

# **SMARTGeoViewer®**

## **User's Manual**

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**Version 1.2**

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**Dallas, Texas**



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## **About This Document**

This manual is designed for technical personnel installing and operating Geotech Instruments' SMARTGeoViewer®. The following chapters are included in this manual:

- **Chapter 1**, General Information about the SMARTGeoViewer®
- **Chapter 2**, Installation and setup
- **Chapter 3**, SMARTGeoViewer® operator features and procedures

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# 1 General Information

## 1.1 SMARTGeoViewer® Overview

SMARTGeoViewer® (Figure 1-1) is a powerful, user-friendly software application for display of real-time and off-line seismic data. It is written in Java as a Graphic User Interface (GUI) application that runs on all Unix, Windows, and Linux operating systems. SMARTGeoViewer® requires a backend relational database, and is designed to operate as either a local or remote client for the SMARTGeoHub® database server.

SMARTGeoViewer® is a data viewer with extended zooming capabilities. In real time mode, it performs waveform display of user selected data channels for new or existing data from the local database. Each channel trace is separately configurable. Automatic triggers are also displayed in real time, when SMARTGeoViewer® is working in connection with the SMARTQuake® automated earthquake processor. SMARTGeoViewer® can also display flat data files.

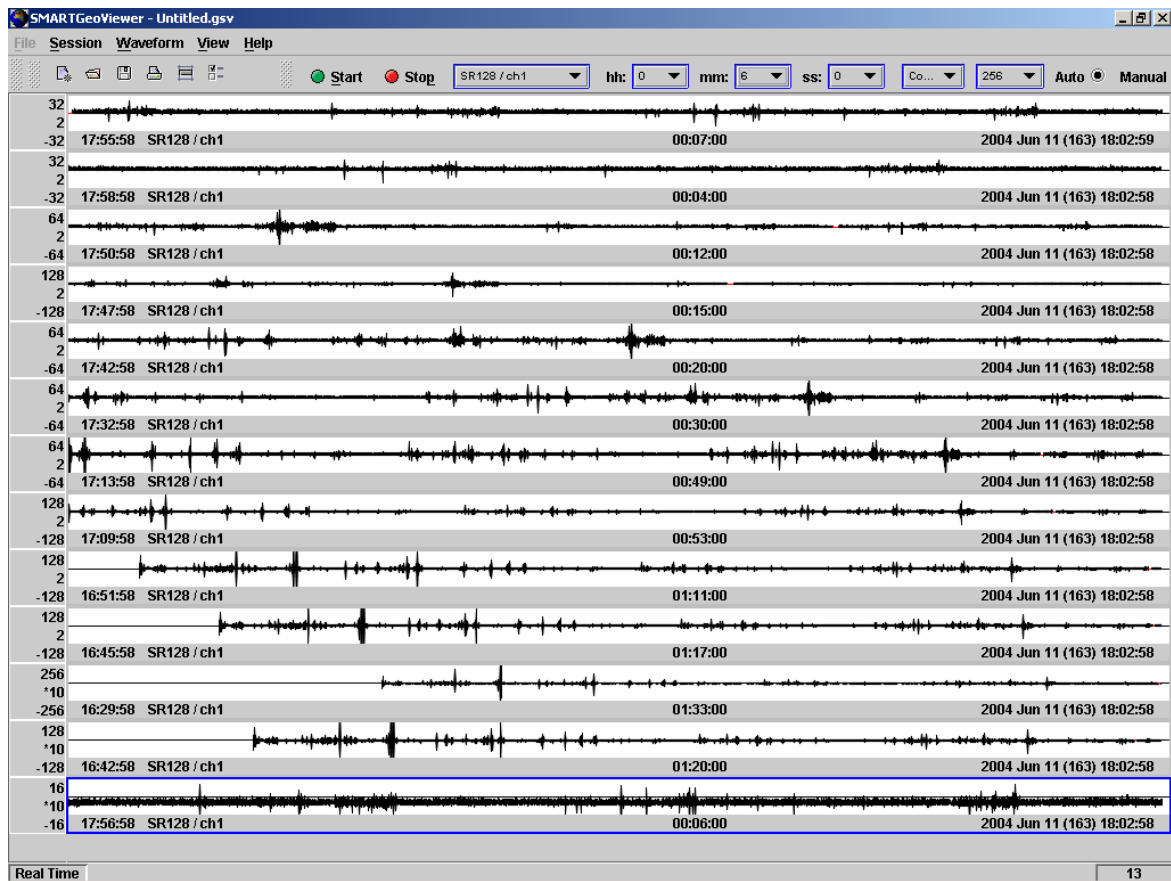


Figure 1-1. Typical View of SMARTGeoViewer®

## **1.2 Operator Functionality**

The operators of SMARTGeoViewer® can:

- Create and save custom viewing configurations capable of simultaneously displaying multiple channels from different remote stations.
- Select the stations and channels to be displayed and configure individual channel traces.
- Customize the look and feel of the channel viewers.
- Closely examine individual channel waveforms by zooming in both time and amplitude axis.
- Rearrange channels viewers by “dragging and dropping” them.
- Copy, cut, and paste channel viewers.

## **1.3 System Requirements**

The minimal hardware requirements are a computer with Intel Pentium™ 4 @ 2.26GHz processor, 512 MB RAM, with Microsoft Windows XP™ operating system. Additional resources may be required to support large seismic networks. Support for Linux and Unix operating systems is also available.

## **2 SMARTGeoViewer® Installation**

The SMARTGeoViewer® Client is installed (typically) as part of the SMARTGeoHub® data acquisition system. The install procedure is very simple and automated, as described below.

To install SMARTGeoHub® onto your computer:

Insert the Geotech's SMARTGeoHub® CD in the system CD drive and double-click on the Install program from the CD root directory. This procedure will create all folders and will copy all files necessary to run SMARTGeoHub®. On a Windows platform the installation folder defaults to `c:\SmartGeoHub`, where the SMARTGeoHub® programs will be installed in different subfolders, one for each software component.

Next the Java Runtime Environment will be installed, or updated to the newest version if already present on the computer. The Typical setup should be selected during the Java Runtime Environment Install Wizard.

The install procedure will also install the relational database needed by SMARTGeoHub®.

This installation procedure assumes that you have no current SMARTGeoHub® installation on the computer. Another procedure should be used to update or re-install SMARTGeoHub®, by double-clicking on the Update program from the CD root directory. The update procedure is similar to the install procedure but it excludes the installation of the relational database.

When the software installation is completed, it is recommended to create (or update existing) shortcuts on the Desktop to point to the SMARTGeoHub® programs. The SMARTGeoViewer® shortcut should point to the following program file (given here as an example): `c:\SMARTGeoHub\SMARTGeoViewer\SmartGeoViewer.bat`. Also, it is recommended to set the program icon (by editing the shortcut Properties) to point to: `c:\SMARTGeoHub\icons\SmartGeoViewer.ico`

Double-click on the SMARTGeoViewer icon to start the SMARTGeoViewer® Client.

A typical application for the SMARTGeoViewer® Client is to display data from the SMART-24 Series instruments. In this case, the SMARTGeoHub® Sever application is used to accept incoming real time data connections from SMART-24 instruments via a TCP/IP network connection, and to write the received data to the database, from where they can be accessed by the SMARTGeoViewer® Client. To start the SMARTServer, double-click on the SMARTServer shortcut that points to the following program file (given here as an example): `c:\SMARTGeoHub\SMARTServer\bin\runServer.bat`.

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### 3 SMARTGeoViewer® Operation

This chapter describes the user interface and operating procedures for the SMARTGeoViewer®.

#### 3.1 User Interface or Desktop

The primary areas of the SMARTGeoViewer® desktop (Figure 3-1) are the menu bar, standard and waveform toolbars, and a display area for multiple site and channel waveforms. The user interface also includes numerous windows and panels. The session indicator in the lower left corner indicates either Real Time (current) or Offline (stored) data display.

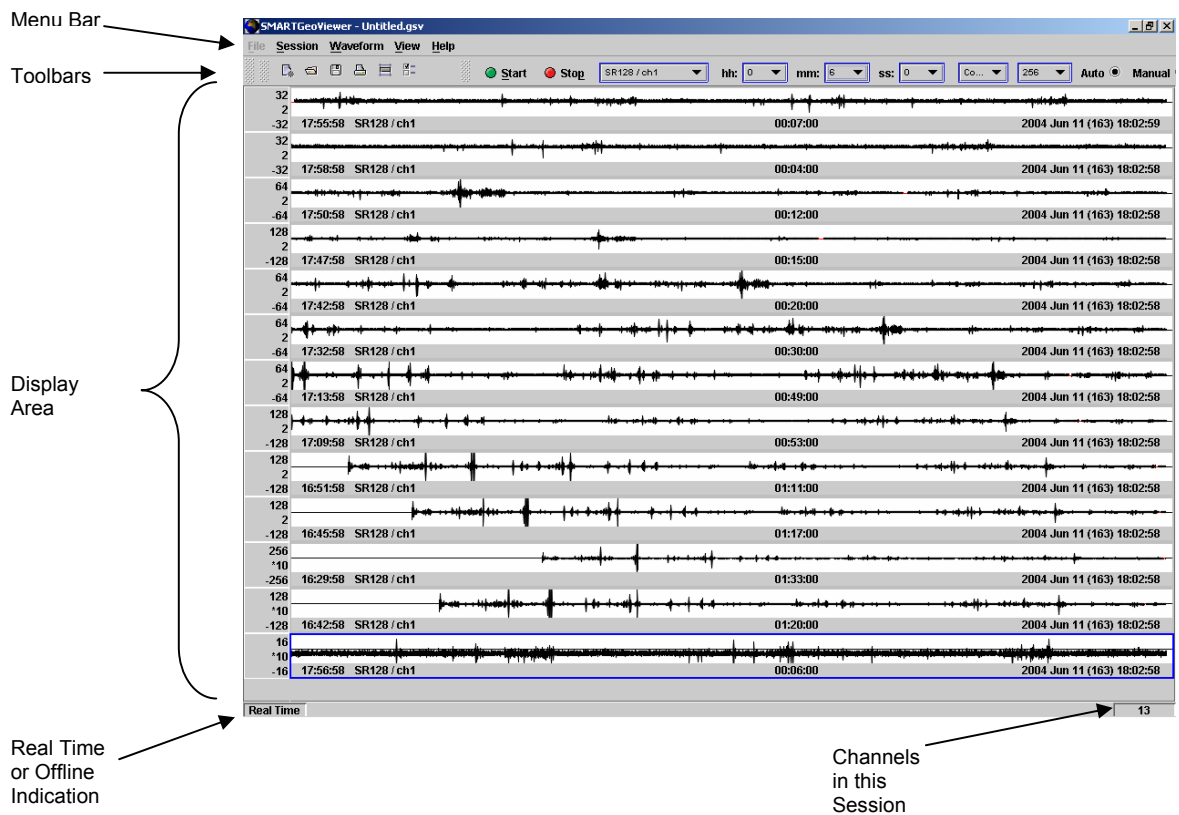


Figure 3-1. Desktop

##### 3.1.1 Menu Bar

The SMARTGeoViewer® menu bar provides quick access the following pull-down menus:

File – Functionality is TBD (see paragraph 3.1.7).

Session – Create new, open existing, and save user-defined configuration preferences (see paragraph 3.1.8). The print selection sends the current channel viewers to an attached printer (if available). When this button is clicked, the print menu of the computer's operating system is displayed.

**W**aveform – Add or delete site channel viewers to a session or modify the display parameters of a site channel (see paragraph 3.1.9). This menu is not available until the user creates a new session or opens an existing session.

**V**iew – Display (add) or hide (delete) the standard and waveform toolbars (see paragraph 3.1.10).

**H**elp – Functionality is TBD (see paragraph 3.1.11).







These menus can also be accessed via the Alt key and the initial letter of each menu.

### 3.1.2 Standard and Waveform Toolbars

The SMARTGeoViewer® standard toolbar (Figure 3-2) provides quick access to the following functions (also selectable from the pull-down menus):



Figure 3-2. Standard Toolbar

-  Starts a new real-time session configuration. When this button is clicked, the Channel Dialog Properties Menu (paragraph 3.1.9.1) automatically appears. Equivalent keystrokes: Alt + N
-  Displays the Open Window (paragraph 3.1.3) and allows selection of an existing session configuration. Equivalent keystrokes: Alt + O
-  For new sessions, displays the Save Window (paragraph 3.1.4) and allows the user to retain the current session configuration. After a 'save as' location is entered, clicking this button saves changes to that location. Equivalent keystrokes: Alt + S
-  Prints the current channel viewers to an attached printer (if available). When this button is clicked, the print menu of the computer's operating system is displayed. Equivalent keystrokes: Alt + P
-  Selects all waveform viewers. Equivalent keystrokes: Alt + A
-  Opens the preferences panel (paragraph 3.1.5).

The SMARTGeoViewer® waveform toolbar (Figure 3-3) allows each channel to be configured independently, and has the following functions:



Figure 3-3. Waveform Toolbar

Start (green button) – Restarts previously “stopped” display of selected channel viewer to begin display of real-time data.

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Stop (red button) –	Stops the selected waveforms (freezes sensor channel data display with the currently selected view) and enables zooming.
Site/Channel –	Allows the user to select or modify channels displayed in the viewer. A pull-down window provides a list of available site channels read from the local database.
Duration (hh, mm, ss) –	Allows the user to set the duration of the display window for the selected site channel in hours (hh), minutes (mm), and seconds (ss). The number of displayed channels and their duration is limited to the resources of the user's computer.
Units –	Allows the user to set the data units for the selected site channel display window, as digital counts or Volts. Other units are TBD.
Gain –	Allows the user to set the display gain for a selected channel viewer, by selecting the display full scale value (zero to peak in digital counts or Volts, as set by the Units selection). A pull down window provides a list of available values, ranging from 2 to $2^{23}$ in digital counts units, and from $10^{-9}$ to 100 in Volts units.
Auto/Manual –	These buttons allow the user to select either automatic or manual offset removal mode. In auto mode, the application automatically corrects waveform offset. In manual mode, the user can correct the offset using the mouse wheel while holding down the Shift or Ctrl keys. Waveform offset value is indicated on the left channel viewer border. An asterisk (*) indicates Auto mode.
Waveform Color Icon –	Allows the user to set the color of the displayed data trace for the selected channel viewer window.
Background Color Icon –	Allows the user to set the color of the background for the selected channel viewer window.

All of these functions require the selection of a channel viewer. Channel viewers are selected by clicking with the mouse on the data display window. A red frame borders the window of each currently selected channel viewer to allow the user to acknowledge focus of view. The toolbars can be moved from their positions at the top of the desktop. To return a moved toolbar to the top of the desktop, simply click the **X** button in the toolbar upper right corner.

### **3.1.3 Open Window**

The Open window (Figure 3-4) appears when either the Open File icon is selected on the standard toolbar or Open File is selected on the Session Menu (paragraph 3.1.8). This window supports selection of popular (TBD) seismic flat file formats for off-line display mode and selection of selection of an existing session configuration for real-time display mode. After entering a file selection, click the Open button to select it. The Cancel button closes the window.

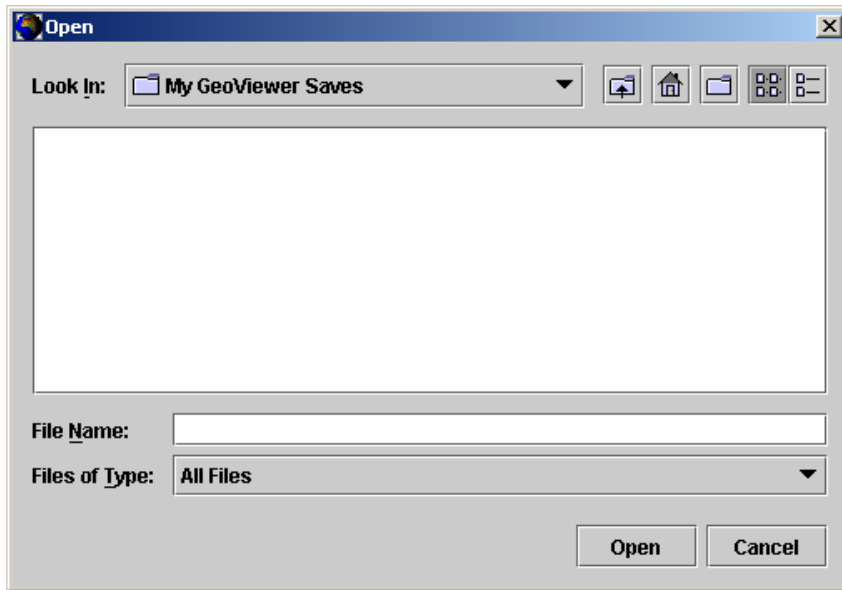


Figure 3-4 Open Window

### 3.1.4 Save Window

The Save window (Figure 3-5) appears when '**Save As**' is selected from the Session Menu. It allows users to retain session data in a known location. After identifying a location to save the session data, a file name is entered, and the **Save** button is clicked. The viewer confirms the entered data with the screen shown in Figure 3-6.

The Save window also includes buttons to move up one level in the file structure, return home, create new folders, display file names or both file names and details. The Cancel button closes the window.

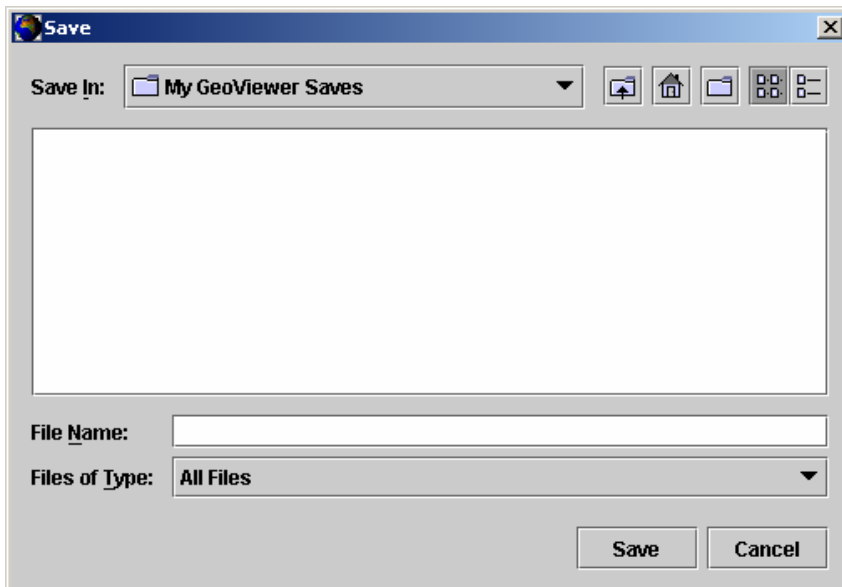


Figure 3-5. Save Window



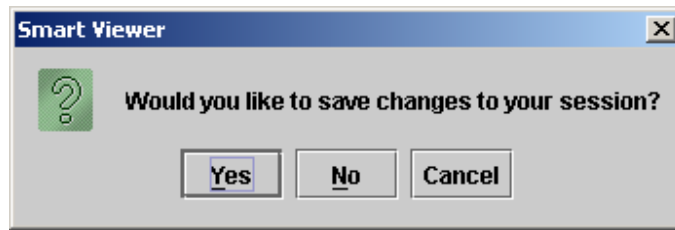


Figure 3-6. Save Changes Confirmation

### 3.1.5 Preferences Panel

The Preferences Panel allows users to configure SMARTGeoViewer® display attributes and refresh rates (general settings), as well as waveform panel heights. Clicking the last icon in the standard toolbar accesses this panel.

#### 3.1.5.1 General Settings

The user can use the General Settings Window (Figure 3-7) to customize desktop start/stop and forward/back icons and performance. The Start and Stop buttons are used when “zooming” a waveform. The Forward and Back buttons appear on the zoom frame toolbar (paragraph 3.2.4.1). The check box labeled “Show database connection dialog on startup” allows the user to see the Database Settings window (paragraph 3.1.5.2) on startup.

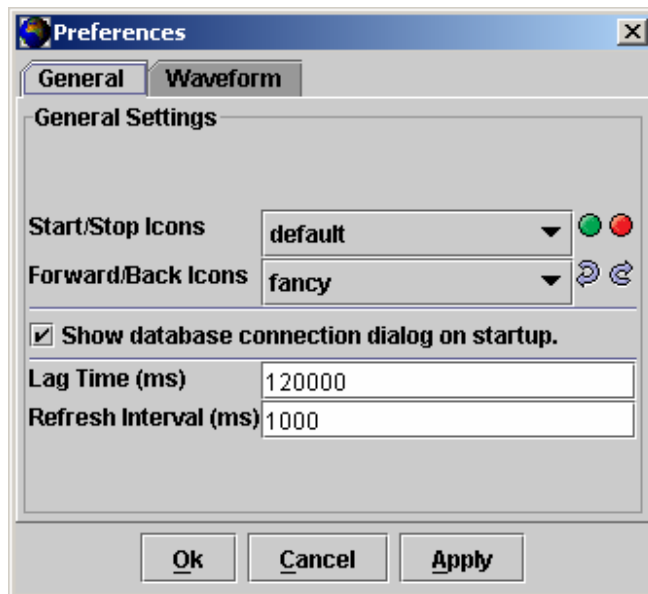


Figure 3-7. General Settings Window

The SMARTGeoViewer® capability to handle a large number of channels with large data windows may be impacted by computer resources. **Lag Time** is the time in milliseconds for data frame receipt from remote digitizer. It is adjusted to minimize the time difference between the clock on the lower right Viewer corner and the actual time the data was created at the sensor. The **Refresh Interval** controls how often

data is “painted” on the SMARTGeoViewer® desktop. This setting is largely dependent on the duration selected for the channel viewers. If the duration is long, the computer could spend valuable computing resources repeatedly sending the same data to the desktop.

When the start/stop and forward/back icons and performance are adjusted for a pre-selected channel, the **A**pply button should be clicked to enter the settings. The **O**k button closes the window. The **C**ancel button deletes the entries.

### 3.1.5.2 Database Settings Window

The Database Settings window (Figure 3-8) allows the system administrator to restrict access to a specific host via user names and passwords. This window is displayed on application startup, but can be disabled by deselecting the box labeled “Show database connection dialog on startup”. After entering any field settings, click the **A**pply button. The **O**k button closes the window. The **C**ancel button deletes the entries.

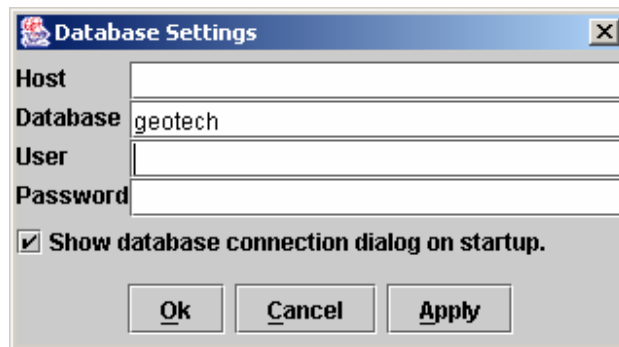


Figure 3-8. Database Settings Window

The following fields are displayed in this window:

Host – Location of the SMARTGeoHub® relational database on a computer or file server.

Database – This field is must always show **geotech** in order for the SMART applications to operate properly.

User - TBD

Password – TBD

### 3.1.5.3 Waveform Settings Window

The Waveform Settings window (Figure 3-9) sets the viewing options for each session waveform displayed on your desktop.

The display size and resolution of each session waveform can be adjusted in height by clicking on its lower edge with a mouse and moving it. The **Initial Height**, when a site channel is added to a session is set here. The largest, **Maximum Height**, and smallest, **Minimum Height**, size a channel waveform expanded to and reduced to after it is added to a session are also set here. **Expand Height** provides waveform expansion and reduction via a double click of the mouse button. By double clicking on the waveform, a selected waveform changes from one height to the other. When

the waveform panel heights are adjusted for a pre-selected channel, the **Apply** button should be clicked to enter the settings. The **Ok** button closes the window.

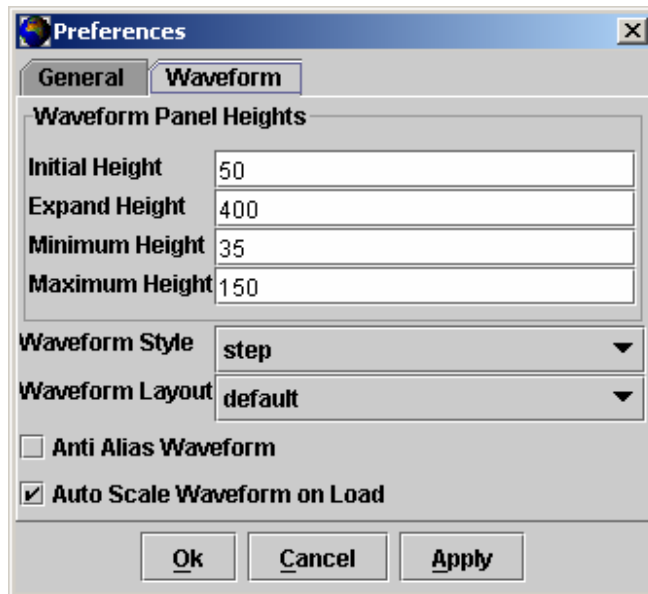


Figure 3-9. Waveform Settings Window

The **Waveform Style** selection allows the user to customize zoomed displays of seismic data. This selection does not affect the standard waveform view, only the zoomed view. The default style is typically a saw-tooth waveform. The step style presents the data as a square wave (Figure 3-10).

The **Waveform Layout** scales sensor/channel display size in relation to the desktop. In **Default** mode, new waveforms are displayed at the **Initial Height**. In **Autofit** mode, the sensor/channel display size is automatically adjusted to fit the display area. As each new sensor/channel display is added all displays are resized (the initial display fills the screen; when the next display is added, each takes up half the screen; when the third is added each takes up a third of the screen; etc.). The SMARTGeoViewer® must be restarted after selecting this option. A shortcoming of **Autofit** mode is that when selected, the user can't change the display height.

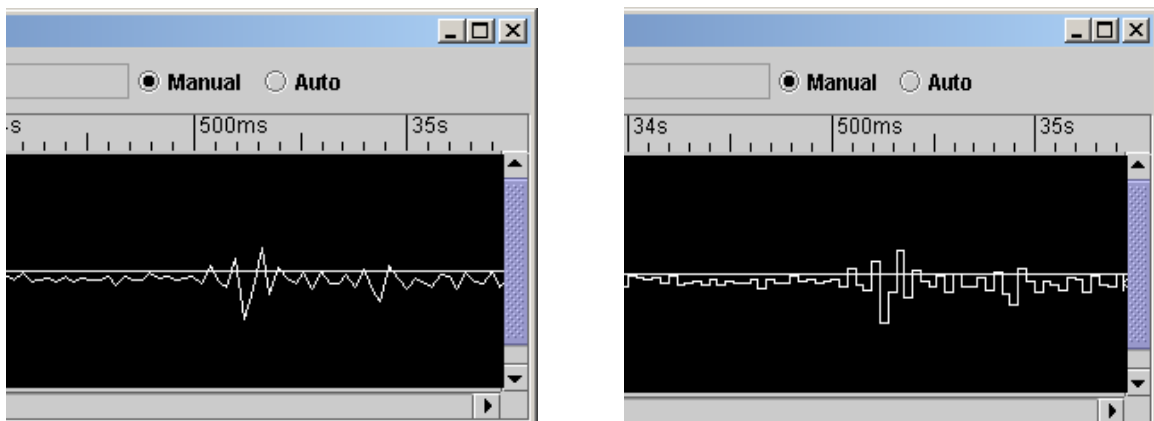


Figure 3-10. Waveform Styles (Default vs. Step)

The **Anti Alias Waveform** selection smoothes the displayed waveform. It partially blends of the individual seismic events into a smoother contour.

The **Auto Scale Waveform on Load** selection affects how a waveform is initially displayed when it is added to a session. In default (unchecked) mode, the waveform may be larger than the display area and require adjustment to see the highest amplitudes. When selected (checked), the waveform is automatically sized to fit the display area. This selection is available on the right-click menu (paragraph 3.1.6). When any of the waveform selections are adjusted for the desktop, the **Apply** button should be clicked to enter the settings. The **Ok** button closes the window. The **Cancel** button deletes the entries.

### 3.1.6 Site/Channel Displays

Site/channel displays (channel viewers) are inserted under the menu and toolbars during session configuration. The channel viewers are independently configurable. The typical features of a channel viewer are shown in Figure 3-11.

When a channel viewer is selected by clicking it with the left mouse button, the settings are displayed both in the viewer window and in the waveform toolbar. A red line around the viewer indicates that it is selected. Note that several viewers can be simultaneously selected by holding down the keyboard Shift or Ctrl key. When several viewers are selected none of the information is displayed in the waveform toolbar. The **Select All** key in the standard toolbar can select all of the viewers.

The characteristics of a selected channel viewer can be changed at any time, from the Waveform Menu edit function or the Waveform Toolbar. Right clicking on a selected waveform displays a rapid access menu with some of the selections available on the Waveform Menu.

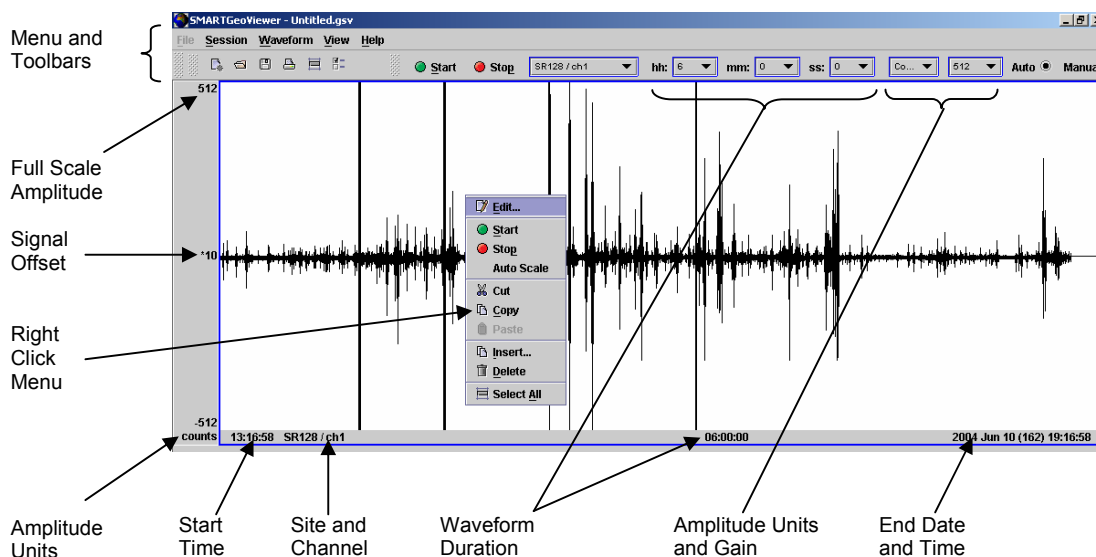


Figure 3-11. Typical Sensor/Channel Display

Users can adjust the amplitude gain of any channel viewer by moving the mouse cursor over the waveform and rotating the mouse wheel. Offset (the y-axis) can be adjusted via the keyboard and mouse when the viewer is in manual mode. To put the viewer in manual offset mode:

1. Click on the viewer with the mouse cursor. A red line appears around the waveform window.
2. Click the **Manual** button on the Waveform toolbar or click the Waveform menu, select Edit, and Offset on the Channel Dialog Properties menu. Select Manual Offset Mode and click **Apply**.

In manual offset mode, holding down the keyboard Shift key and rotating the mouse wheel moves the waveform offset in coarse increments. With both the Shift and Ctrl keys depressed, the waveform offset moves in fine increments. Offset value is indicated at the centerline of the channel viewer. Note that when in auto offset mode, an asterisk (\*) appears before the offset value displayed on the channel viewer. When a waveform has been selected (with a red line around the waveform window) a right click with your mouse displays a menu with most of the functions available through the Waveform menu and the Waveform toolbar.

### **3.1.7 File Menu**

This menu will allow users to select popular (TBD) seismic flat files for display for off-line display mode.

### **3.1.8 Session Menu**

The Session menu (Figure 3-12) allows users to create and open user session preferences. Each display may include several site channels. Users must select either new session or open session before the other functions are available.

New – Creates a new real-time display session configuration. When this option is selected the Channel Dialog Properties Menu (paragraph 3.1.9.1) automatically appears.

Open Session – Accesses a pre-existing session configuration. Users are prompted to choose the desired session configuration with the Open window (paragraph 3.1.3), before the channel viewers for the given session are displayed. After creating a new session or opening an existing one, no channel is selected.

Close Session – Users are prompted with the Save window (paragraph 3.1.4) to save the session configuration before the session is closed.

Save and Save As – Users can save session contents, and can also designate the file location on either the local client terminal or at a network location. When the save location is defined, the Save selection performs the same function as the save button on the standard toolbar. The Save window (paragraph 3.1.4) appears for the save as function.

Print – Sends the current channel viewers to an attached printer (if available). When this button is clicked, the print menu of the computer's operating system is displayed.

Exit – Closes the SMARTGeoViewer® application.

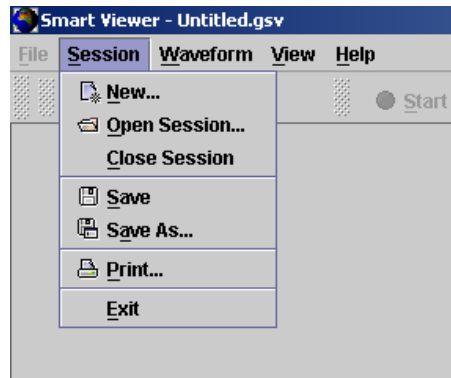


Figure 3-12. Session Menu

### 3.1.9 Waveform Menu

The Waveform menu (Figure 3-13) allows users to modify a pre-existing session configuration by adding or deleting site channels or modifying the display parameters of a site channel. After either opening or creating a session configuration file, the only function available is Insert. To access the other functions in this menu, the user must first select a site channel in the display area. Selected channels are highlighted with red boxes.

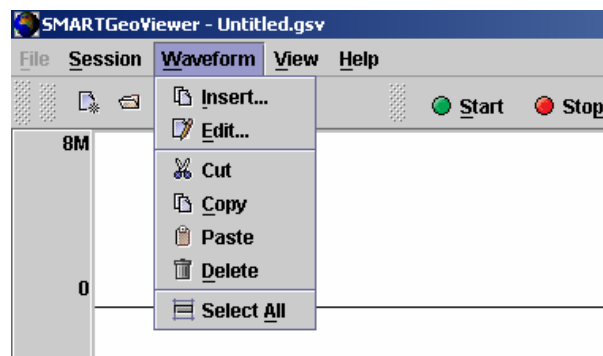


Figure 3-13. Waveform Menu

**I**nsert – Add a new site channel viewer to an existing session configuration file. When this function is selected, the Channel Dialog Properties Menu (paragraph 3.1.9.1) appears to allow setting of preferences for the new channel viewer.

**E**dit – Modify a pre-selected site channel viewer. When this function is selected, the Channel Dialog Properties Menu (paragraph 3.1.9.1) appears.

**C**ut – Remove a selected site channel viewer from its current location in the display area. The channel is then available for pasting in another location in the display.

**C**opy – Duplicate an existing site channel viewer with the idea of pasting it in another location, possibly with modification via the Edit function.

**P**aste – Insert a previously cut or copied site channel viewer in a new location.

**D**elete – Eliminate a selected site channel viewer from a session.

**S**elect **A**ll – Selects all site channels in the session.

A quick menu that includes these functions is available by highlighting a channel viewer, and right clicking the mouse button.

Note that in addition to cutting and pasting site channels to change the viewer configuration, site channels can be “dragged and dropped” via a computer mouse into a new location. The user can click on a site channel (as when selecting it), and pull it up or down to a new location. A horizontal green line appears to identify where the channel will be dropped.

### 3.1.9.1 Channel Dialog Properties Menu

The Channel Dialog Properties Menu allows users to modify pre-selected site channel viewers or to add a new site channel to an existing configuration. Users may either select a site channel to modify in the Waveform menu or select insert on the Waveform menu before this menu appears. The four windows on this menu are for Channel, Offset, Unit/Gain, and Waveform Color. On any of the four windows, click the **Apply** button to enter the settings, the **Ok** button closes the window, and the **Cancel** button deletes the selections.

#### 3.1.9.1.1 Channel Configuration

The Channel Window (Figure 3-14) displays the current configuration of the selected site channel viewer. The Channel select allows the user to specify the site and channel to insert or assign to an existing display channel. The Time Interval specifies the channel display duration in Hours, Minutes and Seconds.

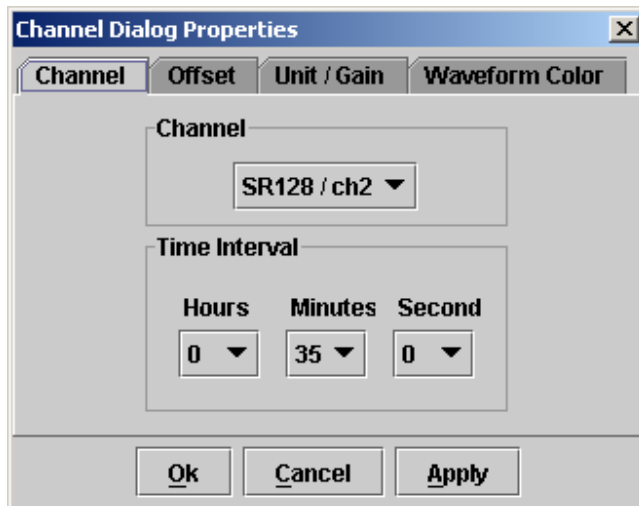


Figure 3-14. Channel Window

#### 3.1.9.1.2 Offset Configuration

The Channel Offset window (Figure 3-15) allows users to select either manual or automatic modes for a selected site channel display offset correction. Automatic correction positions the displayed waveform within approximately 10 counts or a corresponding voltage of the median line. In auto offset mode, an asterisk (\*) appears before the offset value displayed on the channel viewer. Manual correction allows the user to shift a selected channel by pressing the Shift key while rotating

the wheel on the client's mouse. Note that rotating the wheel without depressing any keys changes the amplitude gain.

Users can also select offset correction mode by selecting a channel display (with a red line surrounding the waveform) and clicking Auto or Manual on the waveform toolbar.

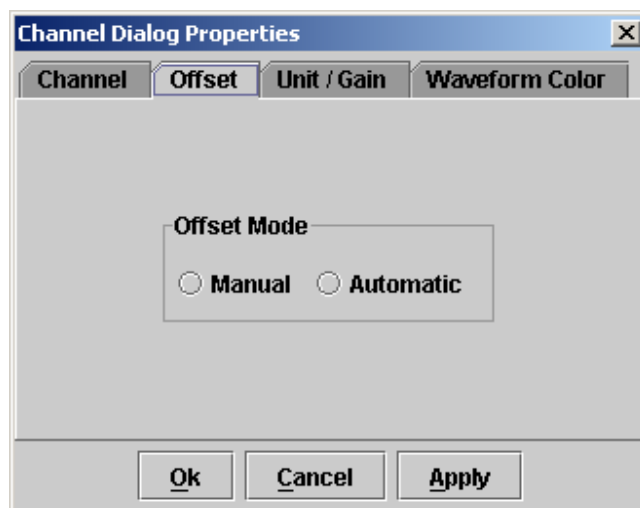


Figure 3-15. Channel Offset Window

### 3.1.9.1.3 Unit/Gain Configuration

The Channel Display Units Window (Figure 3-16) allows selection of either counts or volt display units and the amplitude gain. In counts, this ranges from 2 through 8 million units. In volts, the ranges are from 1 to 500 nanovolts (nV) or micro-volts ( $\mu$ V), 1 to 50 milli-volts (mV), and 1 to 100 volts.

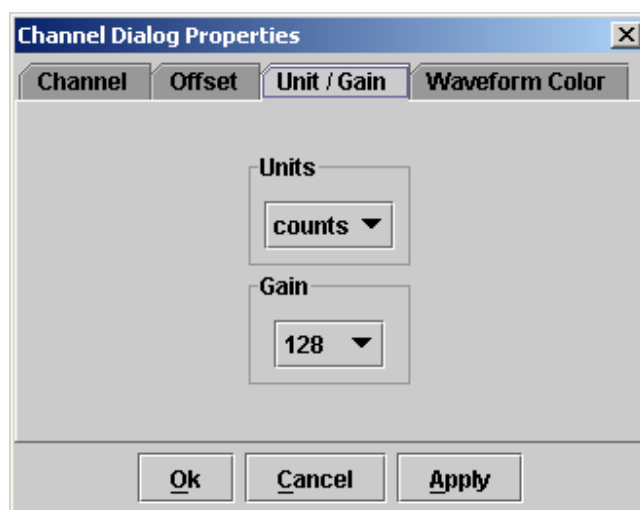


Figure 3-16. Channel Display Units Window

Users can also select display units and gain by selecting a channel display (with a red line surrounding the waveform) and clicking the appropriate areas on the waveform toolbar.



### 3.1.9.1.4 Waveform Color Configuration

The Waveform Color Window (Figure 3-17) allows the user to assign special colors for each waveform and its background. The user clicks the Choose Waveform Color or Background Color button in the Channel Colors Window. The three screens 'Choose Waveform or Background Color' screens are displayed and one of three methods is chosen.

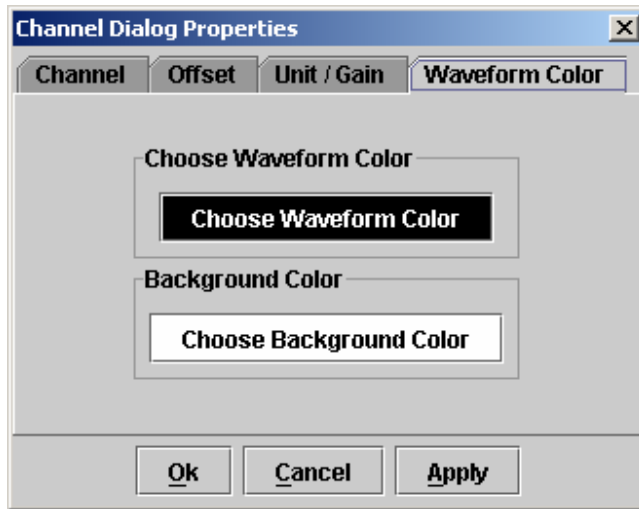


Figure 3-17. Channel Colors Window

Users can select colors via three methods, swatches (Figure 3-18), HSB (Hue/Saturation/Brightness) (Figure 3-19) or RGB (Red/Green/Blue) (Figure 3-20). Users are advised to avoid choosing a red background color, as this could be difficult to see with a highlighted channel. Highlighted channels are always red.

After selecting a color, click the OK button to enter the setting. The Preview panel will show a sample text image showing the selected color combination. The Reset button returns the color to the original setting. The Cancel button deletes the selection and closes the window. After making a selection, The Waveform Color Window is again displayed so that the user can select the other color for the Waveform.

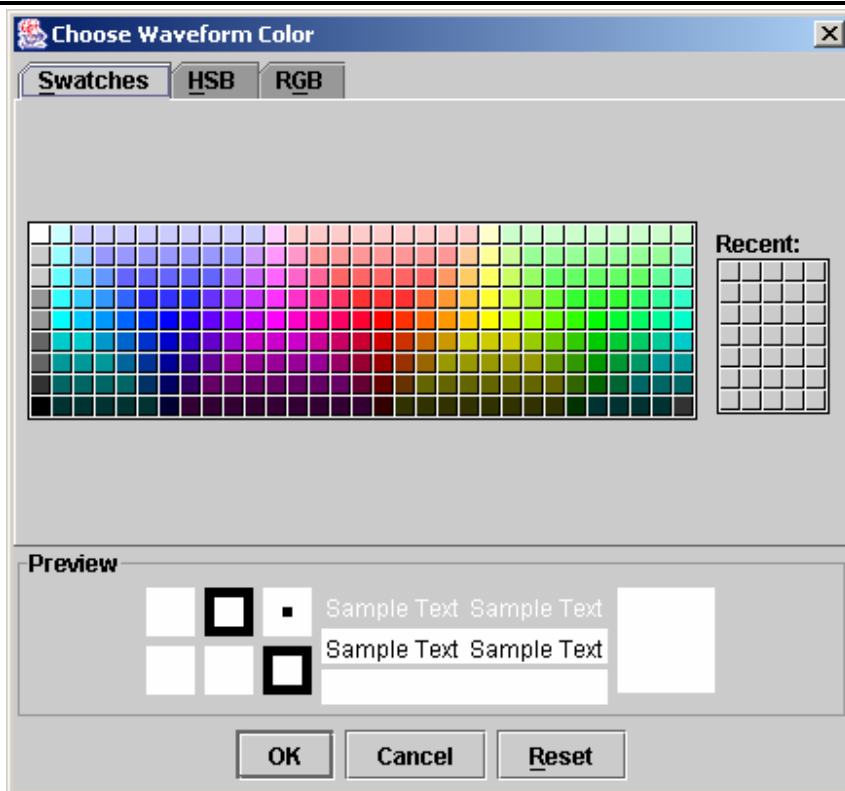


Figure 3-18. Waveform Color Selection by Swatches

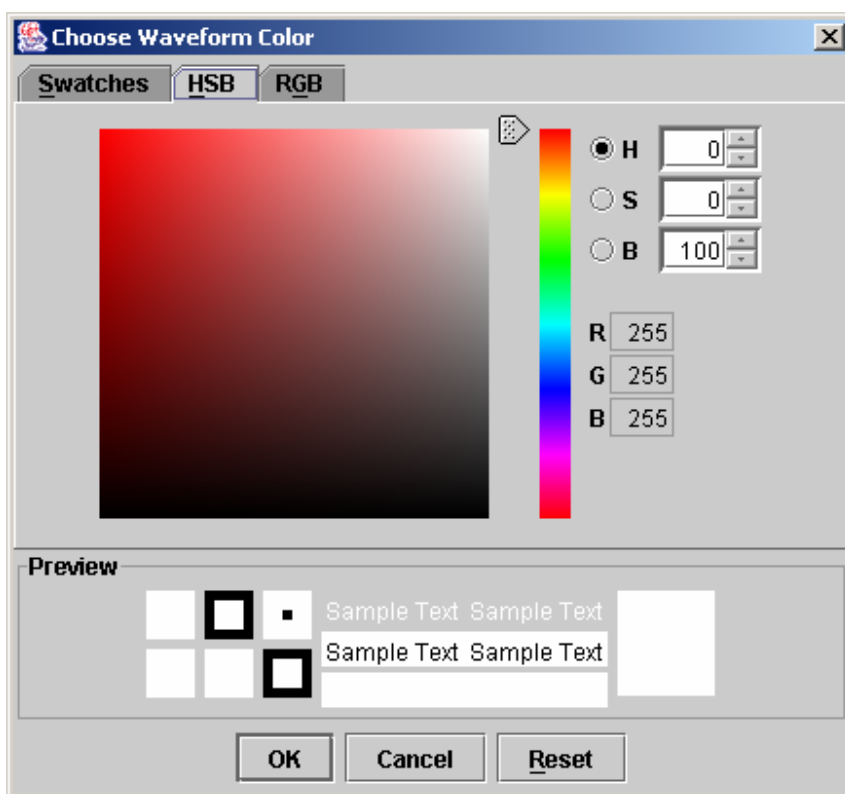


Figure 3-19. Waveform Color Selection by Hue/Saturation/Brightness

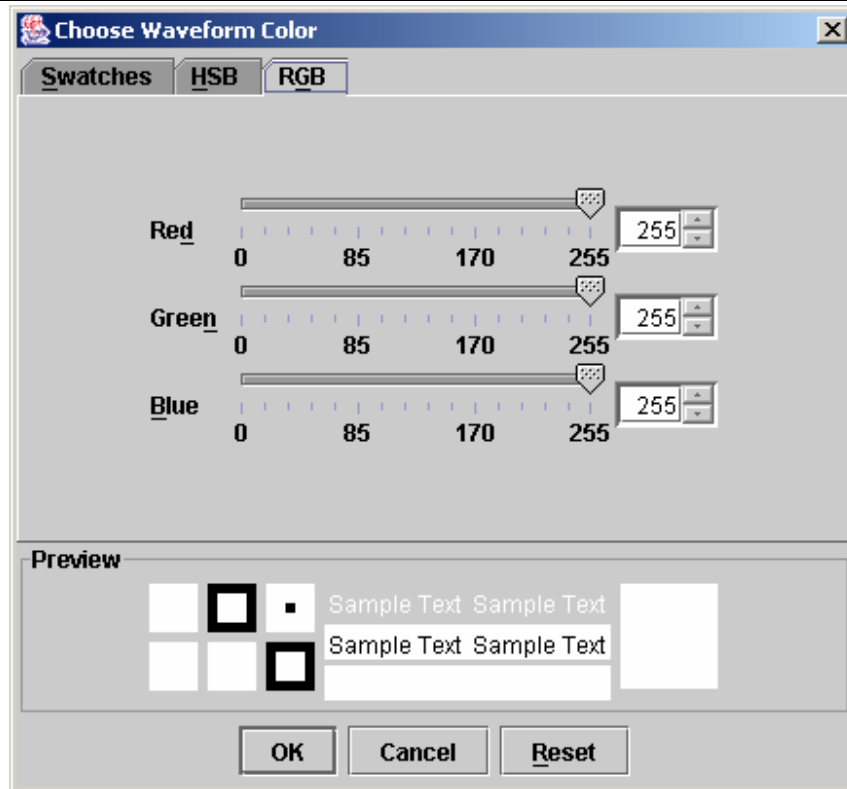


Figure 3-20. Waveform Color Selection by RGB

### 3.1.10 View Menu

The view menu (Figure 3-21) allows user to add or delete the standard and waveform toolbars from the SMARTGeoViewer® desktop. For further information on these toolbars, please refer to paragraph 3.1.2. Deleting the toolbars provides additional display area. Note that the Standard toolbar functions are accessible from either the menu bar or via shortcut keys, and the Waveform toolbar functions are accessible by right clicking with the mouse on a selected waveform. A menu is displayed with all of the toolbar functions (Figure 3-11).

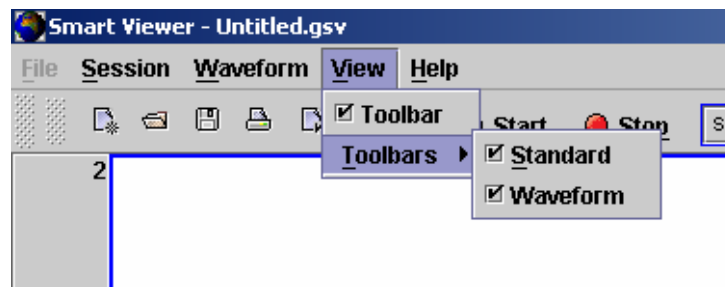


Figure 3-21. View Menu

### 3.1.11 Help Menu

This menu is currently TBD.

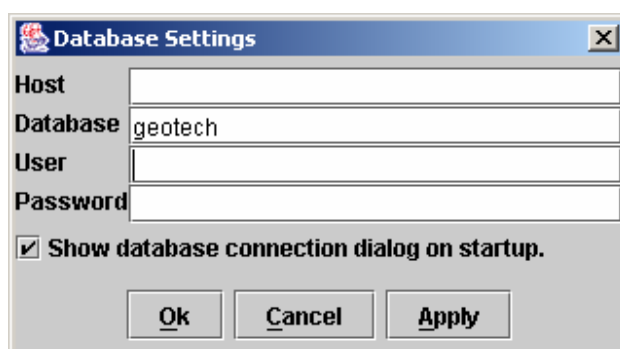
## 3.2 Operation Procedures

The major user functions for this application include:

- Configuring the desktop
- Creating and using session configurations
- Examining Site Channel Waveforms

### 3.2.1 How to start SMARTGeoViewer®

1. Double click the SMARTGeoViewer® shortcut icon on your desktop. If enabled, the Database Settings window appears:



2. Enter the appropriate host, user, and password information if this window appears. Ensure that **Database** shows 'geotech'. Deselecting "**Show database connection dialog on startup**" disables this feature. If this setting is unchecked, the desktop appears shortly after the icon is clicked.
3. Click the **Ok** button. The SMARTGeoViewer® desktop appears.

### 3.2.2 How to Change the Desktop's Appearance

Users can change the desktop appearance at any time during operation with the Preferences panel and the View menu. The Preferences panel (paragraph 3.1.5) allows users to change desktop icons. The View menu (paragraph 3.1.10) allows users to display or delete the standard and waveform toolbars, providing additional display space.

### 3.2.3 Using Session Configurations

The primary function of the SMARTGeoViewer® is displaying real-time seismic data. Creating and using session configurations simplifies data display. Existing session configurations can also be used.

Each session configuration contains a set of preferred settings for the SMARTGeoViewer® window, including selected channels and all their data display settings (such as window duration, gain, waveform, and background colors).

Some display features are independent of the session configurations, such as the waveform style, waveform layout, "Anti Alias Waveform" and "Auto Scale Waveform on Load" selections on the Waveform Settings Window (paragraph 3.1.5.3). The

**Autofit** selection requires a restart of the SMARTGeoViewer® application before it takes effect.

### **3.2.3.1 How to create a session configuration**

1. Create a new session by any of the following methods:
  - a. Click the new session button on the standard toolbar
  - b. Click **Session** on the menu toolbar and click New on the session menu.
  - c. Press Alt + N.
2. Name and save the session.
  - a. Press Alt + S.
  - b. When the **Save** menu appears, find a location by scrolling the **Save In** window and click on it.
  - c. Type the file name in the **File Name** window.
  - d. Click **SAVE**.
3. Add waveforms to the configuration.
  - a. Click the **Waveform** on the menu toolbar and **Insert**. The Channel Dialog Properties panel (paragraph 3.1.9.1) appears.
  - b. In the Channel box, scroll to find a desired site channel and click on it. Note that the available sites and channels are determined by the database the user is logged into.
  - c. Select a Time Interval (duration) for the channel waveform display.
  - d. Click the **Offset** tab and select either Manual or Automatic Offset Mode. The default setting is Automatic mode.
  - e. Click on the **Unit/Gain** tab and select the display units and gain. The default setting is Count display units and a full scale amplitude of 2.
  - f. Click the **Waveform Color** tab and choose Waveform and Background colors. The default setting is a black waveform on a white background.
  - g. Click OK at the bottom of the Dialog Properties panel. Data for the requested site channel is retrieved from the database and displayed on the desktop as a waveform.
  - h. Repeat the previous seven steps a through g, to add further site channel viewers. When the number of channels exceeds the number that can be displayed on the desktop, a scroll bar appears on the right side of the display area.
4. When the configuration is complete, either press Alt + S or click on the save icon in the standard toolbar.
5. Click Yes on the Save confirmation screen.

### 3.2.3.2 How to access an existing session configuration

1. Click the Open existing session button on the standard toolbar or click **Session** on the menu toolbar and click Open on the session menu or simultaneously press the Alt key and O. The Open panel appears.
2. Find the location where your session configurations are located by scrolling the **Look In** window and click on it.
3. Find the configuration file name in the **File Name** window and click it.
4. Click **Open** in at the bottom of the panel. The configuration file is retrieved and the channel viewers for the given session are displayed. Note that more than one session configuration file cannot be opened at the same time on a single instance of the SMARTGeoViewer®.

### 3.2.3.3 How to modify session configurations

At any time while viewing a session, users can modify the desktop. Possible modifications include:

- Expand or reduce selected site channel waveforms by “dragging and dropping” the bottom border of a selected waveform. You can also toggle between a minimum and maximum size by double clicking the bottom border. The maximum and minimum sizes are set at the Waveform tab of the Preferences panel. This flexibility helps to conserve display space, allowing a greater number of channels to be displayed. Note that when **Waveform Layout** on the Preferences Waveform Settings Window (paragraph 3.1.5.3) is set to **Autofit**, the waveform size will not adjust. This setting must be set to **Default** to change the waveform display size.
- Change the shape of the displayed waveform with the **Anti Alias Waveform** selection on the Preferences Waveform Settings Window (paragraph 3.1.5.3). When **Anti Alias Waveform** is selected, the displayed waveform is smoother.
- Change the channel waveform order. You can highlight a site channel by clicking on it, and dragging it to a new location.
- Change the properties of a displayed waveform including selection of a new site/channel, alter duration (Time Interval), offset method, display units and gain, and different colors. Users make these modifications by highlighting a waveform and changing the settings on to the Channel Dialog Properties menu (paragraph 3.1.9.1). The settings take effect when the **Apply** button is clicked at the bottom of the menu.
- Delete site channel viewers by highlighting them and selecting either **Delete** or **Cut** from the **Waveform** menu. If a viewer is removed by the Cut function, it is available for re-insertion via the **Paste** function in the **Waveform** menu (paragraph 3.1.9).

After any changes are made, either press Alt + S, click the **Save** button on the **Session** Menu or click on the save icon in the standard toolbar to retain the new settings. To remove a waveform highlight, click on the gray area of the desktop below the channel displays.

### 3.2.4 How to Closely Examine a Site Channel Waveform (Zooming)

Users can increase resolution on portions of a site channel waveform by “zooming”. Zooming expands small sections of a waveform into a full-size display window. The zoom function is only available when the initial channel viewer duration is less than 30 minutes. An example of a “zoomed” waveform is shown in Figure 3-22.

Note the **Waveform Style** selection on the Preferences Waveform Settings Window (paragraph 3.1.5.3) affects how zoomed seismic data displays look (Figure 3-10). The **default** style is typically a saw-tooth waveform. The **step** style presents the data as a square wave. You can switch between the two modes at any time while zooming. To “zoom” a channel waveform, do the following:

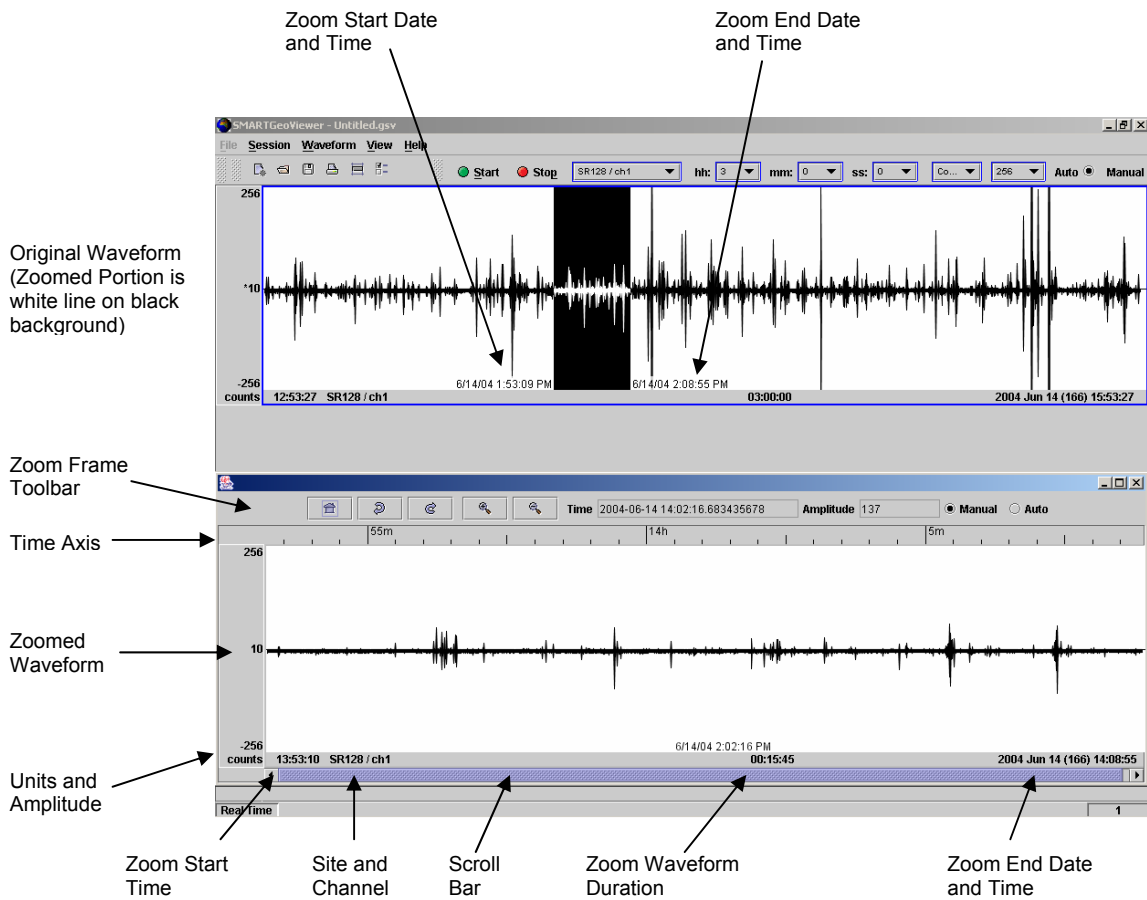







Figure 3-22. Zooming a Waveform

1. Select a channel waveform by clicking in the display area (not on its border). A red line surrounds the waveform display area.
2. Click on the Stop (red button) on the Waveform toolbar or right-click your mouse and select stop on the menu that appears. This freezes the data display for the selected channel waveform.
3. Define the zoom window by clicking and holding the mouse left button and drawing it across the channel waveform. As the mouse cursor moves across the waveform, the date and time are displayed allowing the user to see the time range. This increases accuracy when identifying the zoom window.

When the mouse button is released, a new display window opens at the bottom of the display area. The display is the selected waveform expanded to the full window. This allows close examination of individual events in the channel waveform. The zoom window indicates the site and channel name (but this time written in the window title), the duration begin and end times, as well as the amplitude of the full scale given in counts or Volts. On the “zoomed” display window, the zoomed time axis includes tick marks spaced according to the window duration, typically each second. Also, a scroll bar allows moving the window of the selected duration forward and backwards in time, up to the ends of the channel viewer window size (after the first zoom operation) or of the previous zoom window size (for the following zoom operations).

### **3.2.4.1 The Zoom Frame Toolbar**

The zoom frame toolbar appears at the top of each expanded waveform view. It provides several special functions for examining waveforms in detail. The following tools are represented on the toolbar:

	Returns to original zoom status.
	Returns to the previous zoom status (backward).
	Returns to the next zoom status (forward).
	Increases the space between the time divisions (time zoom in). Note that neither this tool nor the one for decreasing time division spacing changes the number of time divisions.
	Decreases the space between the time divisions (time zoom out).
Time Display	Date and time are displayed as the mouse cursor is moved across the length of the zoomed waveform. Displayed date and time reflect the cursor position.
Amplitude Display	Amplitude in count or volts is displayed as the mouse cursor is moved along the zoomed waveform. Displayed amplitude reflects the cursor position.
Manual	Select manual offset correction. The user can correct the offset using the mouse wheel while holding down the shift and Ctrl keys. Waveform offset is indicated on the left channel viewer border.
Auto	Select automatic offset correction. Waveform offset is corrected to approximately 10 units. When this mode is selected an Asterisk (*) displays on the signal offset value to the left of the display centerline.



### **3.2.5 Shortcut Keys**

You can use the following shortcut keys to quickly perform certain tasks and access SMARTGeoViewer® screens.

Function	Keystrokes
Access the View menu	Alt+V
Access the Waveform menu	Alt+W
Close a session	Alt+C
Create a new session	Alt+N
Open an existing session	Alt+O
Save the current session configuration (but not with a channel viewer selected)	Alt+S
Start a selected channel viewer (after zooming)	Alt+S
Stop a selected channel viewer (before zooming)	Alt+P