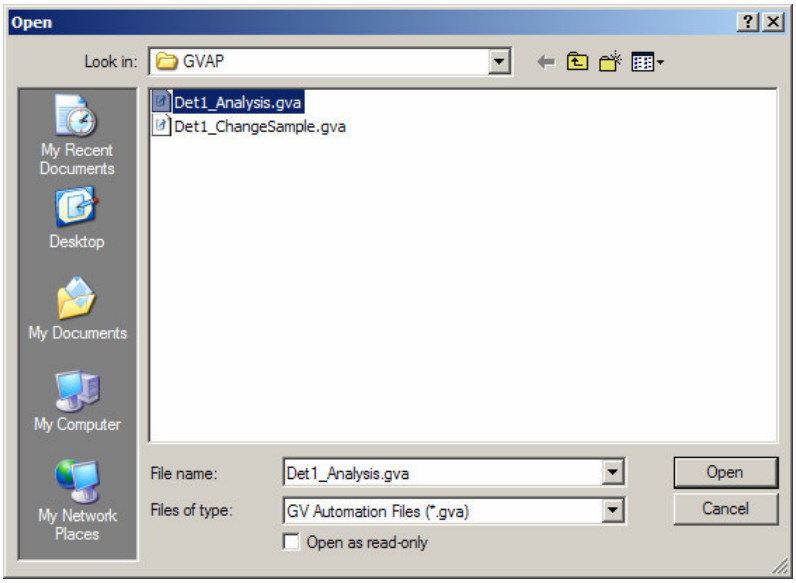

Figure 4.4, Open Analysis Settings File

5. RUNNING AN ANALYSIS SEQUENCE

Once the Analysis Sequence has been defined, running the sequence is a snap. From the main screen select an Analysis Sequence from the dropdown list. The associated tasks for this sequence will be displayed in the list. If there are fewer samples on the sample changer than the maximum number of samples established for the selected sequence then enter the actual number of samples in the **Max Samples** field to reduce the number of items in the list.

NOTE: For some applications the Job Template associated with the last sample in a sequence may have special commands (i.e. to reset the changer or perform other "clean-up" operations). For these applications it may be beneficial to allow the analyst to select the applicable Job Template when fewer than the maximum samples are loaded in the automatic sample changer.

For each list item, enter the sample information for each field defined by the administrator. Typically, this should only require a few entries for each item. Field data is validated and stored when subsequent list items are selected. After all information has been entered for each item, simply click on the **Start Counting Sequence** button.

When the counting sequence is started a series of GammaVision Job Files are created and GammaVision is launched to execute those files. After GammaVision is started it has complete control over data acquisition and analysis. If it is necessary to stop the analysis process at this point the Job must be terminated from within GammaVision.

Note that GVAutomationPack runs independent of GammaVision and remains open while GammaVision executes the analysis routine. This allows additional counting sequences to be launched simultaneously, each using a different instance of GammaVision, to perform analyses using different detectors. When the entire Counting Sequence is completed the last step in the Job file will close GammaVision.

Appendix A – Job File Templates

GVAutomationPack is an add-in utility for GammaVision that essentially generates a list of Job Files for GammaVision to execute during an analysis routine. These Job Files are defined by the end-user to perform a number of automation functions and are saved as Job Templates (.jtp) which can be edited using any text editor such as Notepad. Refer to the GammaVision Manual for an extensive list of Job Commands.

In addition to the functions provided by GammaVision, GVAutomationPack requires special parameters in Job Templates called **|GVAutomationCode|** and **|GVSaveSpectrum|.** These parameters are replaced by commands used to update the Sample Default File (using the UpdateSDF program described in Appendix B), set the Sample Description, and set the Spectrum File name as shown in the example below.

NOTE: Several examples are provided in the GVAutomationPack installation directory. The settings below assume that the following settings are used in GammaVision: 1) Npp32 is the selected analysis engine, and 2) Report Writer is used. These commands may require adjustment for your particular application.

Job Template Example

```
Set_Detector 1
Stop
Clear
Change_Sample
-------------------------------------------------------------------------------
NOTE:  The following code may be used in lieu of Change_Sample.  There is a two
       minute time-out associated with the Change_Sample and Wait_Changer
       commands so this method allows greater flexibility for sample changers
       that require more than two minutes to complete a cycle.  This code is
       omitted from the Job file described below for simplicity.
       ------------------------------------------------------
       Send_Message "set_output_high"
       Wait 5
       Send_Message "set_output_low"
       Wait 60
       Wait_Changer
       ------------------------------------------------------


NOTE:  This code is replaced with JOB text as described below.
-----------------------------------------------------------------
|GVAutomationCode|
-----------------------------------------------------------------

Start
Wait 2
Wait


NOTE:  This code is replaced with JOB text as described below.
-----------------------------------------------------------------
|GVSaveSpectrum|
-----------------------------------------------------------------

Wait 2
Analyze
Wait "C:\Program Files\GammaVision\Npp32.Exe"
Wait 2
Wait "C:\Program Files\ORTEC\GammaVision Report Writer\gvrpt32.exe"
```

Job File created by GVAutomationPack from this Template

```
Set_Detector 1
Stop
Clear
Change_Sample


NOTE:  This text replaces |GVAutomationCode|.
-------------------------------------------------------------
Run "C:\User\GVAP\UpdateSDF.exe C:\User\GVAP\Default.Sdf,
                                C:\User\GVAP\Normal_Operation_Sample001.txt"
Wait "C:\User\GVAP\UpdateSDF.exe"
Recall_Options "C:\User\GVAP\Default.Sdf"
Describe_Sample "Sample 1"
-------------------------------------------------------------


Start
Wait 2
Wait
NOTE:  This text replaces |GVSaveSpectrum| based on the file name
       Specified in the GVAutomationPack Analysis Settings field.
       Invalid file characters will generate an error and the job
       will be stopped by GammaVision.
-------------------------------------------------------------
Save "C:\User\Sample 1.spc"
-------------------------------------------------------------
Wait 2
Analyze
Wait "C:\Program Files\GammaVision\Npp32.Exe"
Wait 2
Wait "C:\Program Files\ORTEC\GammaVision Report Writer\gvrpt32.exe"
```

Appendix B - UpdateSDF Utility

UpdateSDF is used to update Sample Defaults Files (SDF) with analysis information from an Analysis Information File which is described below. This file is generated by GVAutomationPack for each item in the Counting Sequence Analysis List when a Counting Sequence is initiated.

UpdateSDF requires the SDF File Path and Analysis Information File Path as comma delimited command line arguments. The program and associated files can reside in any directory. The following Job File example assumes that the program and files are all stored in the "C:\User" directory. Note that the SDF is loaded into memory after waiting for UpdateSDF to complete. This code is automatically generated by GVAutomationPack using Job Templates as described in Appendix A.

```
…
Run "C:\User\UpdateSDF.exe C:\User\Default.Sdf, C:\User\SampleParameters.txt"
Wait "C:\User\UpdateSDF.exe"
Recall_Options "C:\User\Default.Sdf"
…
```

Analysis Information File Format:

Each line of the Analysis Information file should contain the Parameter, a Colon, and the Parameter Value. The following list shows all available parameters in an acceptable format.

```
CollectionStart: 12/31/2002 12:00
CollectionEnd: 12/31/02 23:59:59
LiveTime: 200
RealTime: 300
Weight: 7545
DecayDateTime: 31-Dec-02 11:59:59 AM
ActivityUnits: uCi
QuantityUnits: ml
Multiplier: 3
Divisor: 5
ReportFileName: C:\User\NewFileName.rpt
LibFileName: C:\User\LIB\Mixed_Source.Lib
CalFileName: C:\User\GvDemo.Clb
ABSLength: 9.55
SystematicError: 2.5
RandomError: 5.2
RandomSummingFactor: 9.999
ABSConfigID:  1
ABSTypeID:  1
```

Notes:

1) The parameters may be in any order and only those to update are required.
2) Parameters not matching those listed above exactly are discarded.
3) Date/Time parameters may be any standard date/time format. A few different acceptable formats are shown in the parameter list above.
4) ActivityUnits and QuantityUnits are limited to 6 characters.
5) ReportFileName is limited to 255 characters.
6) LiveTime and RealTime are Long Integers
7) Multiplier and Divisor are Singe/Float values.
8) Changes to ActivityUnits and QuantityUnits will require appropriate adjustments in the Multiplier and Divisor since the standard activity units in GammaVision are “uCi” or “Bq” as set in the Sample Defaults File.
9) If the Absorber Length (ABSLength) is set, attenuation is turned on by default.
10) ABSConfig is either Linear (0) or Mass (positive number). An empty space is equivalent to zero; therefore, a negative value is required for no change.
11) ABSType is either External (0) or Internal (positive number). An empty space is equivalent to zero; therefore, a negative value is required for no change.