RST INSTRUMENTS LTD.

Geoviewer
User's Manual

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Model: Version 3.7.29

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1 GEOVIEWER

Geoviewer is a software package used at mines, dams, tunnels and major construction projects to monitor critical physical parameters prior to, during and after construction or modifications to foundations, structures, slopes ….etc… With Geoviewer the user can read data from multiple loggers and process the information in near real time, apply calibration constants, set & check for alarm levels, archive data and display sensor readings in a variety of formats. The main Geoviewer computer can also act as a host so that satellite computers can retrieve data via the internet and display data in their own projects.

Users of Geoviewer create Projects. Geoviewer runs one project at a time. A project contains all the user input information to monitor a particular site or area of interest.

A Project contains:

- Links to data file locations & update schedules
- Data channel configuration, channel names, calibration constants & locations
- User supplied bitmaps with sensor locations & added indicators
- Alarm levels, alarm history & alarm response
- User defined groups for plotting or text display
- User defined Archive and Alarm parameters

Geoviewer is designed to work in conjunction with automated data logger such as Campbell Scientific data loggers and the Campbell Scientific PC208 or Loggernet software packages.

The CR10x is a fully programmable data logger used to condition, measure and store data from a variety of sensors.

Campbell Scientific PC208W / Loggernet software is used to program the CR10x and collect data from the loggers at scheduled intervals. The software must continually run in the background retrieving data from the loggers for Geoviewer to display new data. The data is stored in an ASCII comma separated files. Geoviewer reads data from these files, in near real time, and allows the user to display the data in a number of different formats.

1.1 GEOVIEWER SECURITY

Every time a project is opened a security check is made. If the USB dongle is not detected, a password dialog is displayed. The user has three attempts to enter a valid password, after that the demo mode will be automatically entered. There are 3 modes of operation, full access, remote access and demo.

1) Full access: USB dongle detected or month access code entered.
2) Remote access: A password from a full access Geoviewer is entered.
   - Obtain password from the full access Geoviewer server dialog
3) Demo: No USB dongle or no access code.

The following restrictions are placed on the remote and demo modes.

1) Remote access:
   - Data is collected from full access Geoviewer, via Internet connect.
2) Demo:

- Data is collected from full access Geoviewer, via Internet connect.
- No data archiving.
- No print text.
- No print view window.
- No data server.
- No report generation.
- No alarms.

1.2 GEOVIEWER INSTALLATION

Installing the Software:
A copy of the Geoviewer install software can be downloaded from the RST web page or a copy can be obtained on CD from RST.

- If a copy of Geoviewer install program was downloaded, unzip the file, gvXXX_install.ZIP, (XXX is version number) to an empty folder.
- If a CD was obtained, insert the disk into your CD-ROM drive.
- Navigate to the CD-ROM drive or new folder and run the program setup.exe.
- Follow the on-screen instructions to install the software, specifying the location of the folders.
- If this is the first time that Geoviewer was installed, the computer will need to be restarted.
- If the Geoviewer USB dongle is being used, the USB driver must be installed.
    - Make sure USB dongle is not inserted in computer.
    - Navigate the desktop fan out menu and run the program: Start\Programs\Geoviewer\Install Geoviewer Dongle
    - Insert the Geoviewer USB dongle into an available USB port on your computer.

Warning:

Please ensure that the Geoviewer USB dongle driver is installed on your computer prior to inserting the dongle into your USB port.

System Requirements:

- Pentium III 1 GHz
- 200 MB of hard drive disk space
- 1024 MB of RAM
- 1024 x 768 pixels of screen resolution

Note: The above specifications are applicable to an average project. Increasing the project size by using a large channel count, data set size or high picture resolution, will result in poor system performance unless the system requirements are also increased. Consult RST for more information.

1.3 GEOVIEWER DEMO PROJECT

Geoviewer includes a demo project when first installed (DEMO V3.4). This project demonstrates some of the capabilities of Geoviewer such as multiple logger setup, plots, chains, picture views. alarms and text data. The user is advised to work through this manual using the Demo project.

1.4 GEOVIEWER DIRECTORY STRUCTURE

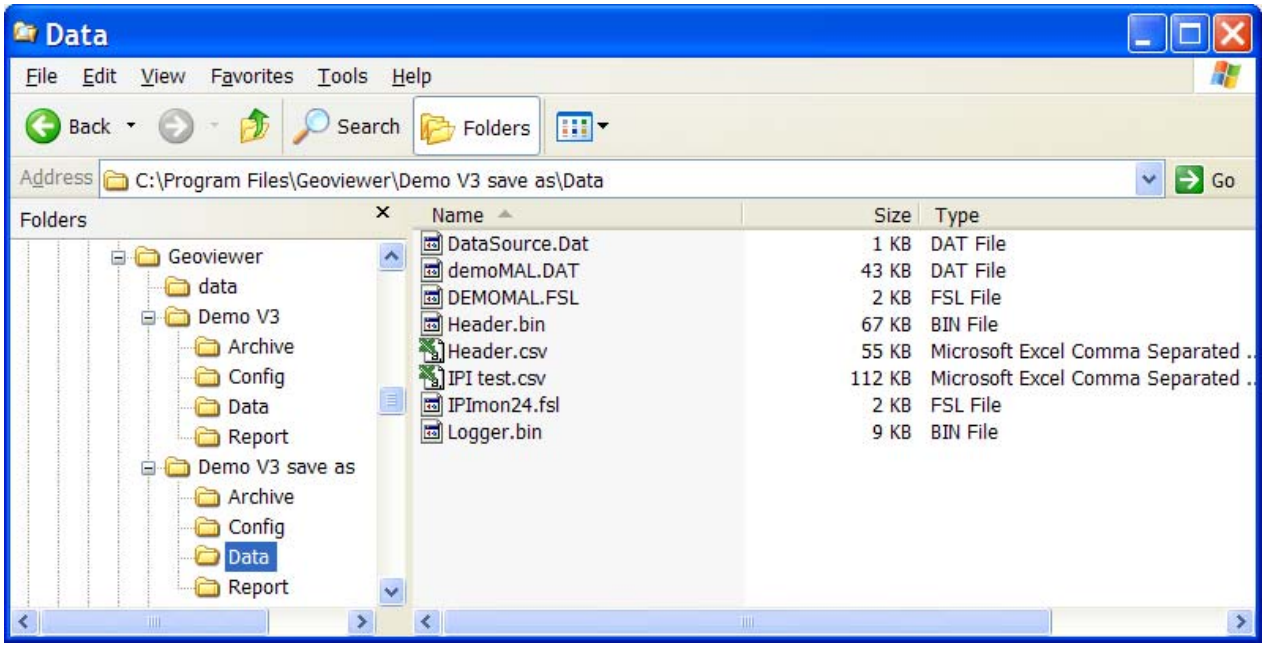


Figure 1: Geoviewer Directory Structure

The above screen shot shows the Geoviewer directory structure:

- **Projects** – "Demo V3" and "Demo V3 save as" are project directories
- **Archive –** The default directory where archived files are stored.
- **Config** – Where various project configuration files (picture, chain, chart….) are stored and the default location for user supplied pictures used in picture view. These files should not be edited or moved.
- **Report –** The default directory where report files are stored.
- **Data –** Default location where active data, header and logger generated FSL (final storage labels) are stored. Editing the header file in Excel can save time when you are required to set up a lot of channels with similar parameter. It is best to set up one channel of each type using the tools in Geoviewer and then cut and paste common information in Excel. The Header must be saved as a CSV type file and as always, make a project backup before hand.
- ***.INI** – The project INI file (initialization)which is located under the main project directory (not shown) stores initialization parameters for the project. A manual entry may be necessary to correct the CR10 Chan display in the Channel List Editor. Line "CR10_Offset=-5" tells Geoviewer how many non-data channels are present (file identifier and date/time) in the data file. In this case the first 5 locations will be assigned a CR10 channel of "0" and the 6th location as CR10 channel 1. The file can be edited and saved in Notepad.
- ***.Bin –** These are binary copies of CSV files that are used during program operation to speed up program execution.

1.5 CREATING A PROJECT

- Run Geoviewer – program will open using the demo project or with project last used. Select Options / New and give your project a name then enter
- Select your project from the list and select open – the Geoviewer main window will open with your project name in the upper left corner.
- Select Edit / Logger – rename the logger to something logical
- Select Edit Channels then Read FSL (fill using current data checked) and navigate to the FSL file for this logger. Select OK
- Edit Data Source – Browse to your data file location and select enter. The file information data (Sample no, Interval, Dates….) should now all be correct.
- Select Ok and OK to close the Edit Logger window , select Project / Save
- The user can now start creating charts, picture views…. To the project.

1.6 CR10 LOGGER PROGRAMMING TIPS

If all data loggers follow these same set of basic rules, integrating them into Geoviewer will be much easier.

- Store the current FSL (final storage labels) and Dat (data files) in the project data directory.
- Give the logger a unique easily identifiable name in Geoviewer.
- Enter channel identifiers in Edlog and keep the names through out the project
- Give each data file a unique ID array (Instruction 80)
- Use only logger memory location 1 or 2 not both (they share the same FSL file)
- Do not collect data at different intervals in a single logger (set output flag only once)
- Store all data files with Year, day, hrmin and seconds for all loggers (Instruction 77 with option code 1111), each data file will then have 5 non-data channels at the start of each file. (array ID, year, day of year, hour min and seconds)

1.7 GEOVIEWER MAIN WINDOW

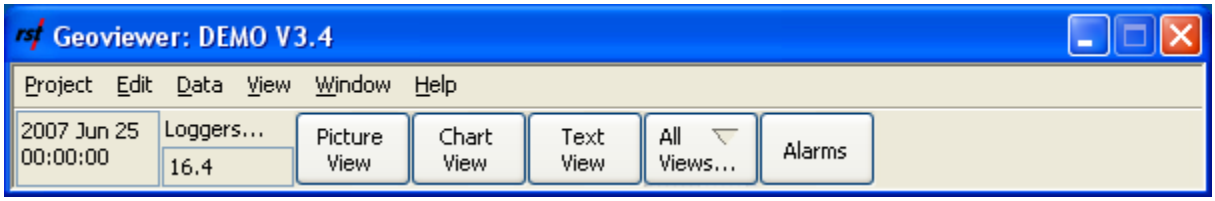


Figure 2: Geoviewer Main Window

The Geoviewer main window has drop down menus across the top and push button commands across the bottom row. The box on the left displays the date and time of the last data scan imported into Geoviewer, the box next to it is a count down timer which displays the time remaining before Geoviewer checks for new data. The box on the right displays system information such as when archiving is disabled, channels in alarm, when viewing archived data.

2 PULL DOWN MENUS

To enter a pull down menu, click on the menu desired and a list of commands will pop down. The menus can also be reached by pressing the Alt + letter key, of the letter underlined in each menu heading. For example to enter the **Data** menu enter Alt + D. Each menu has its own set of commands that can be executed by entering the menu and clicking on the command, or entering its respective key combination.

2.1 PROJECT MENU

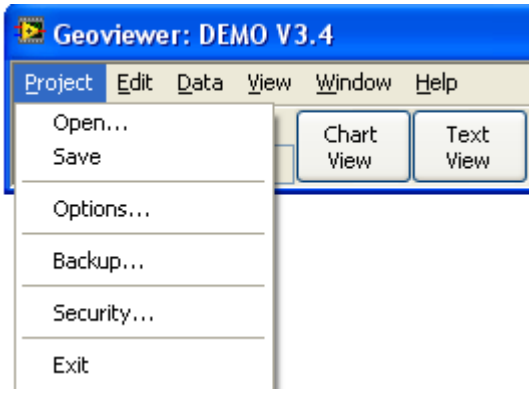


Figure 3: Project Pull Down Menu

The **File** menu has these commands:

- **Open… –** Open a previously saved project.
- **Save –** Saves the current project.
- **Options… –** Saves and closes the current project and allows the user to Rename, Save as, Import or Export the current project. A new or different project can also be selected.
- **Backup… –** Perform a complete project backup**.**
- **Security… –** Prevent users from making permit changes to the project.
- **Exit –** Exit Geoviewer.

2.1.1 PROJECT / OPEN…

The Open Project will be displayed. A previously saved project can be opened.

2.1.2 PROJECT / SAVE

All views will be closed and the current project will be saved.

2.1.3 PROJECT / OPTIONS…

Select the Options command to display the project options window. The current project will be saved and closed.

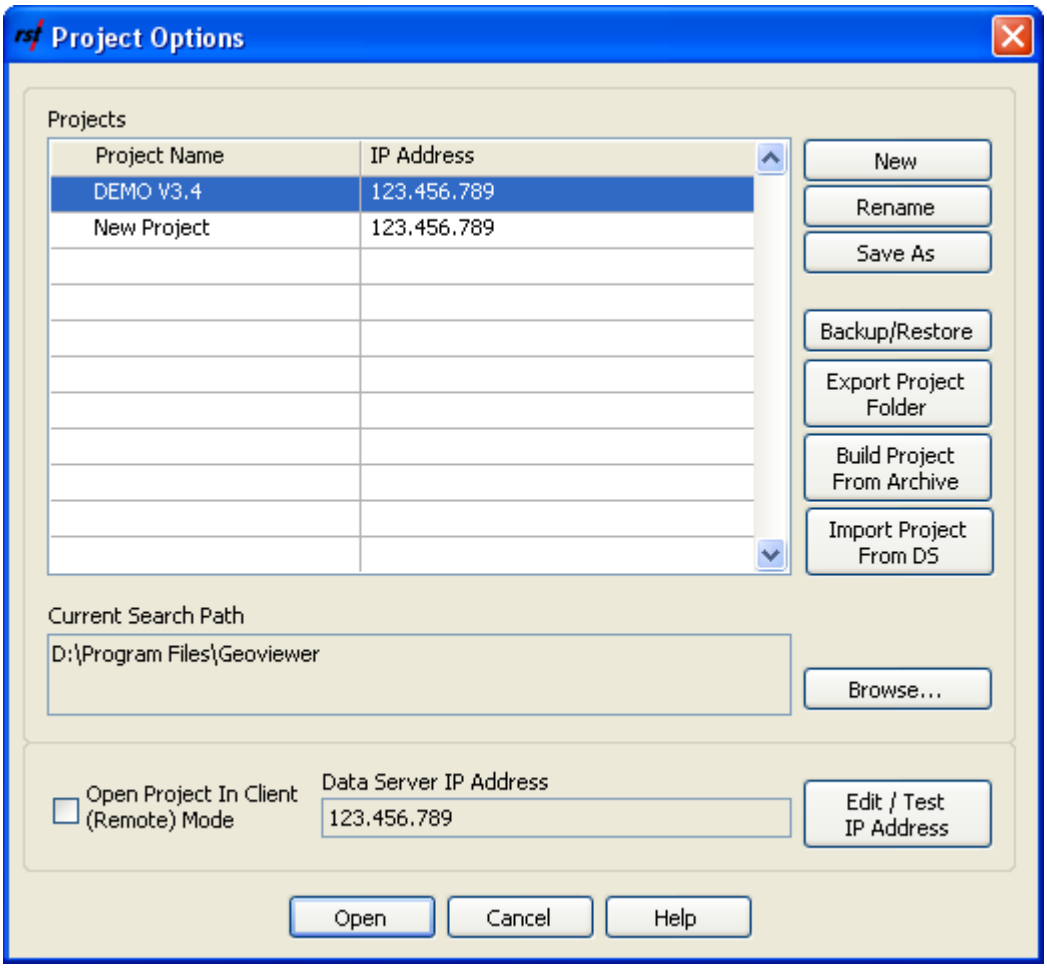


Figure 4: Project Options window

- **New –** Create new project. A prompt for the project name will be displayed and a default header and data file will be used.
- **Rename –** Rename the selected Project.
- **Save As –** Save the selected project with a different name.
- **Backup/Restore –** Allows any portion of a previously backed up project to be restored.
- **Export Project Folder –** Saves the selected project with data files – used to transfer projects to remote users. Links to data files and data files in separate directories are saved with the project.
- **Build Project From Archive –** Create a project from an archived data file.
- **Import Project From DS –** Import a project from another computer connected to the network that is running the Geoviewer data socket server. Used to setup Geoviewer in client/Remote mode.
- **Browse –** Search and select folder for project directories. All projects found in the folder will be displayed in the projects list.
- **Edit / Test IP Address –** Change the IP address that will be used to connect to Geoviewer server.
- **Open Project In Client (Remote) Mode –** If checked project data will be transferred from Geoviewer server. If unchecked, a local copy of project data will be used.
- **Data Server IP Address –** IP address associated with selected project.
- **Cancel button –** Close Project Options window and reopen the last project.

- **Open –** Open selected project

2.1.3.a IMPORT PROJECT FROM DS

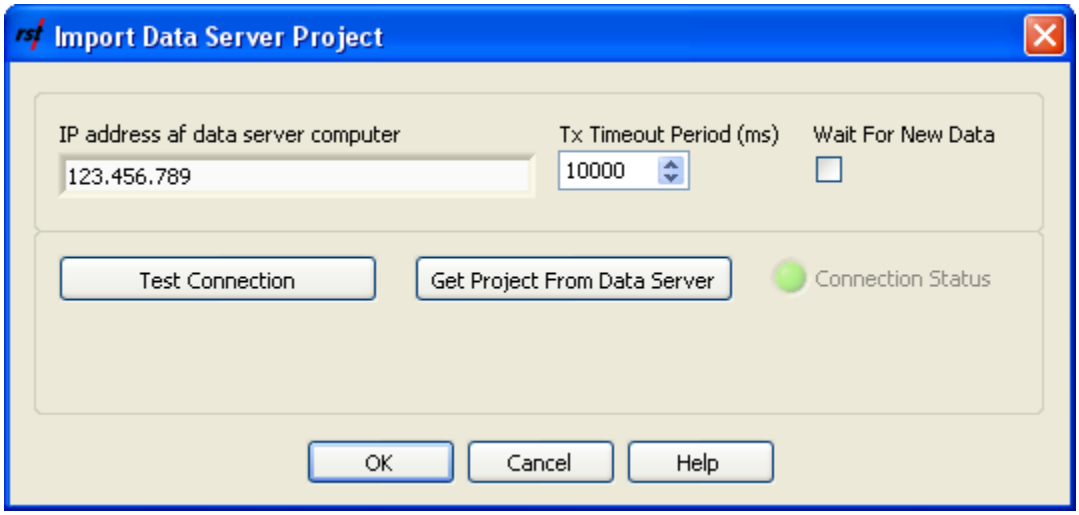


Figure 5: Import Data Server Project

The dialog is used to transfer a project from a computer running Geoviewer server.

- **IP address of data server computer –** IP address of the computer running Geoviewer server.
- **Tx Timeout Period (ms) –** The amount of time to wait for the project to be transferred. If the connection speed is slow or the project is large, multiple attempts at transferring the project may be required.
- **Wait For New Data –** The project will only be transferred if it has been modified since the last time it was downloaded.
- **Test Connection –** Ping the connection to the Geoviewer server. No project data is transferred.
- **Get Project From Data Server –** Transfer the project from the Geoviewer server computer to the local computer.
- **Connection Status –** Displays the current connection state to the Geoviewer server. A progress bar will be displayed during the transfer and a status message will be displayed to indicate the final state of the transfer.

2.1.3.b DATA SERVER IP ADDRESS

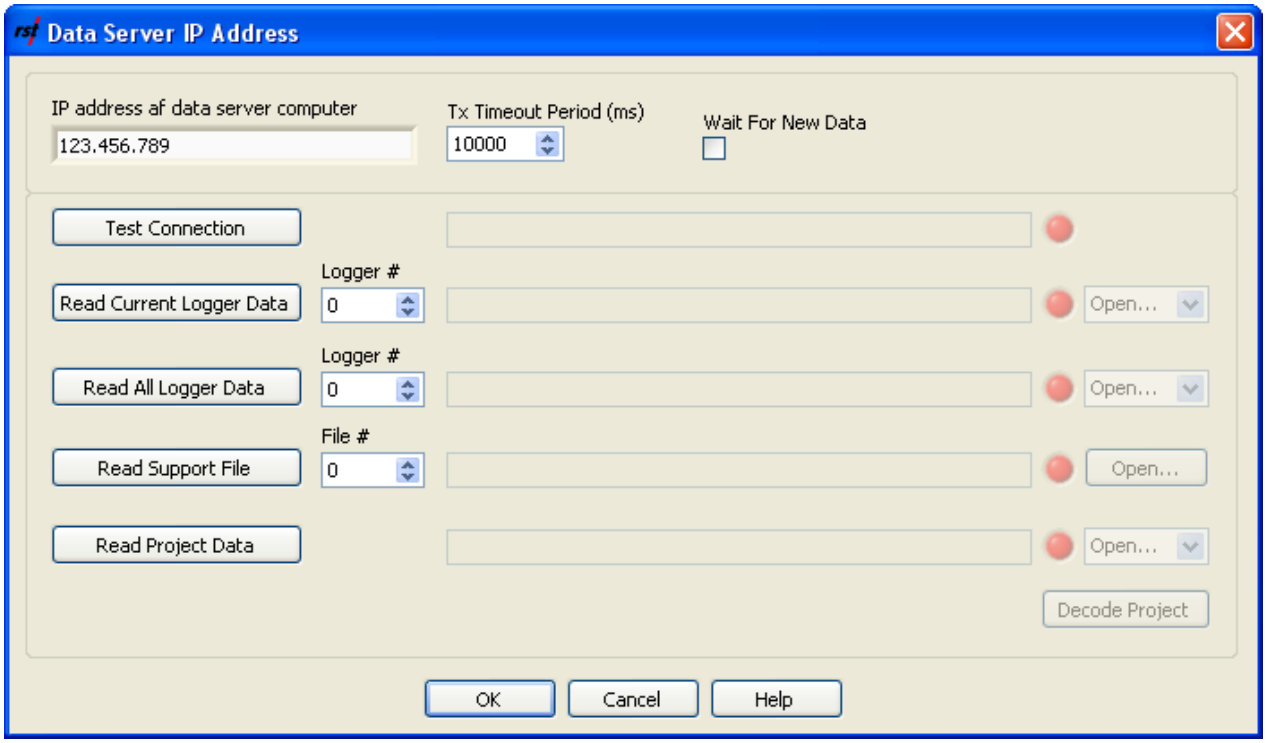


Figure 6: Data Server IP Address

This dialog is used to set the IP address to the Geoviewer server computer and to test single portions of the transfer process.

- **IP address of data server computer –** IP address of the computer running Geoviewer server.
- **Tx Timeout Period (ms) –** The amount of time to wait for the project to be transferred. If the connection speed is slow or the project is large, multiple attempts at transferring the project may be required.
- **Wait For New Data –** The project will only be transferred if it has been modified since the last time it was downloaded.
- **Test Connection –** Ping the connection to the Geoviewer server. No project data is transferred.
- **Read Current Logger Data –** Transfer the latest reading from a server's data file. **Logger #** is zero based. Click on the **Open…** control to view the transferred data.
- **Read All Logger Data –** Transfer all of the data from the server's data file. **Logger #** is zero based. Click on the **Open…** control to view the transferred data.
- **Read Support File –** Transfer a project support file from the server. **File #** is zero based. Click on the **Open…** control to view the transferred file.
- **Read Project Data –** Transfer the complete project from the server. Click on the **Open…** control to view the transferred project file. To decode the transferred project click on the **Decode Project** button.

2.1.4 PROJECT / BACKUP…

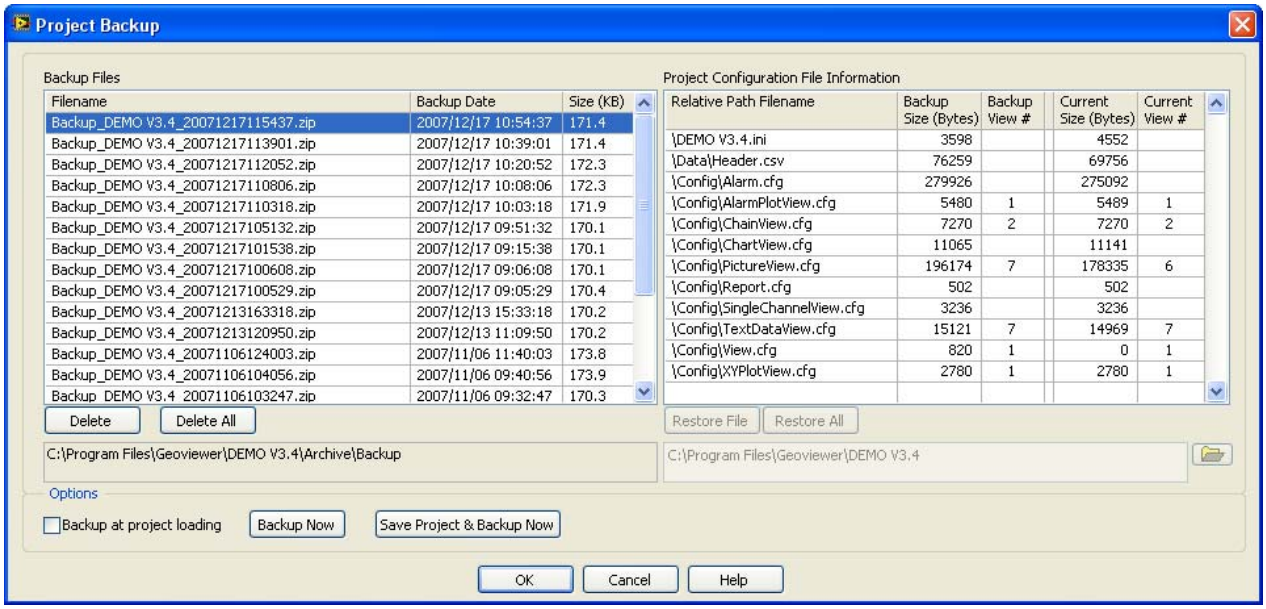


Figure 7: Project Backup window

This dialog is used to make a backup copy of the project. Previous backup data can be viewed or deleted is no longer needed.

2.1.5 PROJECT / SECURITY…

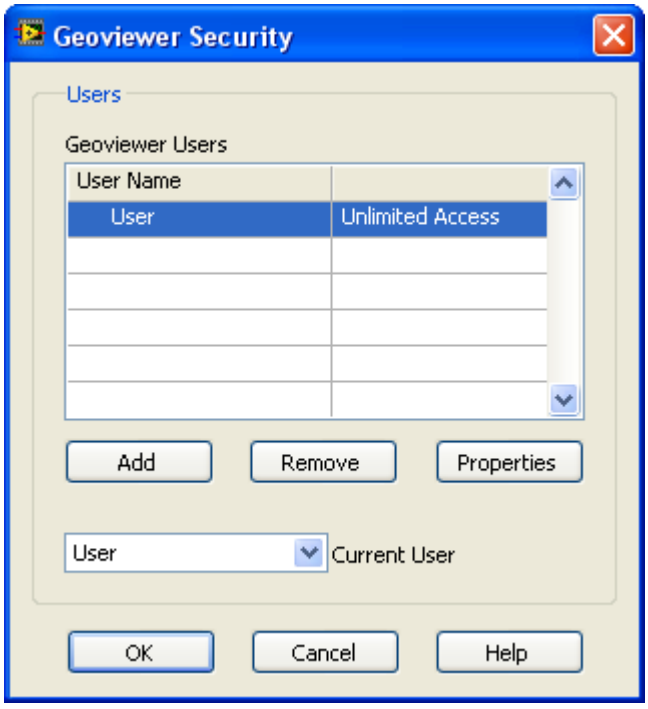


Figure 8: Project Options window

This dialog is used to limit a user from making changes to certain aspects of the project.

2.1.6 PROJECT / EXIT COMMAND

Exit Geoviewer. – Project is saved and closed. Geoviewer program is closed.

2.2 EDIT MENU

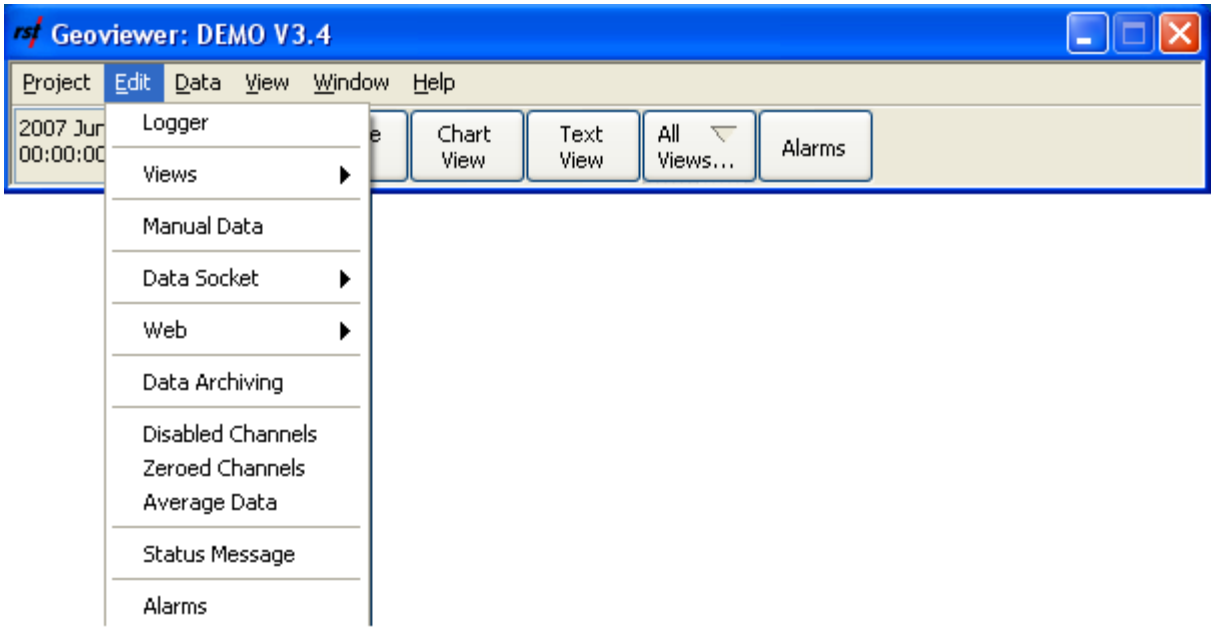


Figure 9: Edit Pull Down Menu

The **Edit** menu consists of the following commands:

- **Logger –** Add loggers, select header files, data file locations, input channel parameters
- **View/Picture –** Add, delete or rename picture files (editing of the actual file is done when picture file is opened)
- **View/Profile –**
- **View/Chain –** Setup chain views of IPI's or Beam tilt sensors
- **View/XY –**
- **View/Alarm –**
- **View/Ring –**
- **View/TDR –**
- **Manual Data –**
- **Data Socket/Server –** Screen to setup Geoviewer as a server for satellite stations
- **Data Socket/Client –** Screen to setup Geoviewer as a satellite station
- **Web/Server –**
- **Web/Client –** dffg
- **Data Archiving –** s
- **Disabled Sensors –** Display which channels have been disabled, add or remove channels to disabled list.

- **Zeroed Channels –** Display which channels have been zeroed, add or remove zeroing to channels.
- **Average Data –** Setup, calculate & display averaged data – can be used for zeroing and setting alarm values
- **Status Message –**
- **Alarms –** Display alarm status, set alarm levels, types, channels

2.2.1 EDIT / LOGGER

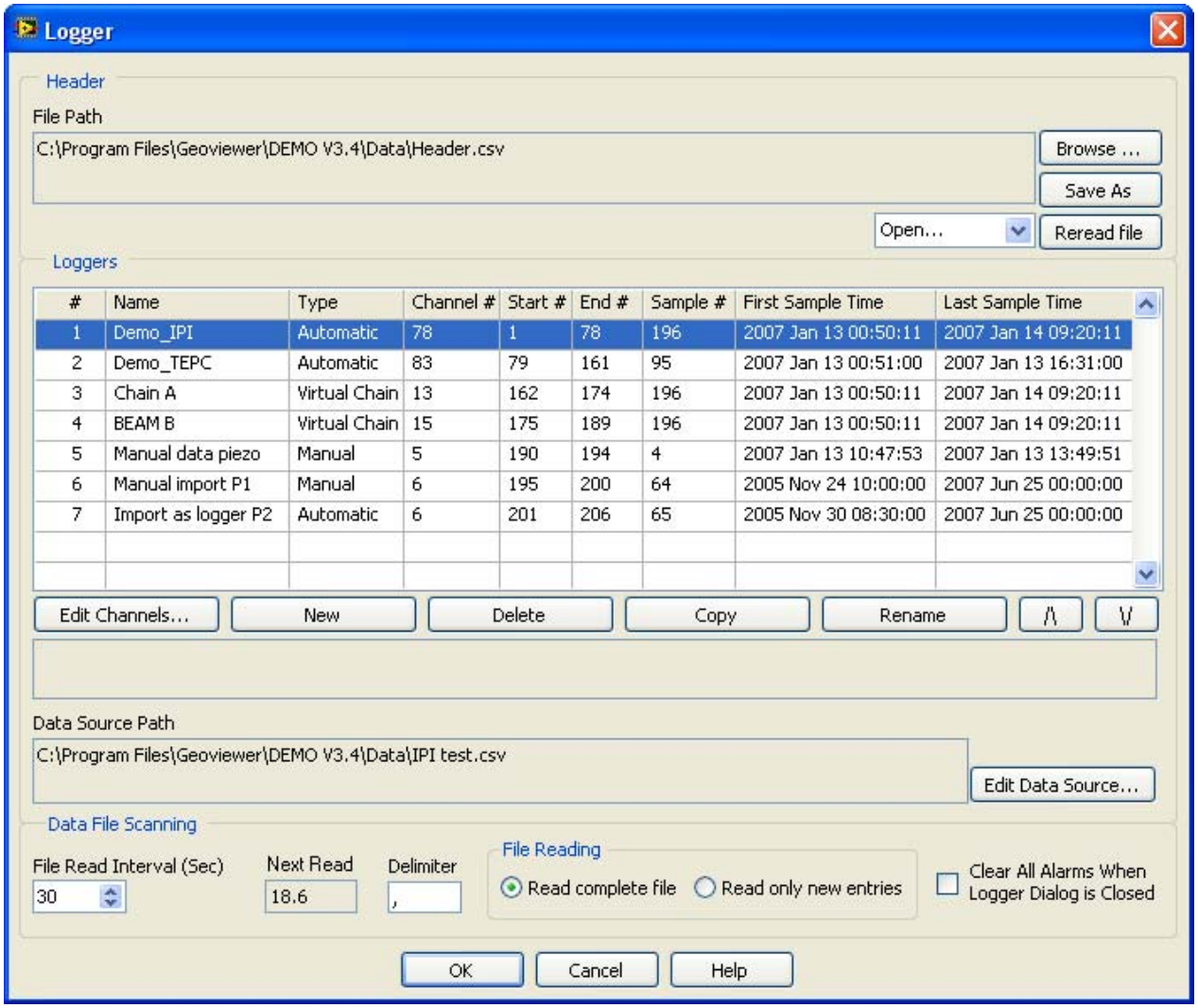


Figure 10: Edit Logger Window

The Edit Logger Command window is used to setup information for all loggers, channels, data files and header files. The Loggers window displays Start # and End # as they are stored in the header file

2.2.1.a EDIT / LOGGER / LOGGER

- **New –** Adds a logger to the project. Select new and give the logger a unique name and select OK. Data channels are assigned based on logger order in the logger list, logger order can be changed by selecting the logger and moving its position using the up/down arrows at the bottom of the window.

- **Edit Channels –** Opens a window where information for each channel of the selected logger can be displayed, edited or entered. Some of this information can also be input by editing the header file using Excel, this is handy when you have a lot of channels with common parameters.
- **Delete, Copy, Rename –** Deletes, copies or renames logger entries
- **Edit Data Source –** Displays the name and location of the current data source file for the selected logger. To select a new data file location press the "Edit Data Source " button. This is normally the *.Dat or *.csv file generated by the data logger.
- **Header File Path –** Allows the user to select, save as or reread the header file for the current project. The header file is first generated when a project is created

2.2.1.b EDIT / LOGGER / HEADER

The Header file stores how Geoviewer processes data from the logger. The Header file stores information (Name, cal constants, raw and calculated units, zero offset …) for each channel for all loggers. Each row entry in the header file corresponds to an entry in the logger data files (*.dat). The data is read in the same order as they are entered in the logger list and channel list box. A header file is comma delimited and can be edited with an external program, such as Excel. Always make a backup copy before editing the file. The file must be re-saved only as a comma delimited file (CSV).

- **Save As –** Press the Save As button to close the Data Header Editor window and save any changes that have been made. Note: if an external editor such as Excel has the file open, an IO error may occur.
- **File Path –** Displays the name and location of the header file. The Header name can not be directly changed in this window but can be changed using the Save as button. Use the browse button to select a new file.
- **Browse –** Press the browse button to select a different header file. The Select header file to open window will be displayed. Navigate to the required file.
- **Reread File –** Reread the current header file. The command is used to read a header file that has been modified outside of Geoviewer.

2.2.1.c EDIT / LOGGER / EDIT DATA SOURCE

The Data Source Editor window is used to setup how the data file (*.dat) is read in. The data file is created, Modified and updated by an external program such as when data is collected using PC208. Geoviewer automatically tests the data file for new samples at a fix interval and then reads in the samples if any are present.

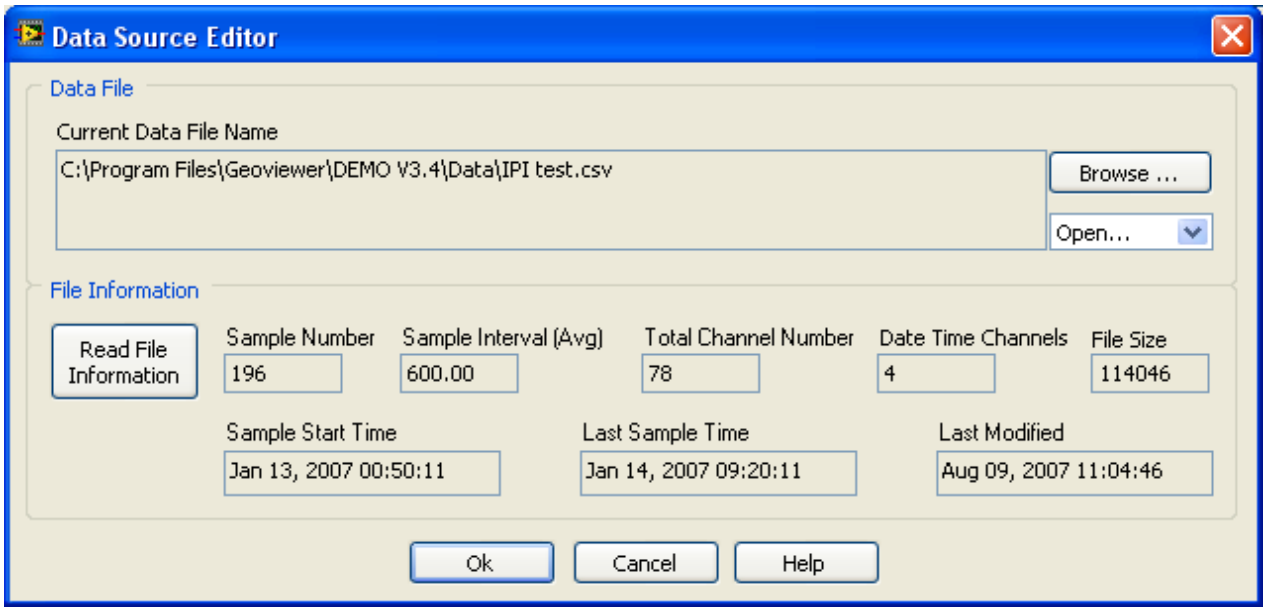


Figure 11: Data Source Editor Window

- **Ok –** Press the Ok button to close the Data Source window and save any changes that have been made.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Data Source window, any changes made will not be saved.

2.2.1.d EDIT / LOGGER / EDIT DATA SOURCE / DATA FILE

- **Current data file name –** Displays the name of the current data file. The data file name can not be directly changed, use the browse button to select a new file.
- **Browse –** Press the browse button to select a different data file. The Select data file window will be displayed. Navigate to the required file.
- **File read interval –**The File read interval determines how often the test for new data is made. Enter a value in seconds.
- **Next read –** Displays the number of seconds until the next test for new data will be.
- **File reading –** Determines how the data file is read. If the Read complete file option is selected, the complete data file is read every time new entries are detected. If the Read only new entries option is selected, only the new entries will be read in. The read new entries option is usually selected to speed up data collection for display
- **Last modified –** Displays the date and time when the data file was last modified.
- **Delimiter –** When the data file is read in a delimiter is used to separate the channels. Enter a single character or \ code of the delimiter being used. The following codes can be used, \t = tab, \s = space, \r = carriage return, \n = linefeed, \b = backspace, \f = form feed, \\ = \, or any 8 bit uppercase hex value can be used in the range \00 - \FF. Files generated by PC208 and LoggerNet are comma (,) delimited.

2.2.1.e EDIT / LOGGERS / EDIT DATA SOURCE / FILE INFORMATION

- **Sample number –** Displays the total number of samples read in from the data file.
- **Sample interval (Avg) –** Displays the average time between samples. If there is a gap in the sampling, this time is included in the average calculation.
- **Reread File Information –** The data source file is completely reread. The test for new data is not altered.
- **Sample start time –** The date and time of the first sample in the data file.

- **Last sample time –** The date and time of the last sample in the data file.
- **Total Channel Number –** Displays the number of channels read from the data file.
- **Date Time Channel –** Displays the number of logger channels used for date and time information.
- **File Size –** Size of data file in bytes.
- **Sample Start Time / Last sample time –** Data and time of 1st and last data sample in the data file.
- **Last Modified -** Data and time the file was last modified.

NOTE: If the data file and the header file do not match the displayed file parameters will be incorrect. i.e. Sample Start Time may read 1903 Dec 31 17:00.

2.2.1.f EDIT / LOGGER / EDIT CHANNEL

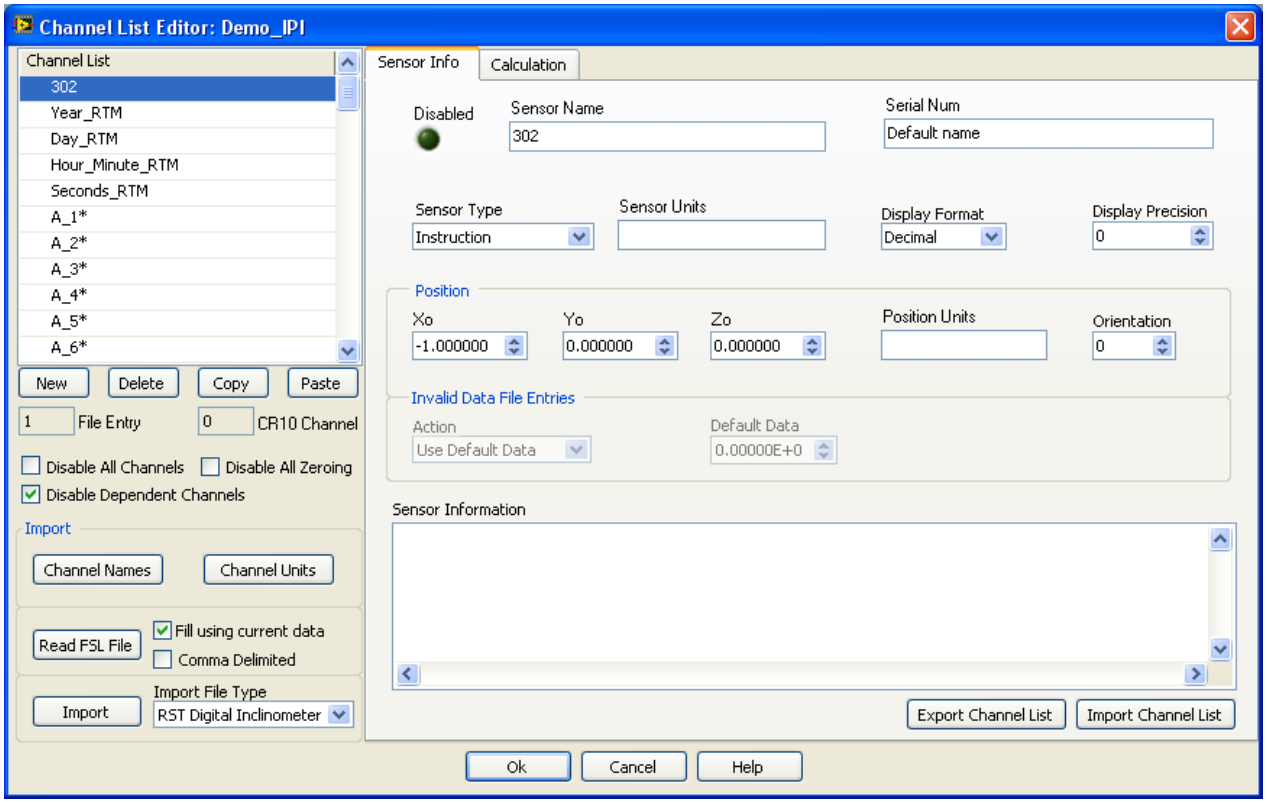


Figure 12: Channel List Editor Sensor Info

- **Channel List –** Displays a list of all channels for selected logger. There is no limit to the number of channels that can be added, added channels can be used for calculations using other channels.
- **New –** Used to insert a new channel in the channel list. The new channel will be inserted below the channel that is currently selected. Default or copied data will be used for all channel properties.
- **Delete –** Used to delete the channel that is currently selected in the list box.
- **Copy –** Copies all the data from the selected channel to temporary memory.
- **Paste –** Paste previously copied data into the selected channel. If no data has been copied, default data will be used.
- **File Entry –** Displays the position of the selected channel in the Header file. The first channel is one.
- **CR10 Channel –** Displays the position of the selected channel relative to the first sensor channel entry. Some channels are not linked to any sensor, such as date and time channels. These channels are not included when the position is calculated and will be displayed as zero. The number of channels not linked to an actual data column is recorded in the project *.ini file. If the CR10 Channel number is

incorrect it can be corrected by opening the "Project Name".ini file in NotePad and editing the CR10 offset =-x location. The default is -4. (File Identifier, Year, Day and Hour Min). The INI file is located in the "Project" root directory.

- **Read FSL File –** This function is used to add channel descriptions and channel numbers to the header file. There is one *.FSL file per logger. The *.FSL file is generated by PC208 or Loggernet whenever a logger program is compiled. The file contains data column header information . Use the Select fsl file to navigate to the required file. When the file is read, the previous header channel information is removed and then the new name and default data for each channel is entered. If the Fill using current data check box is checked, the current channel information is used instead of default information.
- **Fill using current data –** See above, Read FSL File. Have this box checked to preserve existing channel parameters such as location and calibration constants.

NOTE: Exercise Caution when using these functions. Make a backup copy before editing, re-reading or adding channels. The channel list **must** match the imported (*.dat) data file. It is best to add channels at the very end of the channel list.

- **Disable All Channels –** A disabled channel can not trigger an alarm or warning. If the sensor is used in the string calculation the initial sensor value will be used.
- **Disable All Dependent Channels –** Disables calculations that are dependent on other channels for the final reading. E.g. Addition of individual beam or IPI readings in a chain calculation
- **Disable All Zeroing –** Disables all zeroing operations, data will be actual sensor reading without user defined zero offset.

2.2.1.g EDIT / LOGGER / EDIT CHANNEL / SENSOR INFO

This screen displays information about how the data was collected in the source file (raw voltage, KHz^2, converted temperature…) as well as information about the sensor (location, orientation, s/n, sensor type)

- **Sensor Name –** Displays the name for the sensor or channel. This name is used whenever a channel list is displayed or the sensor data is plotted.
- **Serial Num –** Allows input or displays the serial number for the sensor.
- **Disabled –** Displays the disabled status for the channel. Click on the LED to disable or enable the channel. The LED will be red if the channel is disabled. A disabled channel can not trigger an alarm or warning. If the sensor is used in the chain calculation the initial sensor value will be used.
- **Sensor Type – Data type –** Select the data type that the data has been saved in. To select a type, click on the control to display the data type popup menu and choose an item from the list, this is useful for grouping different types of sensors
- **Sensor Units –** Enter the unit label for the selected data type. This label will be displayed whenever the channel is plotted using the raw data type.
- **Display Format –** Select Decimal, Scientific or Engineering
- **Display Precision –** Select the number of decimal points to be used when displaying the data.
- **Sensor Information –** Enter information such as location, date of install, date of calibration, problems, wiring, etc ……

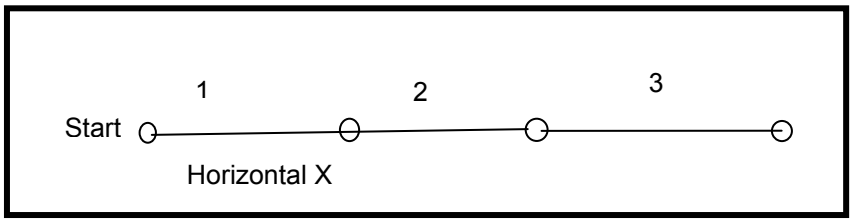
These input boxes are used when defining strings of IPI's or Tilt Beams

- **Xo –** Displays the initial horizontal X location of the sensor. If not used, control is grayed out.
- **Yo –** Displays the initial horizontal Y location of the sensor. If not used, control is grayed out.
- **Zo –** Displays the initial vertical Z location of the sensor. If not used, control is grayed out.
- **Position Units –** Enter units used for X,Y & Y coordinates e.g. m
- **Orientation -** Horizontal = 0 Vertical= 90

Example: Three 3 meter beams in a horizontal formation

Starting from X = 0 Y=11 Z=3
Location Beam 1 X=3 Y=11 Z=3

Location Beam 2 X=6 Y=11 Z=3
Location Beam 3 X=9 Y=11 Z=3



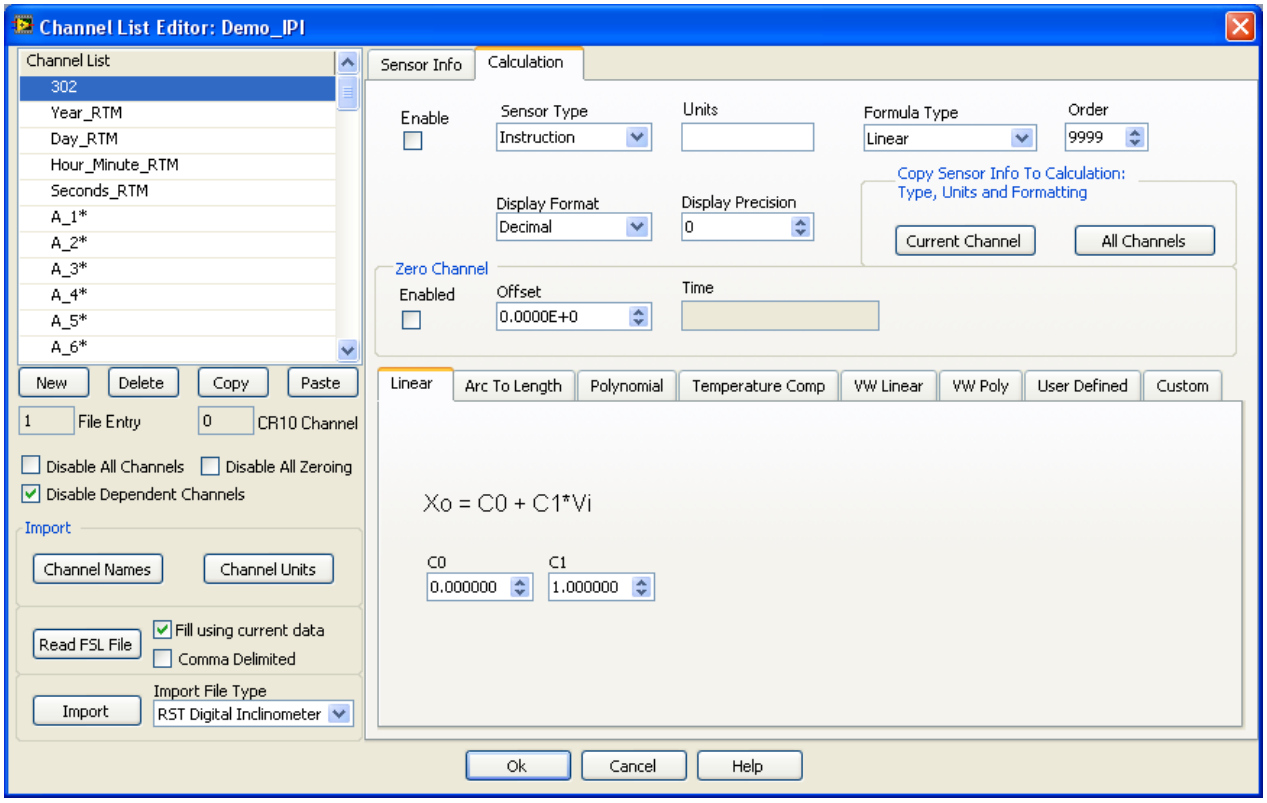


Figure 13: Channel List Editor - Calculation

This screen displays information about how the raw data is converted to engineering units.

2.2.1.h EDIT / LOGGERS / EDIT CHANNEL / CALCULATION WINDOW

- **Enable –** Enable or disable the calculation for this channel – Green = enabled
- **Sensor Type –** Select the data type that the channel will have after the channel's scaling factor is applied. To select a type, click on the control to display the data type popup menu and choose an item from the list.
- **Units –** Enter the unit label for the selected data type. This label will be automatically displayed whenever the channel is plotted using the calculated data type.
- **Formula Type –** Select the formula you want to apply to the raw data from the drop down window.
- **Order –** Allows the user to select the order in which the calculations will be preformed. This is useful when one calculation is dependent on another calculation for a correct result. As an example – IPI Temperature compensation, the temperature must be calculated before the temperature correction can be applied. There fore the IPI thermistor would require a lower order number than the tilt calculation.

- **Display Format –** Select Decimal, Scientific or Engineering
- **Display Precision –** Select the number of decimal points to be used when displaying the data.

2.2.1.i EDIT / LOGGERS / ZEROING SENSOR OUTPUT

Zero offsets can be applied manually in this window or applied graphically in Chart View or in the zeroing utility, see Edit Zero Channels Sec. 2.2.9

- **Zero Enable –** Enable or disable the applied zero
- **Zero Offset –** Enter or display the zero offset in engineering units
- **Zero Time –** Displays time when graphical zero was applied

2.2.1.j FORMULA TYPES

Linear – V = C0 + C1*Vi
- **Multiplier (C1)–** The raw sensor data read from file is multiplied by this number. An exponential number can be entered and will be converted to float, e.g. 1.23E-1 = 0.123.
- **Offset (C0) –** The offset is added after the multiplier has been applied to the raw sensor data. An exponential number can be entered and will be converted to float, e.g. 1.23E-1 = 0.123.

Arc to Length
- Convert tilt angles to deflections. Angles can be in arc degrees or radians. Deflection is in same units as enter length

Polynomial
- **Factors –** Enter the polynomial factors C0 to C5.

Temp Comp
- Specifically designed for use with ELS IPI's and Beams. Applies temperature correction and conversion to arc degrees.

VW Linear
- Specifically designed for use with Vibrating Wire Piezometers. Applies temperature and barometric corrections and conversion using linear factors to engineering units.

VW Poly
- Specifically designed for use with Vibrating Wire Piezometers. Applies temperature and barometric corrections and conversion using polynomial factors to engineering units.

User Defined

This screen allows users to develop their own equations using up to 10 active channels and 18 variables. Because the User defined equations are not hard coded they use a lot of processor power and will slow the system down considerable if used on a large number of channels. It is meant to be used sparingly on a few unsupported channels (up to 30 channel). If your project requires a calculation for a lot channels that is not included with Geoviewer you should select the custom tab.

Custom

This screen allows users to select custom equations that have been hard coded by RST Instruments. The window operates the same as the User Define except the equations are pre-built (hard coded) to customer specifications. Please contact RST Instruments for more information. The equations can use up to 10 active channels and 18 variables. Because the Custom equations are hard coded they use a less processor power and will not slow the system down.

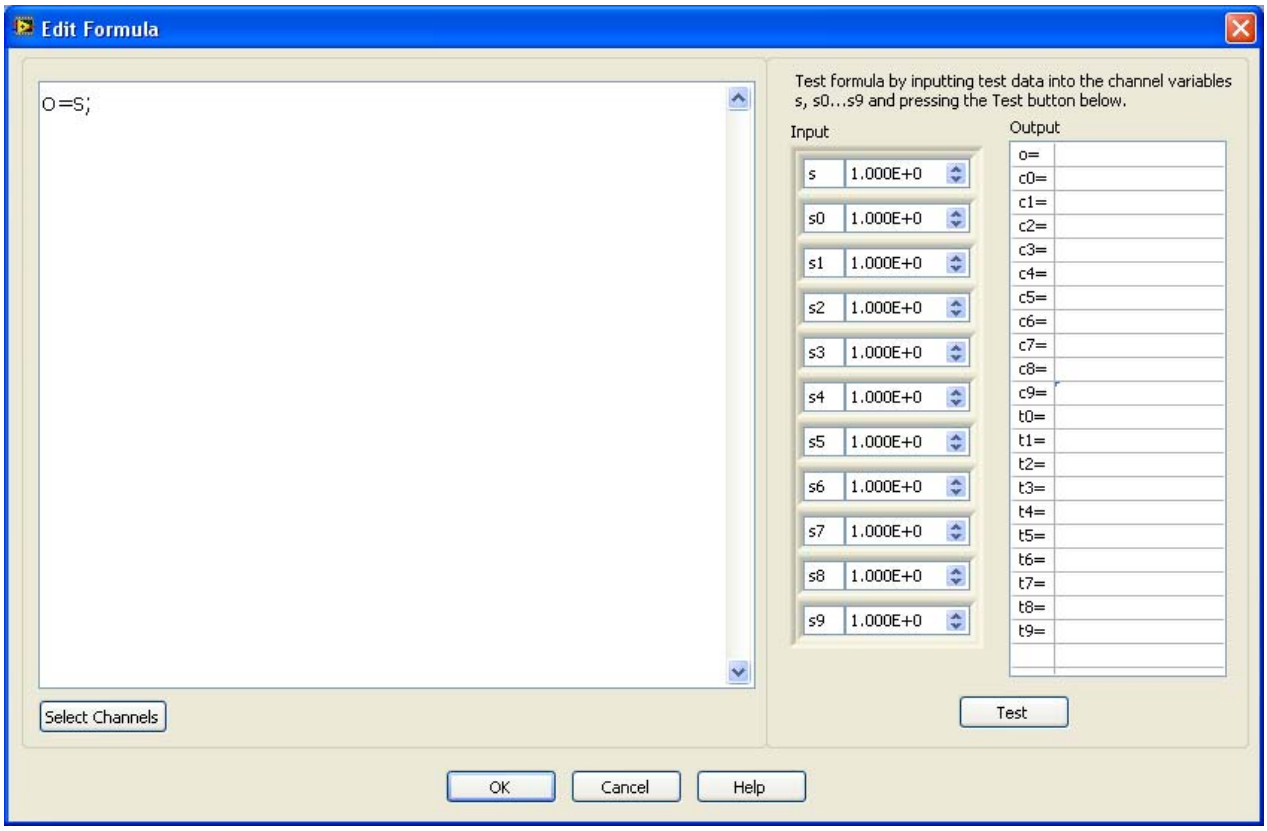


Figure 14: User Defined Edit Window

Sensor will equate the given formula

1. From the User Defined window, select Edit, the above window will open.
2. Select Edit Channels, select add, assign s0 to s9 for the active channels in your equation
3. Up to ten channels can be assigned in the formula calculation.
4. The data from the currently selected channel can be accessed thru the variable s. – Use s if you are only using the currently selected channel
5. Enter the temp variables to be used in your equation: c0..c9,t0..t9
6. **End every line with a ;**
7. All variables and functions must be in lower case.
8. Enter your equation - Assign the output to the variable o.
9. Input test data (any convenient easily calculated number) in the corresponding test data box (s – s9)
10. Select the test button – calculated result will be displayed in the o= output box

Example:

```
c0 = 2;
c1 = 3;
t5 = 11;
o = c0*s1 + c1^3 + t5;
If s1 = 2.2
Result --> o = 2 s1 + 38 = 44.4
```

The following functions can be used.

Function		Description
abs(x)	Absolute Value:	Returns the absolute value of x.
acos(x)	Inverse Cosine:	Computes the inverse cosine of x.
acosh(x)	Inverse Hyperbolic: Cosine	Computes the inverse hyperbolic cosine of x in radians.
asin(x)	Inverse Sine:	Computes the inverse sine of x in radians.
asinh(x)	Inverse Hyperbolic: Sine	computes the inverse hyperbolic sine of x in radians.
atan(x)	Inverse Tangent:	Computes the inverse tangent of x in radians.
atanh(x)	Inverse Hyperbolic: Tangent	Computes the inverse hyperbolic tangent of x in radians.
ci(x)	Cosine Integral:	Computes the cosine integral of x where x is any real number.
ceil(x)	Round to +Infinity	Rounds x to the next higher integer (smallest integer >= x.)
cos(x)	Cosine:	Computes the cosine of x in radians.
cosh(x)	Hyperbolic Cosine:	Computes the hyperbolic cosine of x in radians.
cot(x)	Cotangent:	Computes the cotangent of x in radians (1/tan(x)).
csc(x)	Cosecant:	Computes the cosecant of x in radians (1/sin(x)).
exp(x)	Exponential:	Computes the value of e raised to the power x.
expm1(x)	Exponential(Arg)-1:	Computes the value of e raised to the power of x - 1 (e^x - 1)
floor(x)	Round to -Infinity	Truncates x to the next lower integer (Largest integer <= x)
gamma(x)	Gamma Function	G(n + 1) = n!, for all natural numbers n.
getexp(x)	Mantissa and exponent:	Returns the exponent of x.
getman(x)	Mantissa and exponent:	Returns the mantissa of x.
int(x)	Round to nearest integer:	Rounds its argument to the nearest even integer.
intrz	Round toward zero:	Rounds x to the nearest integer between x and zero.
ln(x)	Natural Logarithm:	Computes the natural logarithm of x (to the base e).
lnpl(x)	Natural Logarithm: (Arg + 1)	Computes the natural logarithm of (x + 1).
log(x)	Logarithm Base 10:	Computes the logarithm of x (to the base 10).
log2(x)	Logarithm Base 2:	Computes the logarithm of x (to the base 2).
pi(x)	Represents the value	p= 3.14159...pi(x) = x * p pi(1) = p pi(2.4) = 2.4 * p
rand( )	Random Number: (0-1)	Produces a floating-point number between 0 and 1.
sec(x)	Secant:	Computes the secant of x (1/cos(x)).
si(x)	Sine Integral:	Computes the sine integral of x where x is any real number.
sign(x)	Sign	Returns 1 if x is greater than 0.Returns 0 if x is equal to 0.Returns -1 if x is less than 0.
sin(x)	Sine	Computes the sine of x in radians.
sinc(x)	Sinc	Computes the sine of x divided by x in radians (sin(x)/x).
sinh(x)	Hyperbolic Sine	Computes the hyperbolic sine of x in radians.
spike(x)	Spike function	spike(x) returns: 1 if 0 £ x £ 1 0 for any other value of x.
sqrt(x)	Square Root	Computes the square root of x.
square(x)	Square function	square (x) returns: 1 if 2n £ x £ (2n + 1) 0 if 2n + 1 £ x £ (2n + 2) where x is any real number and n is any integer. step(x) Step function step(x) returns: 0 if x < 0 1 if any other condition obtains.
tan(x)	Tangent	Computes the tangent of x in radians.
tanh(x)	Hyperbolic Tangent	Computes the hyperbolic tangent of x in radians.

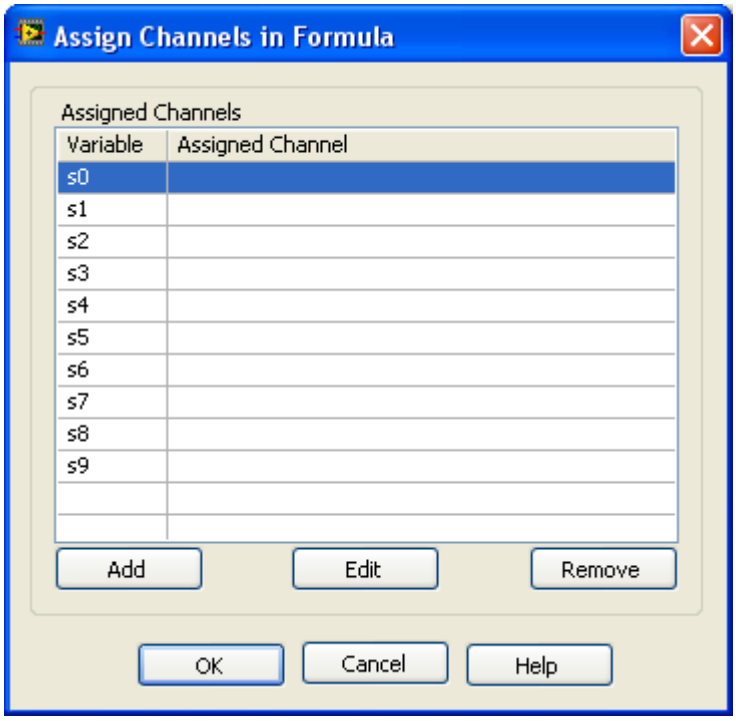


Figure 15: User Defined / Edit / Select Channels Window

- **Add –** Select any channel from the drop down channel list to assign it to the selected variable
- **Edit / Remove –** Edit or remove the selected assignment.

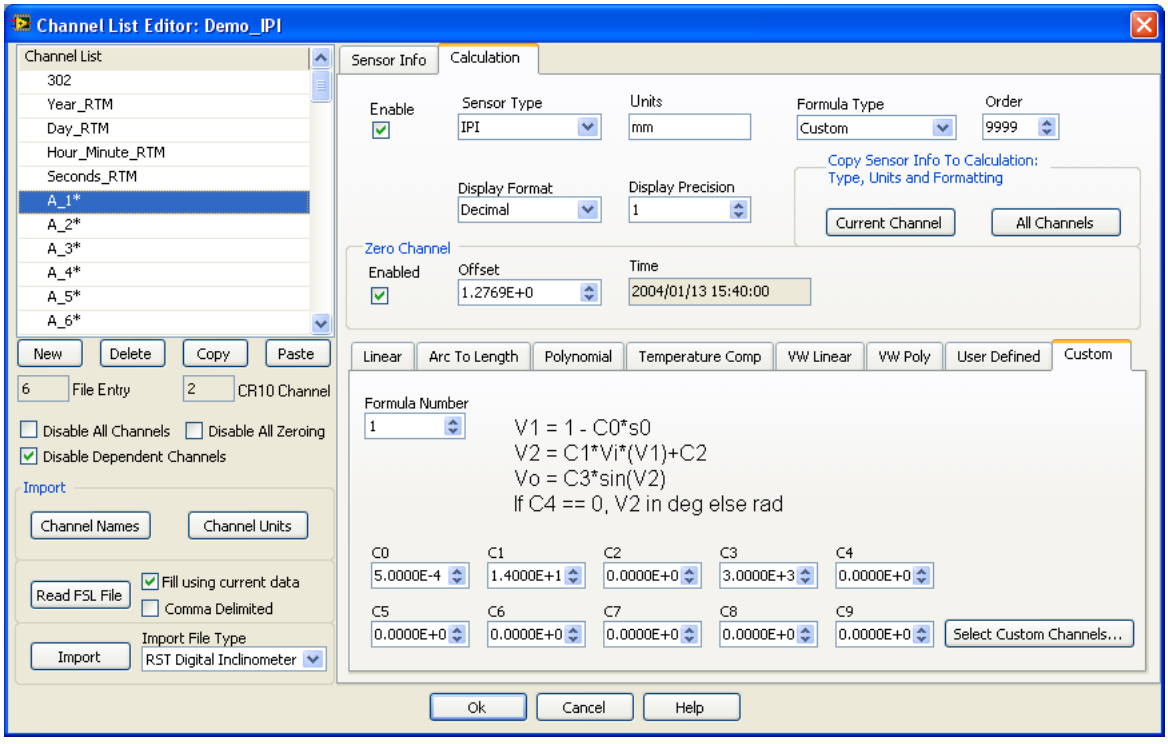


Figure 16: Custom Equation Window

- **Formula Number –** Select a formula number and the custom formula associated with that number will be displayed to the right. Which formula is displayed depends on what the client requested when ordering Geoviewer.
- **Select Custom Channels –** See Figure 15: User Defined / Edit / Select Channels Window
- **C0…C9 –** Input the required constants into C0 to C9

2.2.2 EDIT / MANUAL DATA

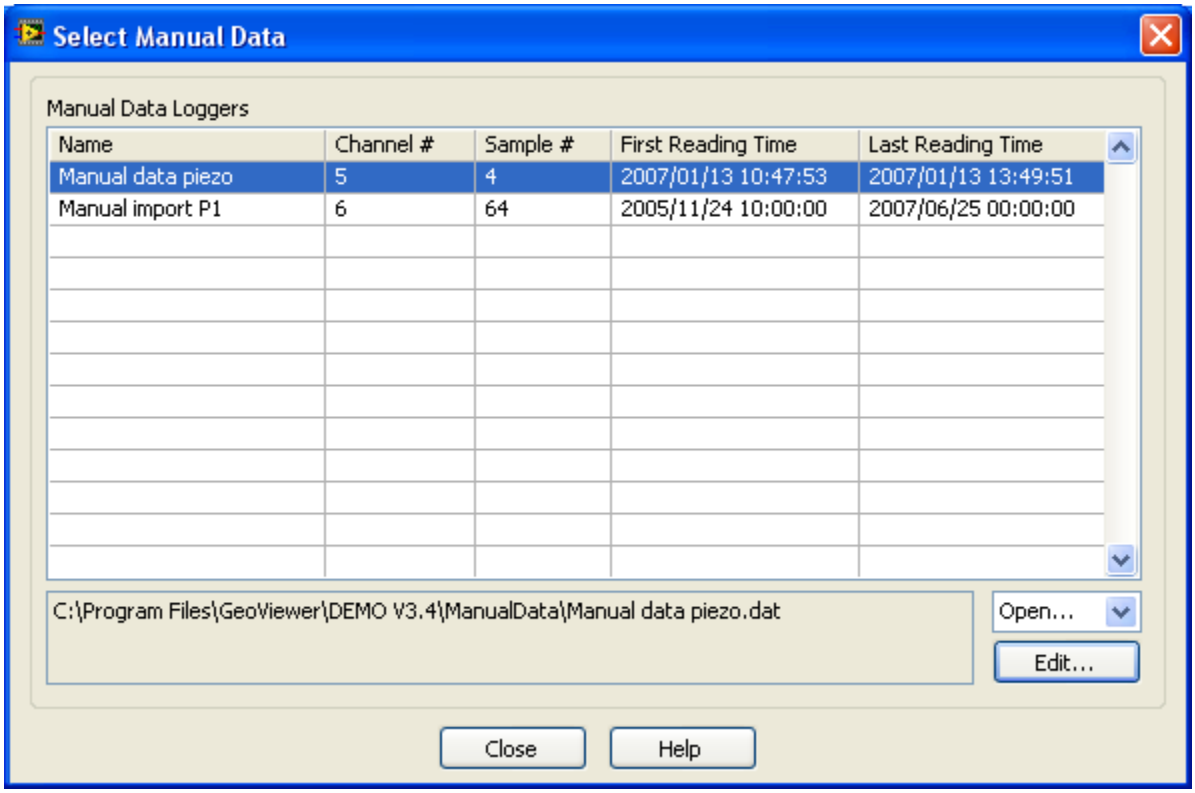


Figure 17: Select Manual Data Window

2.2.2.a EDIT / MANUAL DATA / EDIT

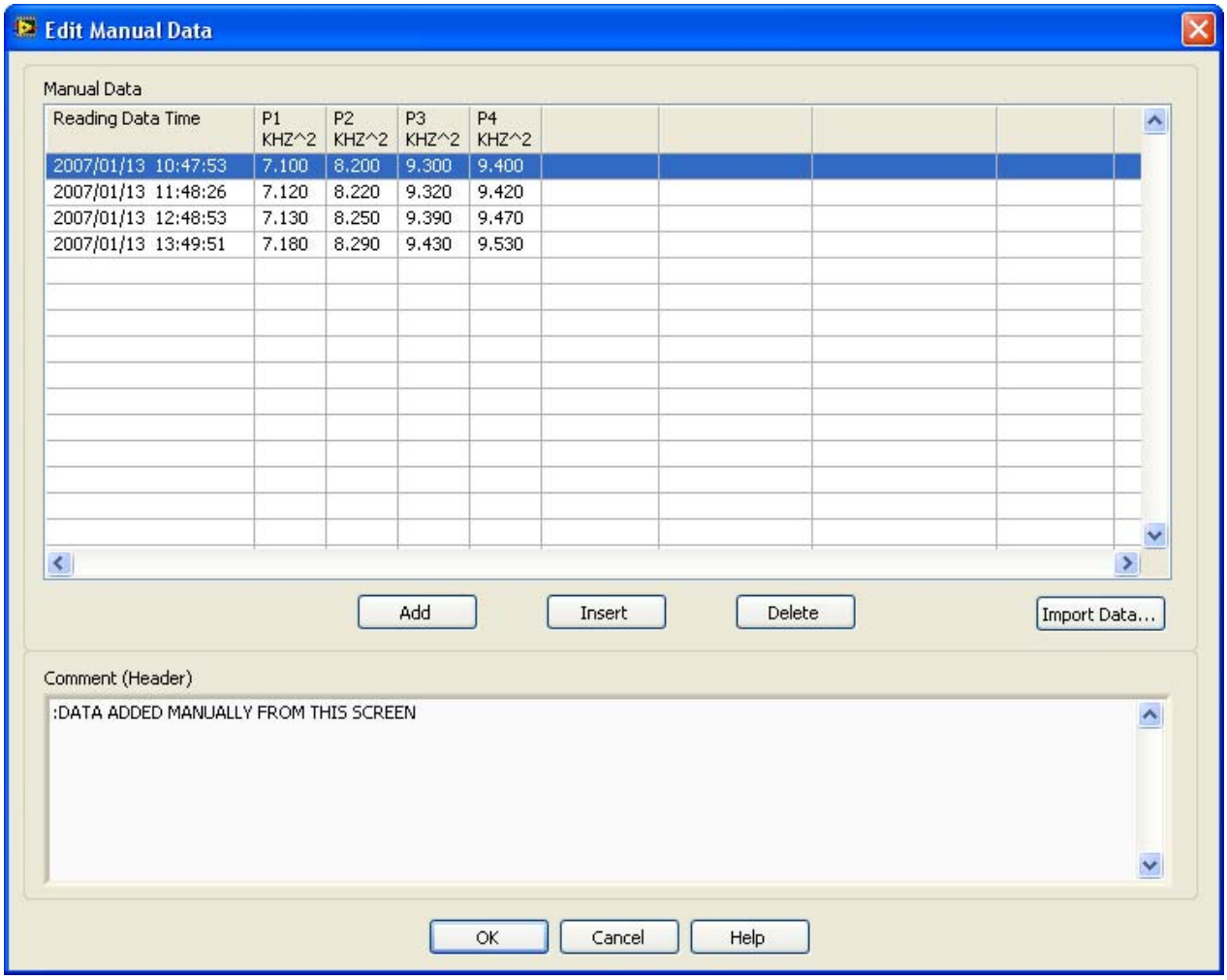


Figure 18: Select Manual Data Window

Manual Data Format

1) The file must be saved in standard csv format.
2) Data from a excel worksheet can be directly exported to this format.
3) The file can contain a header portion.
   - Any information can be placed in the header.
   - There is no limit to the number of rows
   - The first column must not contain valid numeric values or the '$' character.
4) The first valid numeric value, '$', or data/time in the first column marks the start of data.
   - Date can be entered in following formats (Y/M/D), (D/M/Y) or (M/D/Y).
5) The file can not contain a footer.
   - No non data entries can be placed after the last data entry. Any information will be taken as valid data.
6) Information can be placed to the right of the last data entry.
7) Channels names and units can be directly imported in Geoviewer
   - Place the units string a row directly above the first data entry for the channel.
   - Place the Channel name string a row directly above the unit's entry for the channel.
   - From within Geoviewer these values can be read in and saved

2.2.3 EDIT / DATA SERVER

The main Geoviewer computer can act as a host so that satellite computers can retrieve data via the internet and display data form the project in remote locations. When connected to the internet, Geoviewer tests the connection and displays the IP address and the remote Access Code. This address and the access code are saved with the project; the project can then be installed on a remote computer. A static IP address is required. The IP address must be accessible from the remote site. i.e. You can not access and internal LAN connection from outside of the LAN.

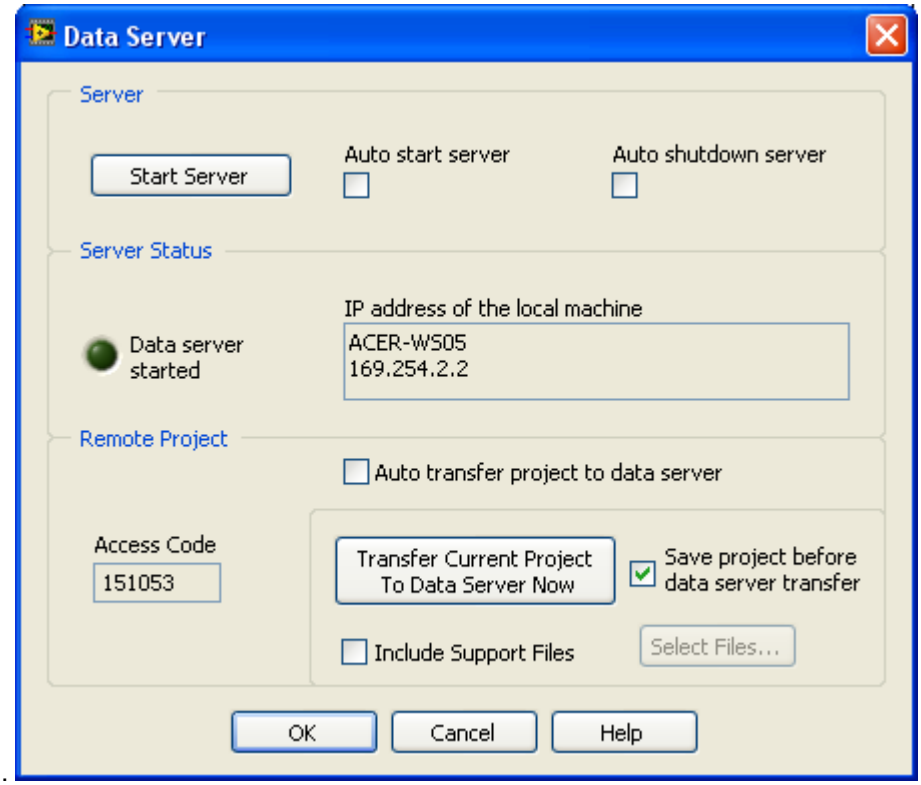


Figure 19: Edit Data Server

- **Start/Shutdown Server-** Enables or disables the server function.
- **Auto Start / Shutdown –** Starts or stops the server function when Geoviewer is started or stopped.
- **Server Status –** Data socket server stated indicator is green when server is running. The IP address displayed is the name and number of the host machine
- **Remote Project –** This is the access code required by the remote computers running Geoviewer. This code is different from project to project and can change within a project when certain parameters are edited.

2.2.4 EDIT / CLIENT CONNECTION

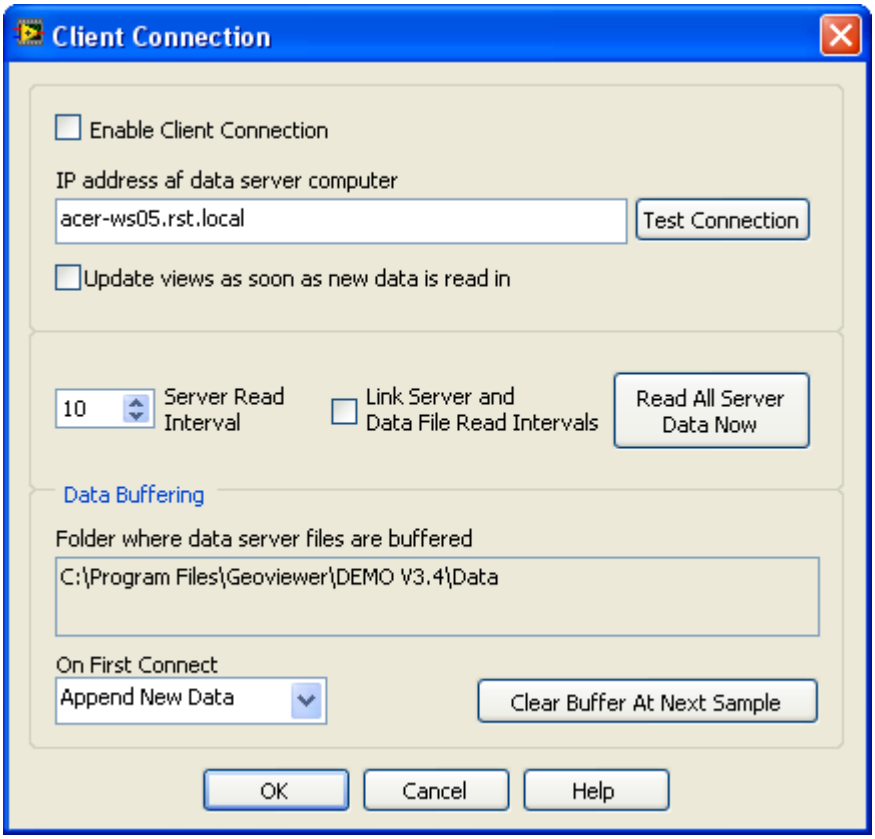


Figure 20: Edit Client Connection

Computers running Geoviewer in Remote Mode can act as satellite receivers and retrieve and display data form the project via the internet. Geoviewer can test the connection of the displayed IP address. The IP address and the remote Access Code are generated by the host computer and can come with the project or can be input manually. A static host IP address is required. The IP address must be accessible from the remote site. i.e. You can not access an internal LAN connection from outside of the LAN.

When first connected the remote computer collects only the most recent log of data and saves it to a buffer file. While connected the remote computer will receive new data logs and append them to the buffered file. If you disconnect from the host and reconnect after several logs have been processed you will only receive the latest log (a time gap will appear in the remote data file) . If Read All Remote Data is selected from on first connect, the current buffer file is over written with all of the data currently in the host. i.e The same active data set from all loggers at the host. If the host file is large it could take some time to collect the complete data file

- **Enable / Disable Remote Connection -** Enables (Green Light ON) or disables the remote function.
- **IP Address of Remote Computer –** Host IP Address
- **Test Connection-** Tests the internet connection.
- **Data Buffering –** Defines where the remote data files are buffered and how the data is collected and saved.

On First Connect – Defines how the current data in the remote project and new data from the host are handled when a connection is started. New data can either be appended to the current buffered file (most recent only), the current buffered file can be archived and a new buffered file started (One reading in the new buffer file, or the buffered file can be overwritten with new data (old buffer file is deleted and a new

one started which will contain only the current readings). If Read All Remote Data is selected the current buffer file is over written with all of the data currently in the host. i.e The same active data set from all loggers as the host

- **Clear Buffer Now –** Clears the current buffer file the next time a sample is collected, you would then have one sample in your buffer file.
- **Read All Remote Data Now –** Reads the complete current data file on the host computer and over writes the current buffer file.

2.2.5 EDIT / DATA ARCHIVING COMMAND

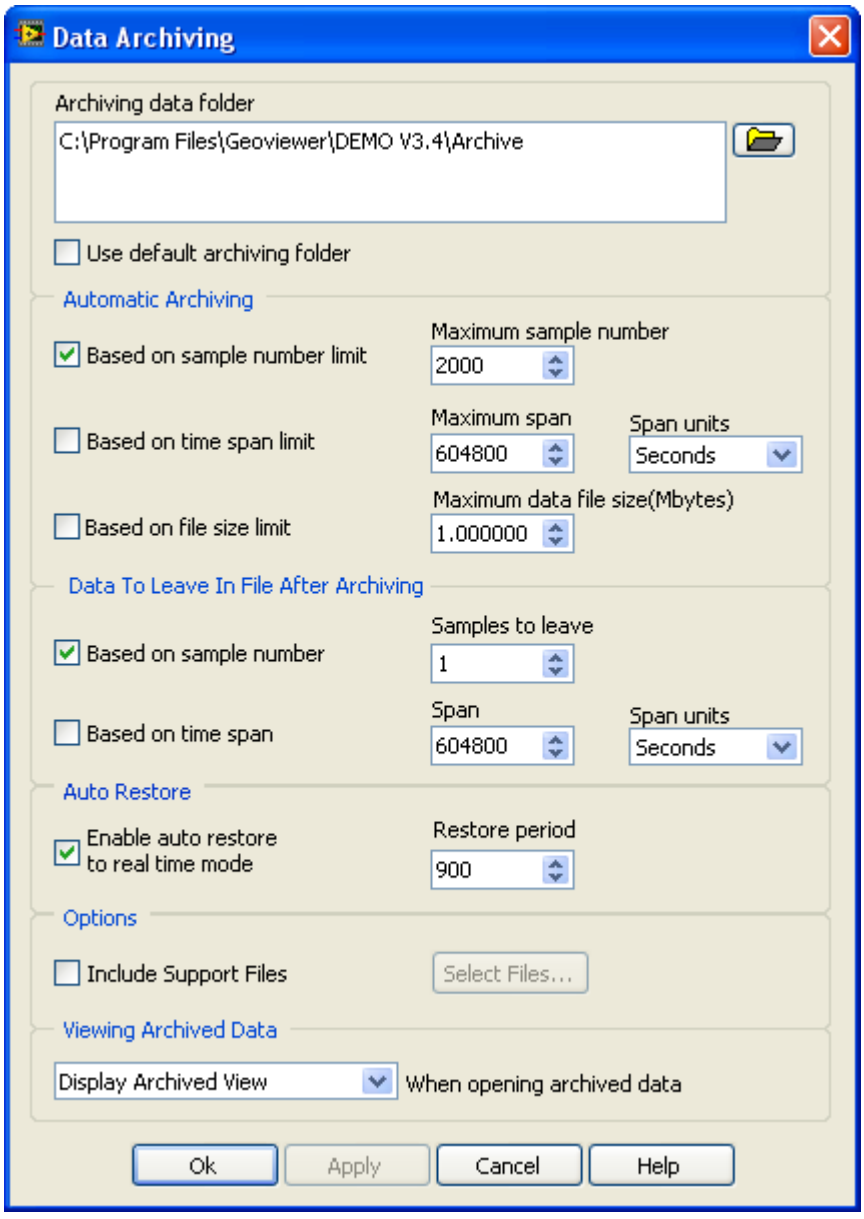


Figure 21: Data Archiving window

Data files should be periodically archived as large data files will slow the overall system down and take additional time to transfer to remote stations. When a data file is archived all view, chain and sensor information is saved in the archive. The *.dat files can and should be archived at the same time. The archived Geoviewer file format is a time stamp with an arc extension. E.g. Project_Name_20040217160013.arc. The archived DAT file format is the logger name and time stamp with a dat extension. E.g. Logger#2_20040217160013.dat

- **Archiving Data Path –** The name of the folder where all archived data files will be saved.
- **Browse –** Used to set the archive data folder. Press the Browse button to browse for the required directory. When the required directory has been located, press the Select Cur Dir button.
- **Use data source path –** Select this tick box to select the current data source directory
- **Automatic Archiving –** Files can be automatically archived based on the number of samples, the file size or the time period.
  - **Based on time span –** enter the maximum number of seconds
  - **Based on file size –** enter the maximum size of file
  - **Based on number of samples –** enter the maximum number of samples.
  - **Never archive data –** The data file is never archived if none of the above boxes is checked. A warning banner will appear on the main Geoviewer menu if archiving is disabled.
- **Auto restore –** When checked, Geoviewer will automatically close an archived data file and redisplay the current data file. This occurs after a certain interval has elapsed, see Restore Period below. The following window is displayed before the archived data file is closed. The user has 15 seconds to click on the Yes button to continue viewing the archived data. If the Do not show this message in the future check box is checked, the message will not be displayed.

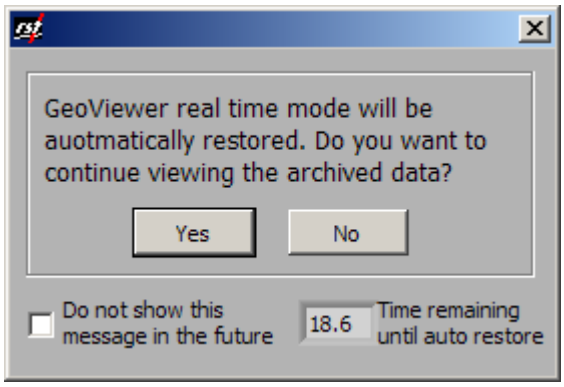


Figure 22: End Viewing Archived Data

- **Restore Period –** The amount of time that must elapse before an archived data file is closed. See Auto restore to real time mode.
- **Ok –** Press the Ok button to close the Data Archiving window and save any changes that have been made.
- **Apply –** Save any changes that have been made without closing the Data Archiving window.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Data Archiving window. Any changes made will not be saved.
- **Help –** Show/Hide popup help window. See section **Error! Reference source not found.**.

- **Viewing Archived Data –** This window allows you to choose the view when an archived file is accessed.
  - **Display Current View –** Displays archived data in the current display selection. i.e. same channels and ranges in chart view, text view and picture view
  - **Display Archived View –** Displays archived data with the display selection when the file was archived.

- **Prompt User For View Type –** Allows the user to choose between the above two options when the archived file is first opened.
- **Auto Open Archived View –** Opens archived view if it is present in the archive, otherwise it used the current views
- **Auto Detect and Prompt User –** Uses current view if archived view is not present, prompts the user to select current or archived if it is present.

2.2.6 EDIT / DISABLED SENSORS COMMAND

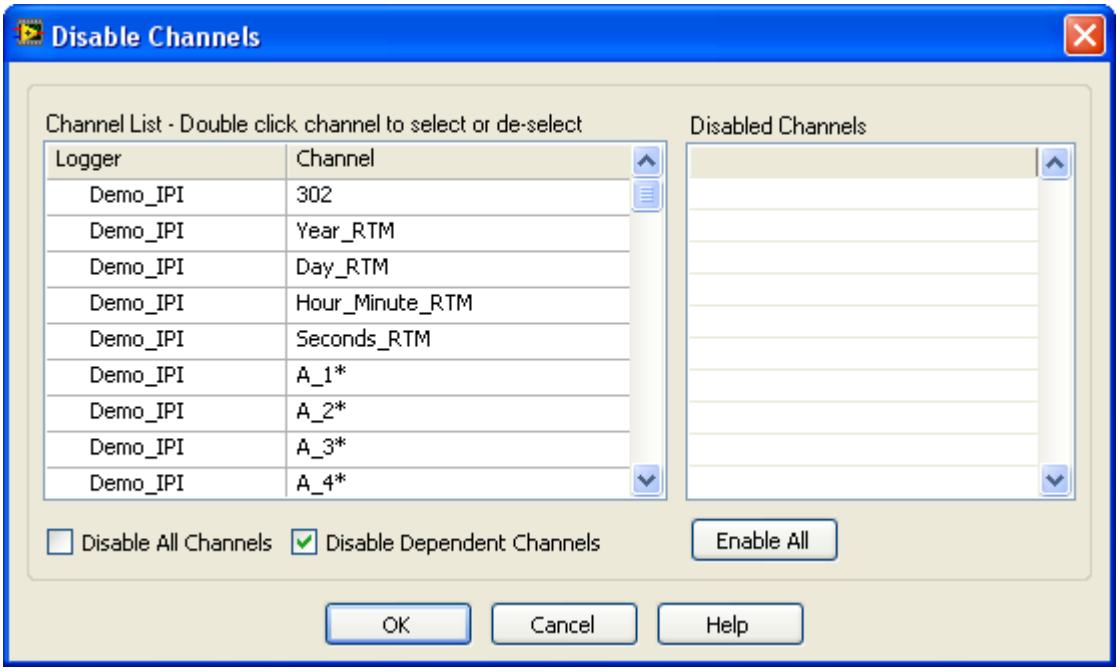


Figure 23: Disable Channels

The Disable Channels window is used to select and display all disabled channels. A disabled channel can not trigger an alarm or warning. If the sensor is used in a chain calculation the initial sensor value will be used if the Disable Dependent Channels box is checked.

- **Channel List –** Displays a list of all channels. To disable a channel double click on the channel from the list. An 'x' will be displayed in front of the disabled channel and the channel will be displayed in the Disabled Channels list. To re-enable the channel double click on the list again.
- **Disabled Channels –** Displays a list of all channels that are disabled.
- **Disable All Channels –** Disables all channels.
- **Disable Dependent Channels –** If the sensor is used in a chain calculation the initial sensor value will be used.
- **Enable All –** Press the Enable All button to enable all sensors that have been marked as disabled.
- **Ok –** Press the Ok button to close the Disabled Channels window and save any changes that have been made.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Disabled Channels window. Any changes made will not be saved.

2.2.7 EDIT / ALARMS COMMAND

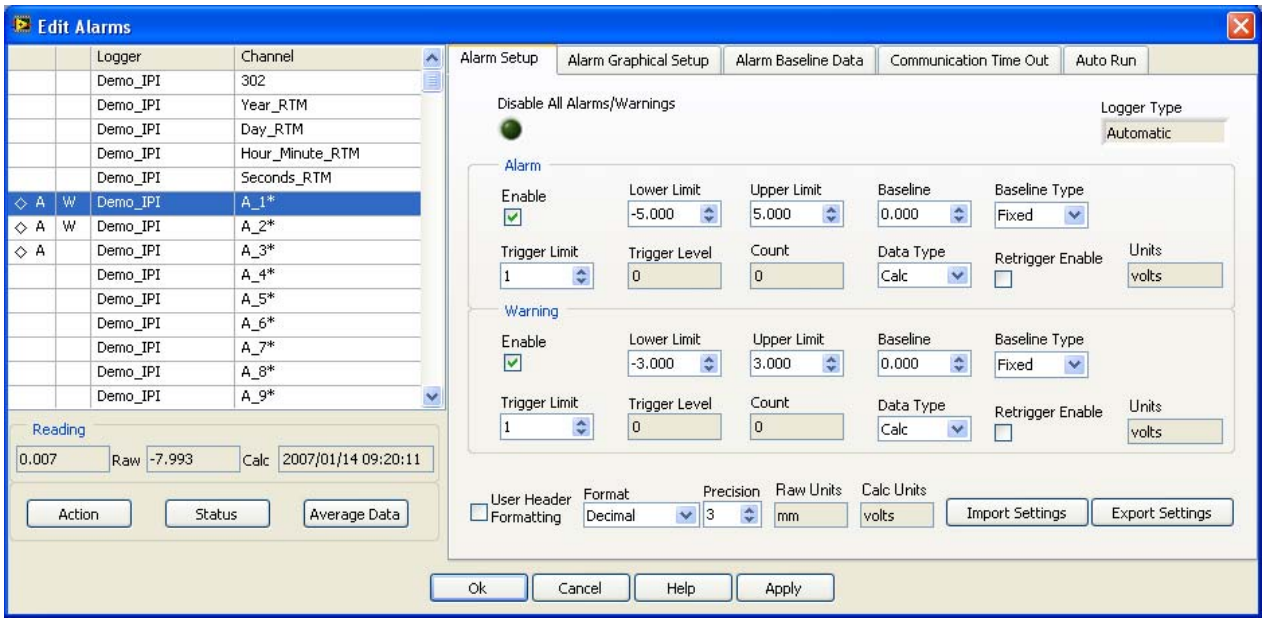


Figure 24: Edit Alarms

The Edit Alarms window is used to setup all alarms in Geoviewer. There are three types of alarms, Alarm/Warning, Communication Time Out, and Auto Run. An Alarm/Warning alarm will be triggered if the data from a channel exceeds the preset limits. A Communication Time Out alarm is triggered if no new data has been read in within the set time period. An Auto Run alarm is used to test that the alarm system is functioning will always occur at the set period.

- **Action –** Pressing this button displays the Alarm Action window. Used to determine the course of action to take when an alarm occurs.
- **Status –** Pressing this button displays the Alarm Status window. Used to re-enable active alarms and to show what alarms have occurred.
- **Average Data –** Pressing this button displays the Running Average window. Sets the averaging period for the current data set.
- **Ok –** Press the Ok button to close the Edit Alarm window and save any changes that have been made.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Edit Alarm window. Any changes made will not be saved.
- **Apply –** Save any changes that have been made without closing the Edit Alarms window.
- **Restore –** Disregard all changes that have been made since the last time the Apply button was pressed.

2.2.7.a EDIT / ALARMS / ALARMS/WARNINGS

Alarms and warning behave the same but can be set to different trigger levels for each sensor.

- **Channel List –** Displays a list of all channels. If an Alarm or Warning has been enabled an A or W will be displayed in the left column.
- **Units –** Display the units label for the channel selected from Channel List.
- **Disable All Triggers –** Click on the LED to disable all alarms and warnings. The LED will turn red.
- **Settings Tab –** Displays alarm information for the selected channel.
- **Graph Settings Tab –** Allows the alarms settings to be changed graphically.
- **Baseline Data Tab –** Allows baseline data to be selected for a group of channels from any data set.

2.2.7.a.i Edit / Alarms / Settings Tab

Allows the user to change trigger information for the selected channel.

- **Enable –** Click on the LED to enable the selected alarm. The LED will turn green. An A or W will be displayed in the channel list.
- **Lower Limit –** An alarm will occur if the current data **is less then the baseline plus lower limit**.
- **Upper Limit –** An alarm will occur if the current data is **greater then the baseline plus upper limit**.
- **Baseline –** The data entered in this control will be used for the fixed baseline.
- **Baseline Type –** The baseline data can be obtained from two sources. If Fixed is selected, the baseline data is obtained from the Baseline control. If Average is selected, the baseline data is calculated from a rolling average for the channel..
- **Trigger Limit –** The number of samples in a row that must exceed the upper or lower limit before an alarm will be triggered. Used to prevent false triggering on a noisy channel.
- **Trigger Level –** The current number of samples in a row that has exceeded the upper or lower limit.
- **Count –** Displays the total number of alarms that have occurred. This number is incremented every time an alarm occurs and can be cleared in the Alarm Status window. After a channel has triggered, the channel cannot re-trigger until it has been reset. A negative sign indicates this condition. See section 2.2.7.f.
- **Data Type –** Determines what type of data will be used for the alarm trigger calculation. Raw: unaltered data read from data file, Calc: raw data with calibration applied, Avg Raw: raw data averaged over a number of samples, Avg Calc: calculated data averaged over a number of samples. The average is set using the Edit / Average Data tool which can also be called from the Edit / Alarms main window. Note: If average baseline and average data are both used for the same channel, the alarm can never trigger.
- **Retrigger Enable –** If this box is checked, a channel that has triggered an alarm is allowed to trigger again. The default is unchecked, the user must manually clear the alarm, see alarm status. 2.2.7.f
- **Format –** Changes the format of all numeric controls in the settings tab. Format options are Decimal, Scientific, and Engineering.
- **Precision –** Changes the precision, number of displayed digits, of all numeric controls in the settings tab.

2.2.7.a.ii Edit / Alarms / Alarm Graphical Setup Tab

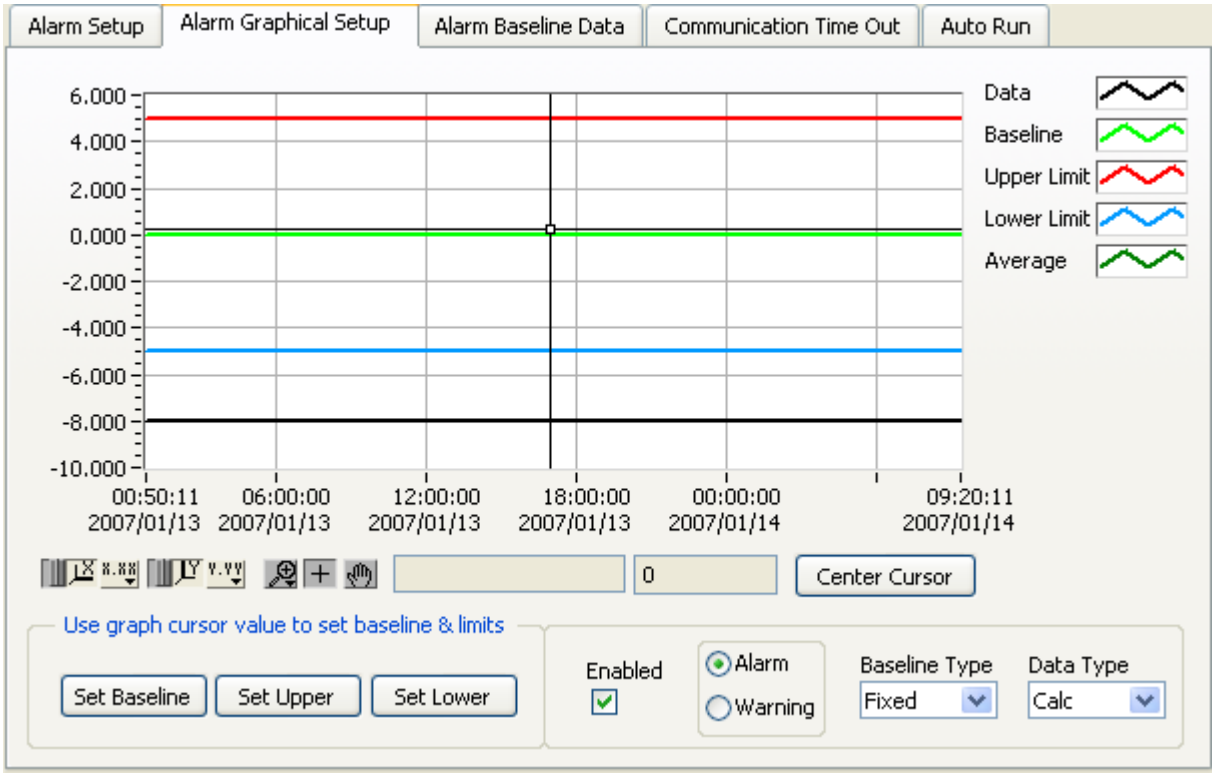


Figure 25: Alarm Graphical Setup Tab

Allows alarms settings, for the selected channel, to be changed graphically.

- **Set Baseline –** Pressing this button will set the fixed baseline value to the position value of the cursor. If the selected Baseline Type is Fixed, the upper and lower limits will be shifted to reflect this change.
- **Set Upper –** Pressing this button will cause the upper limit to be set. The value stored will be relative to the current baseline value.
- **Set Lower –** Pressing this button will cause the lower limit to be set. The value stored will be relative to the current baseline value.
- **Alarm/Warning –** Select type of alarm to be set.
- **Enabled –** Alarm is enabled or disabled.
- **Data Type –** See Settings Tab.
- **Baseline Type –** See Settings Tab.
- **Center Cursor –** Brings cursor to center of graph. Used to locate cursor when off screen.
- **Sample Number –** When the cursor is in lock or snap mode the cursor will always lie on a sample point. The sample number will be displayed in this indicator. When cursor is in free mode, –1 will be displayed.
- **Current Plot –** When the cursor is in lock or snap mode the cursor will always lie on a sample point. The name of the plot will be displayed in this indicator. When cursor is in free mode, indicator is cleared.
- **Graph Controls –** Changes the appearance of the plot and cursor. See section 3.1.2.

2.2.7.a.iii Edit / Alarms / Alarm Baseline Data Tab

Allows baseline data to be selected for a group of channels from the current data set.

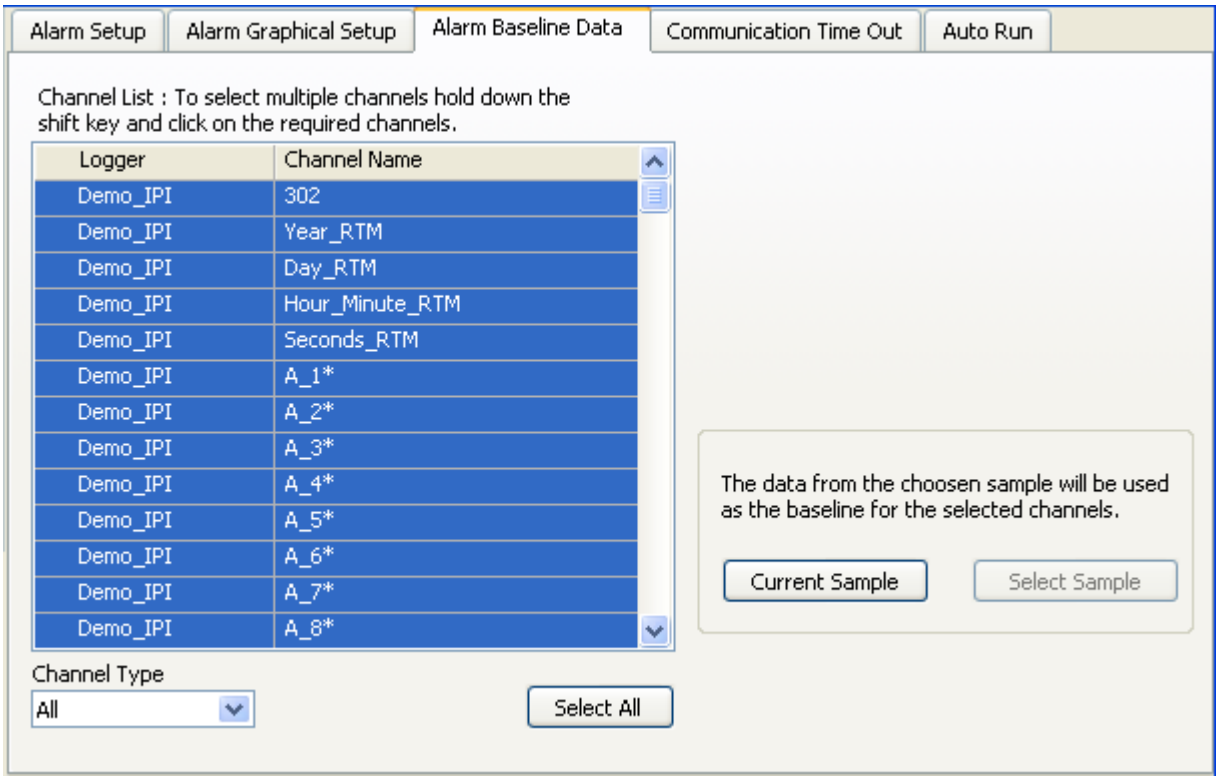


Figure 26: Alarm Baseline Data Tab

- **Channel List –** List of all channels.
- **Channel Type –** Filter the type of channels displayed in the channel list.
- **Select All –** All the channels displayed in the Channel List will be selected.
- **Current Sample –** The data from the latest sample will be used as baseline data for the selected channels.
- **Select Sample –** Allows the user to choose any sample from the current data set. The data will be used as baseline data for the selected channels. See section 2.2.7.a.iii.1.

2.2.7.a.iii.1 Edit / Alarms / Select Baseline Sample

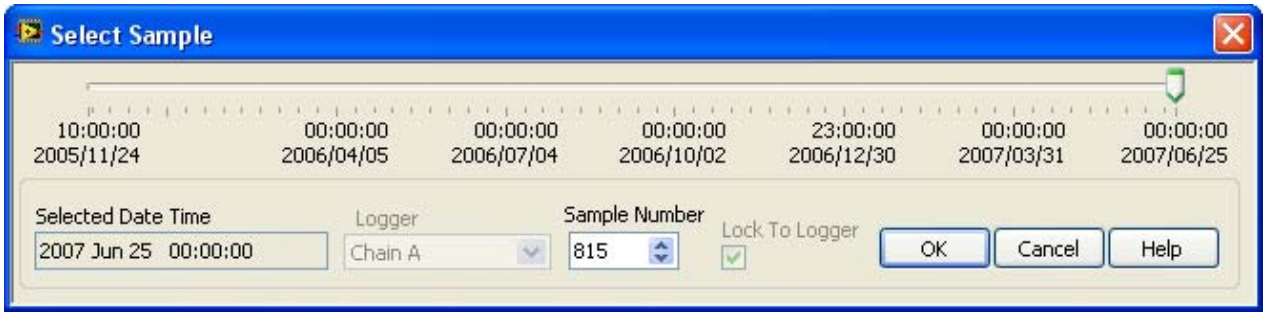


Figure 27: Select Baseline Sample

The Select Sample window is used to choose a data sample point that will be used for baseline data. The Edit Alarm window will be hidden while this window is displayed. Any view can be displayed, and the data in the view will be scrolled as the triangular marker is moved. This window behaves similarly to the history window. To select a sample, click on and drag the triangular marker or enter a value in the Sample Number control.

- **Selected Date Time –** The date and time of the selected sample will be displayed.
- **Logger –** Sets the time bar display to sample times from either all loggers or a particular logger.
- **Sample Number –** The sample number of the selected sample will be displayed. To select a specific sample number enter the number in this indicator.
- **Lock to Logger –** Locks the selection to only sample times that are present in the current data file for the selected logger.
- **Ok –** Press the Ok button to close the Select Sample window. The baseline data for the selected channels will be updated.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Select Sample window. The baseline data will not be changed.

2.2.7.b Edit / Alarms / Communication Time Out Tab

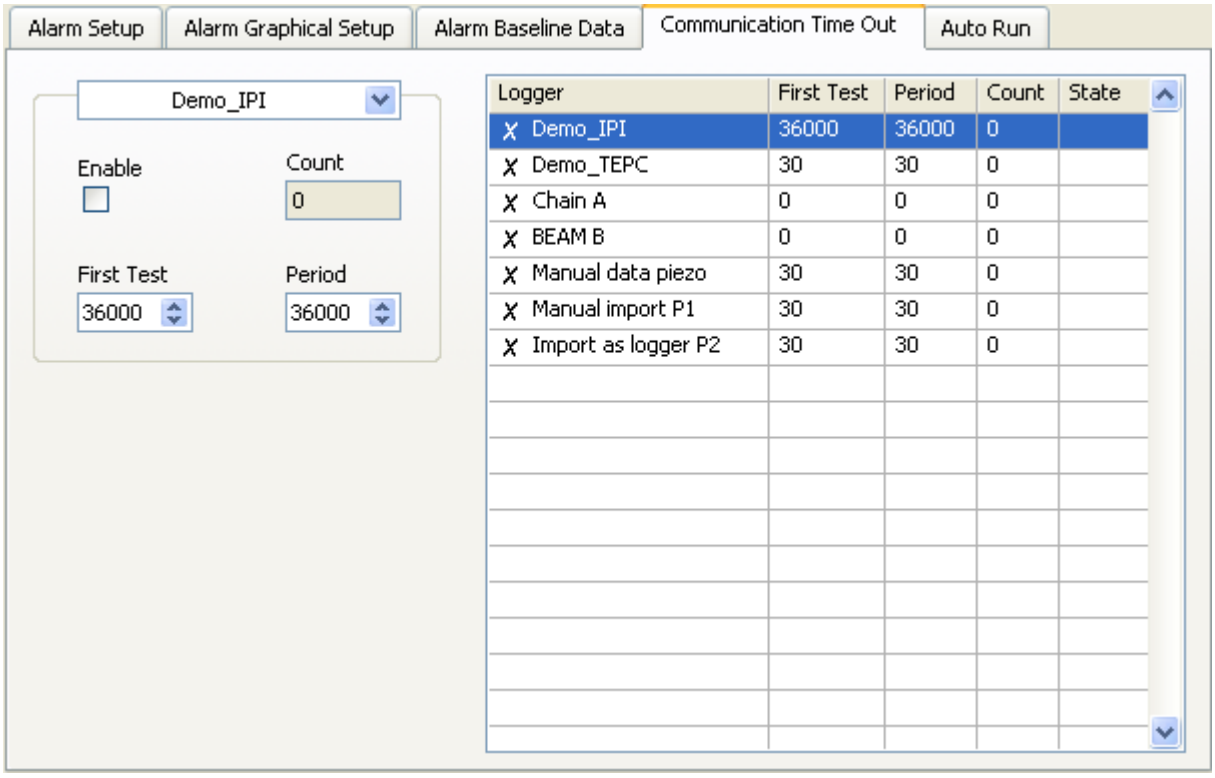


Figure 28: Communication Time Out Tab

A Communication Time Out alarm is used to ensure that data is being collected from each logger. If no new data has been read in within a certain time period an alarm will be triggered.

- **Drop Down Logger List –** Select the required logger from the drop down list, the user can set time periods and enable / disable each logger individually.
- **Enable –** Click on the LED to enable the alarm. The LED will turn green.
- **First Test –** Number of seconds before the alarm period is enabled. This is the time after the program first starts or after the alarm has been first enabled.
- **Period –** If no sample has been read in during this period an alarm will be triggered. Enter a value in seconds.

- **Count –** Displays the total number of alarms that have occurred. This number is incremented every time an alarm occurs and can be cleared in the Alarm Status window. A negative number indicates that an alarm has occurred and is disabled until it is reset. See section 2.2.7.f.

2.2.7.c EDIT / ALARMS / AUTO RUN TAB

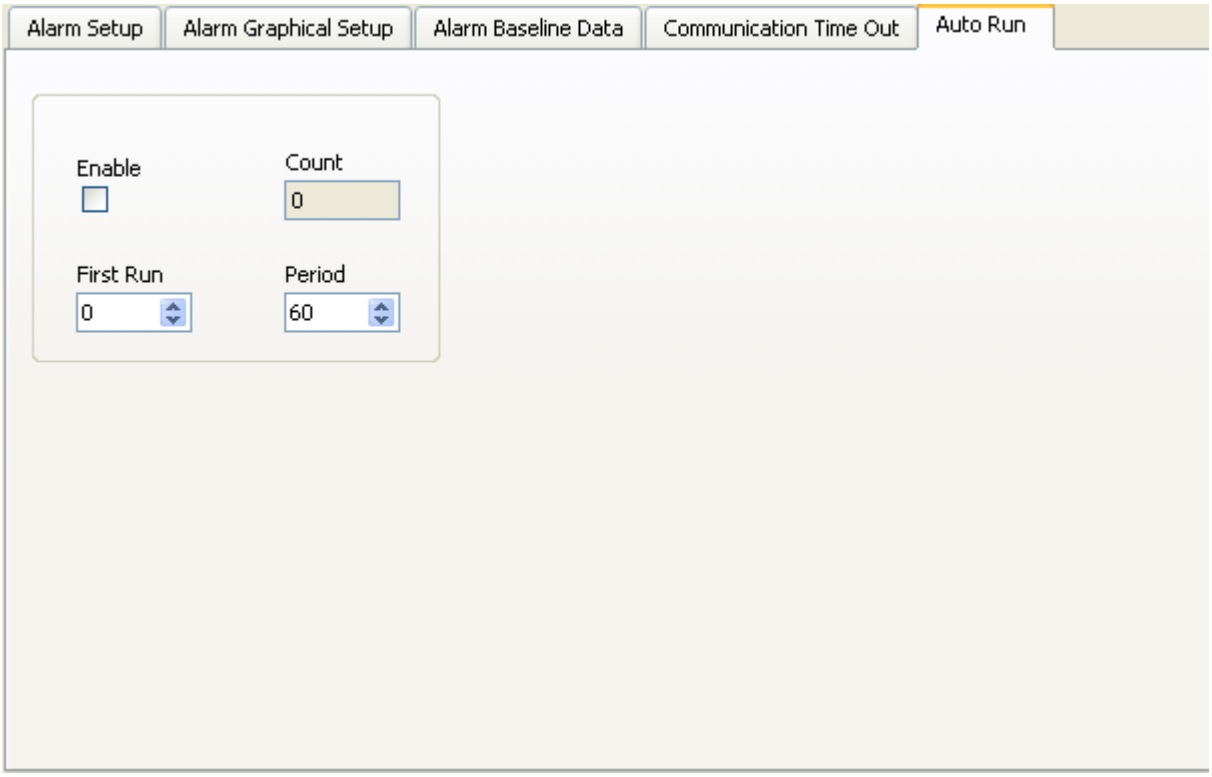


Figure 29: Auto Run Tab

An Auto Run alarm is used to trigger an alarm at a fixed interval. This is useful as a periodic system test.

- **Enable –** Click on the LED to enable the alarm. The LED will turn green.
- **Period –** Enter the alarm interval in seconds. The value determines how often the alarm will trigger.
- **Count –** Displays the total number of alarms that have occurred. This number is incremented every time an alarm occurs and can be cleared in the Alarm Status window. See section 2.2.7.f.

2.2.7.d EDIT / ALARMS / ALARM ACTION

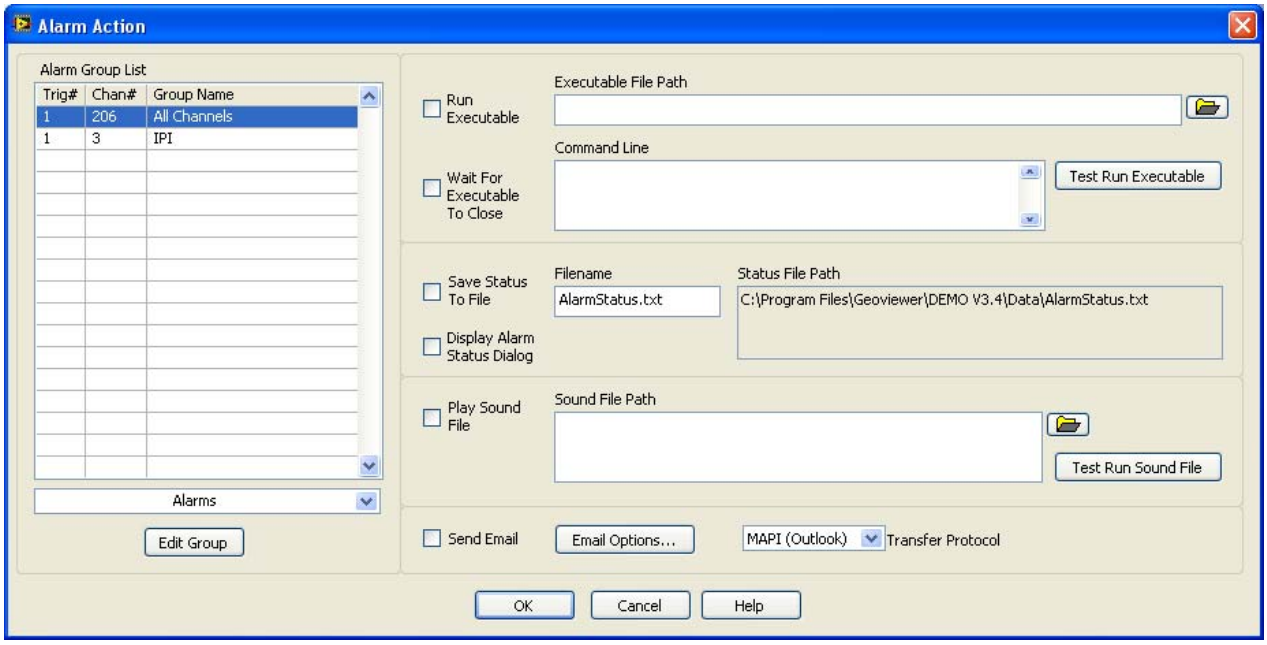


Figure 30: Alarm Action

The Alarm Action window is used to define the action to perform when an alarm condition is met. Each of the three alarm types, Alarms / Warnings, Communications Time Out and Auto Run, can cause another program to run, save alarm status information to file, play a sound file and/or have the Alarm Status window displayed.

- **Alarm Group List –** List of all alarm groups. Alarms and warnings can have multiple groups. An alarm group consists of a number of channels. If any channel within the group triggers an alarm the actions defined for the group will be performed.
- **Alarm Type –** Select the alarm type from the popup menu. Previously saved data for the type will be restored.
- **Edit Group –** Press this button to display the Group Alarm Channels window, see section **Error! Reference source not found.**.
- **Executable File Path –** The program to run when an alarm occurs.
- **Command Line –** Input parameters required by the program listed in the Executable File Path control.
- **Save File Path –** The file where alarm status information will be saved when an alarm occurs.
- **Sound File Path –** The sound file to play when an alarm occurs.
- **Browse Button –** Press the folder button located at the end of the path indicator to navigate to the required executable.
- **Run Executable –** When checked, the program listed in the Executable File Path control will run whenever an alarm occurs. If multiple channels cause alarms for a sample read in, the program will only be run once.
- **Wait Executable To Close –** When checked, a previously called program will not be called again until it has closed.
- **Display Alarm Status Dialog –** When checked, the Alarm Status window will be displayed and have topmost priority whenever an alarms occurs.
- **Save Status To File –** When checked, alarm status information will be saved to file whenever an alarms occurs.
- **Play Sound File –** When checked, the windows sound file will be played whenever an alarm occurs.
- **Ok –** Press the Ok button to close the Alarm Action window and save changes that have been made.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Alarm Action window. Any changes made will not be saved.

2.2.7.e EDIT / ALARMS / ALARM ACTION

The Group Alarms Channels window is used to delete and create alarm and warning groups.

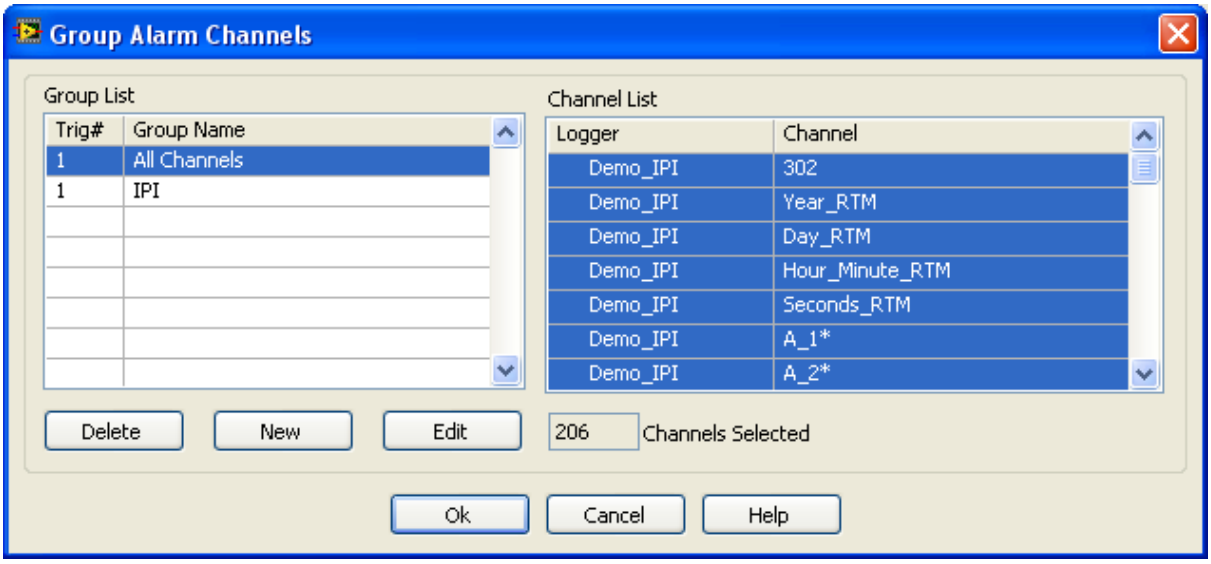


Figure 31: Group Alarm Channels

- **Group List –** Displays a list all alarm groups.
- **Delete –** Delete the current group.
- **New –** Create a new alarm group. Displays the Edit Alarm Group window, see section 2.2.7.e.i.1.
- **Edit –** Edit the current group. Displays the Edit Alarm Group window, see section 2.2.7.e.i.1.
- **Channel List –** Highlights all the channels from the selected group.
- **Channels Selected –** The number of channels in the selected group.
- **Ok –** Press the Ok button to close the Group Alarm Channels window and save changes that have been made.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Group Alarm Channels window. Any changes made will not be saved.

2.2.7.e.i.1 Pull Down Menus / Edit / Alarms / Edit Alarm Group

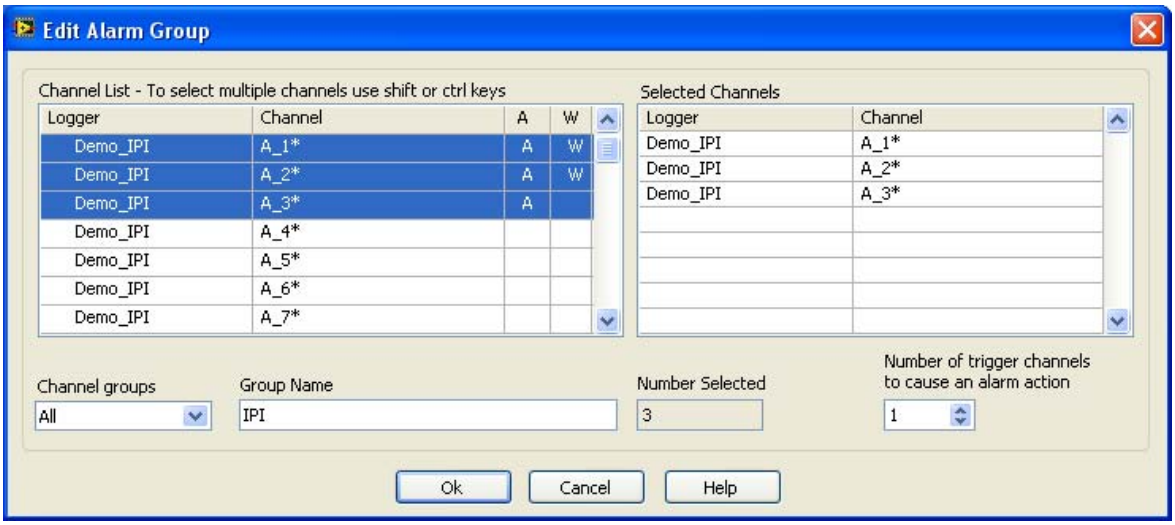


Figure 32: Edit Alarm Group

- **Channel List –** Displays a list of all channels.
- **Group Name –** Name of the alarm group.
- **Channel Groups –** Used to filter the type of channels displayed in the Channel List.
- **Channel Selected –** The channels that are selected from the Channel List will be displayed in this list box.
- **Number Selected –** The number of selected channels.
- **Ok –** Press the Ok button to close the Edit Alarm Group window and save changes that have been made.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Edit Alarm Group window. Any changes made will not be saved.

2.2.7.f EDIT / ALARMS / ALARM STATUS

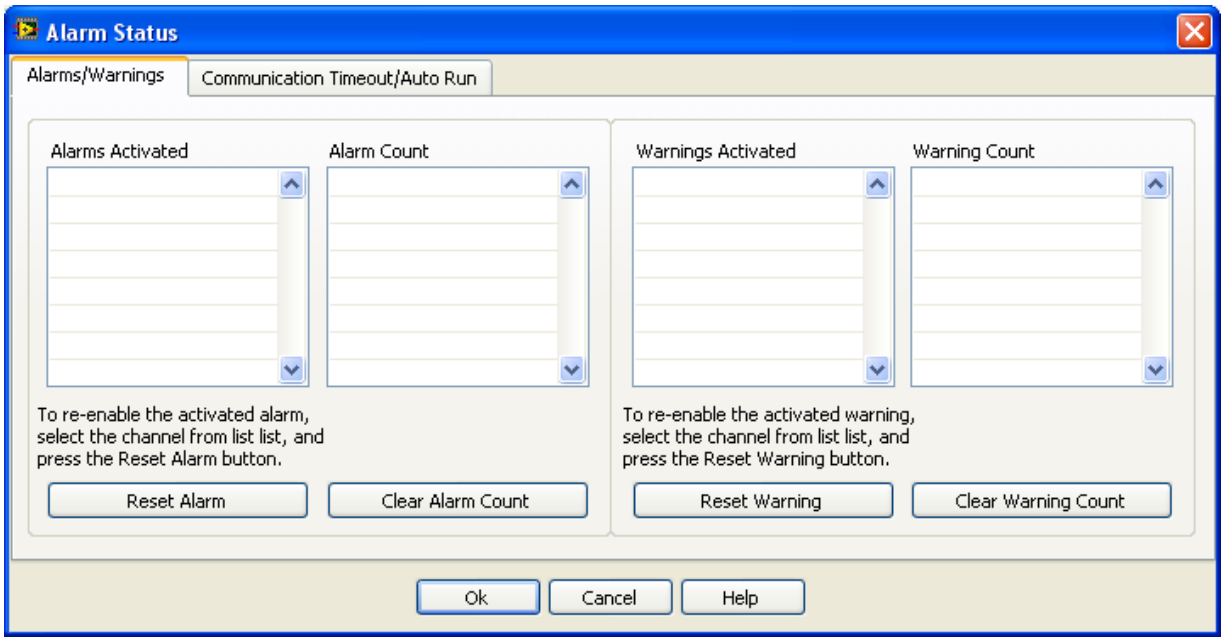


Figure 33: Alarm Status

The Alarm Status window is used to display information about all alarm and warning triggers that have occurred. The Alarms Activated and Warnings Activated list boxes show all the alarms and warnings triggers that are currently set. If a channel has triggered, the channel can not re-trigger until it has been reset. The Alarm Count and Warning Count list boxes show what channels have been causing triggers.

- **Alarms Activated –** Shows a list of all alarm triggers that are currently set. If a channel has triggered an alarm, the channel is blocked from re-triggering an alarm again until it is reset unless Retrigger Enabled has been selected
- **Reset Alarm –** Reset the selected channel from the Alarms Activated list. The channel is enabled to re-trigger an alarm again.
- **Alarm Count –** Keeps tracks of all alarm triggers that have occurred. Every entry in the list shows the total number of alarm triggers that have been activated for a particular channel. If a channel has not triggered an alarm it will not be listed.
- **Clear Alarm Count –** The alarm trigger count for the channel selected from the Alarm Count list box is set to zero. The entry will be removed from the list.
- **Warnings Activated –** Shows a list of all warning triggers that are currently set. If a channel has triggered a warning, the channel is blocked from re-triggering a warning again until it is reset.
- **Reset Warning –** Reset the selected channel from the Warning Activated list. The channel is enabled to re-trigger a warning again.

- **Warning Count –** Keeps tracks of all warning triggers that have occurred. Every entry in the list shows the total number of alarm triggers that have been activated for a particular channel. If a channel has not triggered a warning it will not be listed.
- **Clear Warning Count –** The warning trigger count for the channel selected from the Alarm Count list box is set to zero. The entry will be removed from the list.

Communications Timeout / Auto Run (Not Shown)

- **Logger Comm Timeouts –** Displays which loggers has had a communication time out. A communication time out occurs if no new sample has been read from the data file within a user set time period.
- **Reset Comm Timeouts –** Reset the communication time out trigger. The communication time out alarms are re-enabled to trigger again.
- **Logger Comm Time Out Count –** Shows the total number of communication time out triggers that have occurred.
- **Clear Comm Time Out Count –** Sets the number of communication time out triggers to zero.
- **Auto Run Count –** Shows the total number of auto run triggers that have been set. The auto run trigger is user set to occur at a defined period.
- **Clear –** Sets the auto run trigger count to zero.
- **Ok –** Press the Ok button to close the Alarm Status window and save any changes that have been made.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Alarm Status window. Any changes made will not be saved.

2.2.8 EDIT / AVERAGE DATA

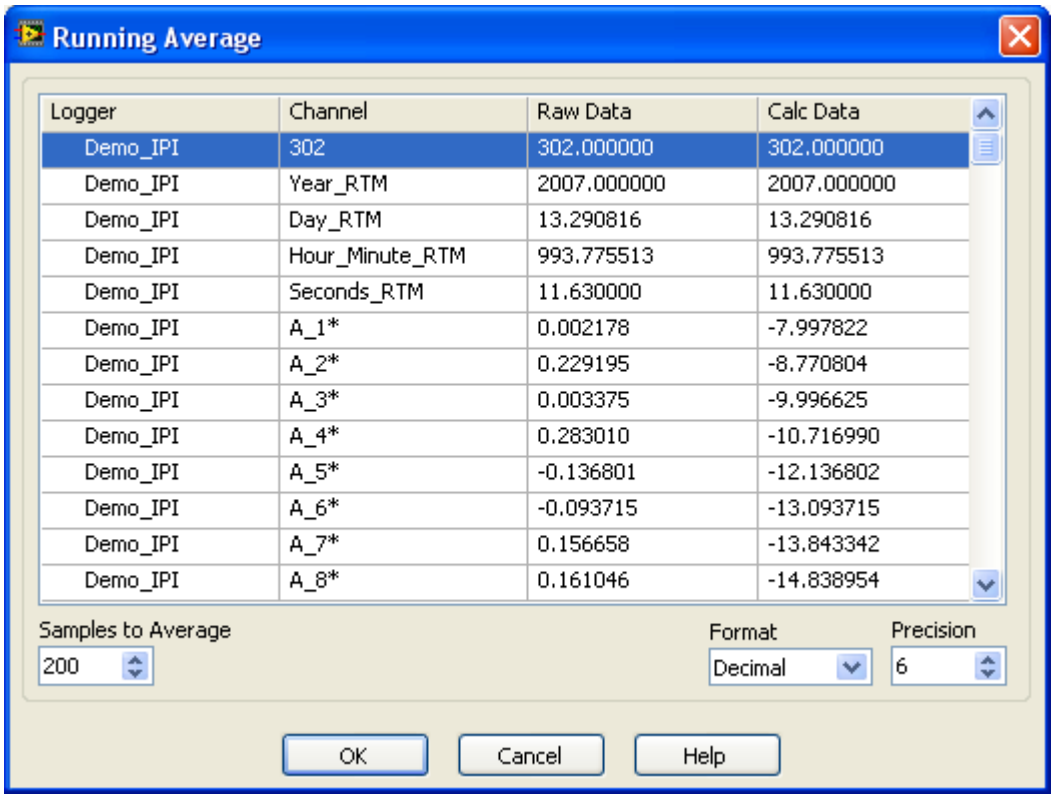


Figure 34: Running average

The Running Average window is used to setup the averaging period for the alarms and warnings when the Avg data type is selected.

- **Average Data –** Displays the averaged data. The number to the left of the horizontal scroll bar indicates the left entry channel number.
- **Samples to Average –** The number of most recent samples to average. The running average data is recalculated automatically as this number is changed.
- **Precision –** The number of significant figures to include when the Running Average Data is displayed.
- **Format –** The type of number to display when the Running Average Data is displayed.
- **Ok –** Press the Ok button to close the Running Average window and save any changes that have been made.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Running Average window. Any changes made will not be saved.

2.2.9 EDIT / ZERO CHANNELS

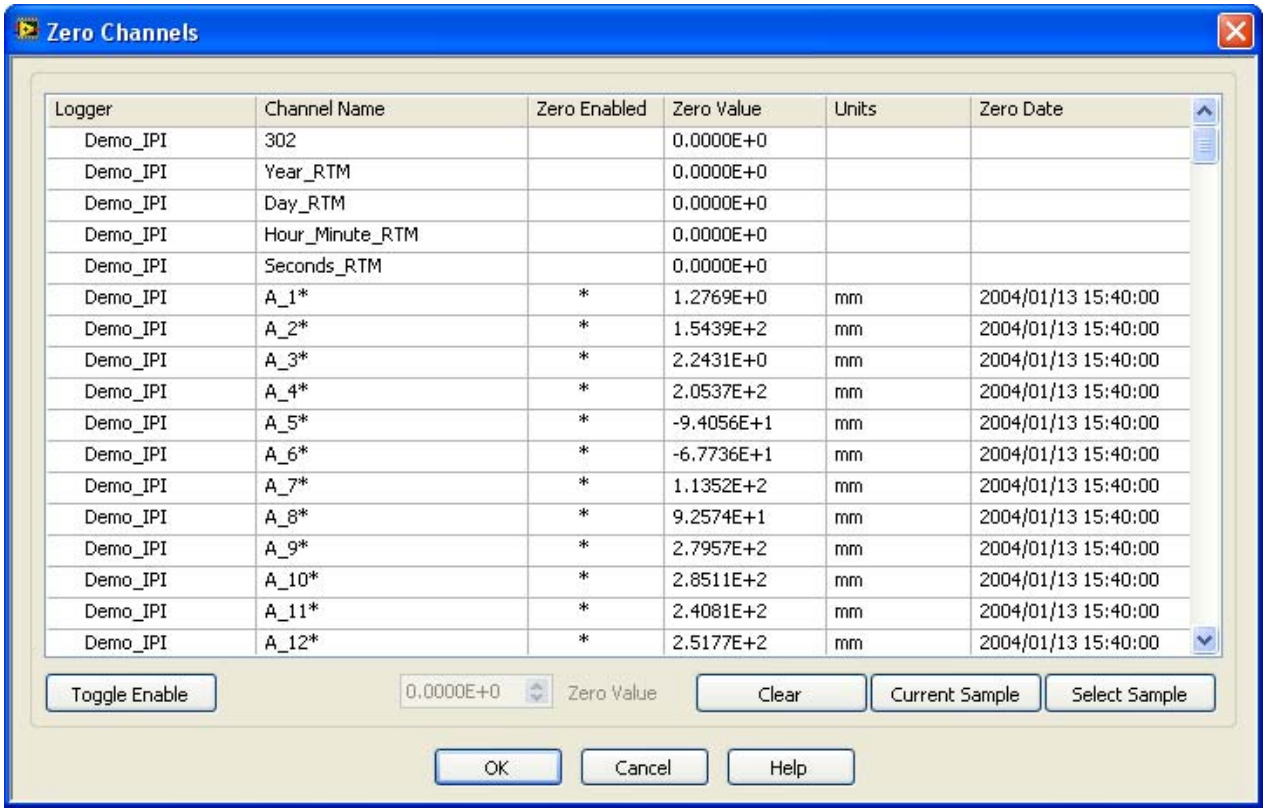


Figure 35: Zero Channels

The Zero Channels window is used to apply an offset to zero a channel or group of channels using data from a previous sample or a calculated value, the current sample or using an input value. The window displays the current zero status (enabled or disabled), the value that is subtracted from all reading, the units and the date/time that 0f the sample used as the zero reference point

- **Toggle Enable –** Toggles the zero enable of the selected channel(s).
- **Zero Value –** Manually enter the zeroing value here.
- **Clear –** Clears the zero value.
- **Current Sample –** Selects the current sample as the zero reference point.
- **Select Sample –** Allows the user to select a data point from anywhere in the current data file.

2.2.9.a EDIT / ZERO CHANNELS / SELECT SAMPLE

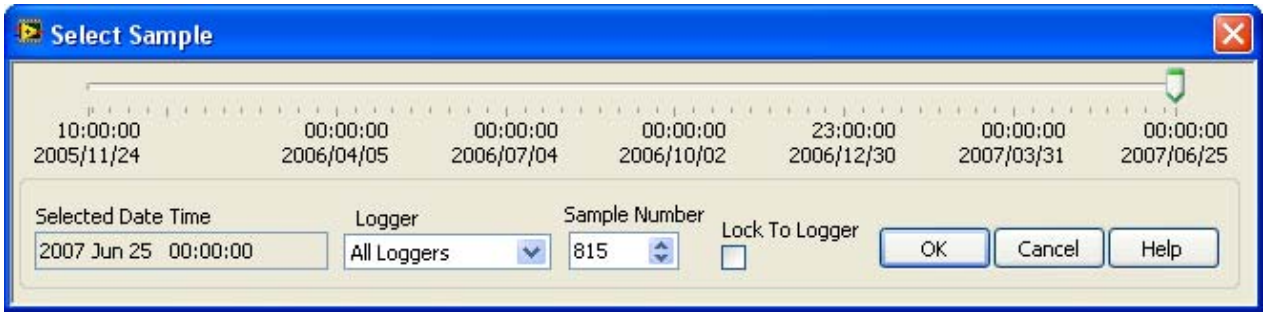


Figure 36: Select Sample

The Select Sample screen allows the user to select the zero reference point from any where in the current data file. Simple click and drag the blue indicator on the time scale bar to the required position. Fine adjustments can be accomplished by clicking on the arrows at the ends of the graph. You can also enter a sample number directly. If the selected channel(s) are open in chart view, the cursor will automatically track to the selected sample.

- **Logger –** The Time Bar, selected Date / Time and Sample Number are dependent on the selected logger. If All Loggers is selected then the above is referenced to the data file with the greatest time span.
- **Lock To Logger –** Locks the sample selection slider to the time range of the selected logger data file. Ensures that you can not select a sample time outside of the current data file time span.
- **Sample Number –** Input required sample number here.

2.2.10 EDIT / PICTURE VIEW

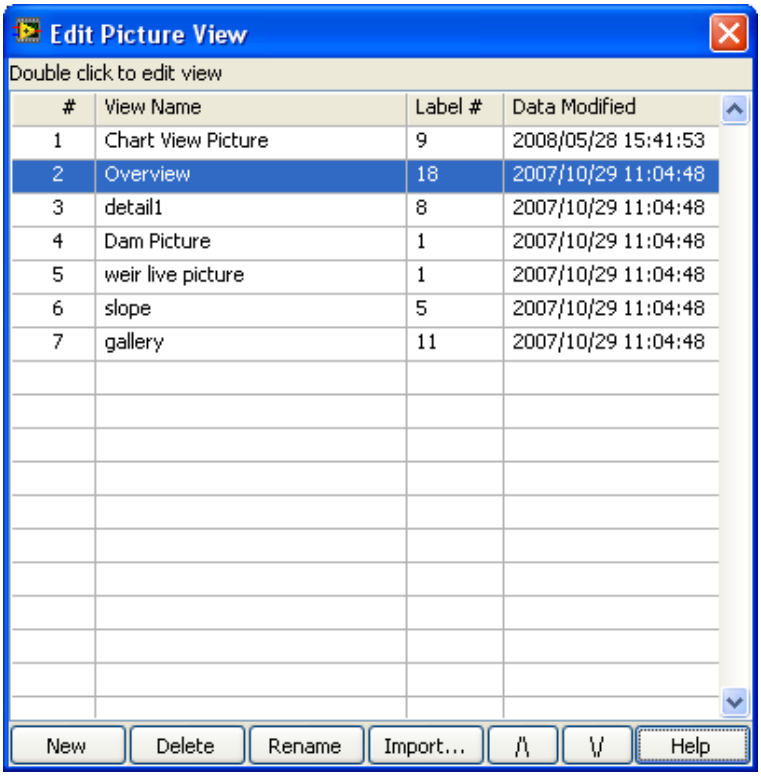


Figure 37: Edit / Picture View

The Picture View screen allows the user add a new blank Picture View, delete or rename an existing picture view. Double Click on the picture to open the edit mode. (you may have to re-select the image)

To add pictures, drawings, indictors ……..text to the picture view it can be opened using the **Geoviewer front panel Picture View Button**. Open and edit the required view by double clicking it and selecting Edit / View. See Push Button Commands / Picture View Section 3.4

2.2.11 EDIT / CHAIN VIEW

The Chain View screen allows the user to chain together sensors such as RST ELS Tilt Beams or In Place Inclinometers to add or subtract the output of each sensor to the next (cumulative deflection). This allows the total deflection of a number of sensors attached to a structure or in a borehole to be visually displayed. The order of calculation (from top to bottom or bottom to top….) can be selected. A reference starting point can also be selected so that change in deflection can also be viewed (Relative View).
Geoviewer treats a new chain as though an addition logger has been assigned to the project. These channels can be edited in the Edit / Logger window.
Chains can be added together (when the chain changes direction (X to Y) for example) by using the calculated output of the last sensor in the X chain as the first sensor in the Y chain. The calculated channels are usually found at the end of the channel list.

Accurate location for the X, Y & Z coordinates must be input in the sensor channel description window (see Pull Down Menus / Edit / Loggers / Edit Channel / Sensor Info section 2.2.1.g)

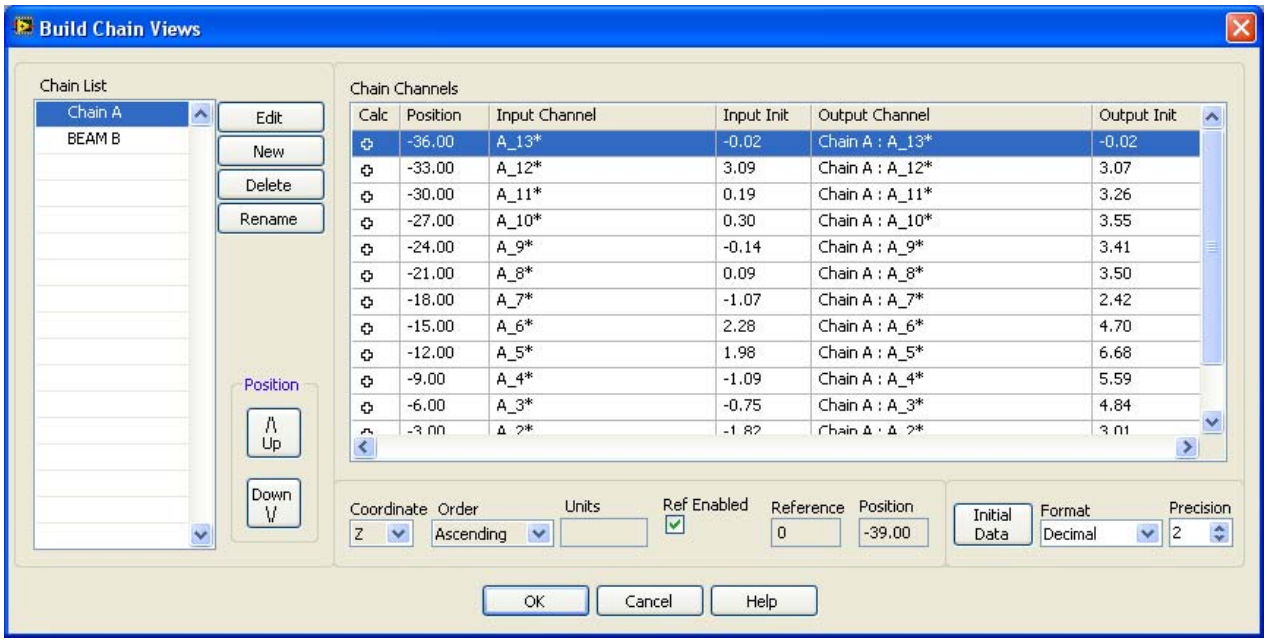


Figure 38: Edit / Build Chain View

- **New –** Adds a chain to the project. Select new and give the chain a unique name and select OK.
- **Edit –** Opens an existing Chain for editing or entered.
- **Delete, Rename –** Deletes or renames chain entries
- **Position –** Moves the selected Chain position in the Chain List using the up/down arrows at the bottom of the window. When adding chains together, the user should ensure that the first chain in the group is calculated prior to the second and so on.
- **Chain Channels –** Displays information about the selected Chain
- **Calc –** Displays calculation for each sensor in the chain (+, - , or none)

- **Position –** Displays the channel position relative to displayed coordinate and the order of calculation. Calculations start from the top
- **Input Channel / Init –** Displays the input channel name and initial reading.
- **Output Channel / Init –** Displays the Chain channel name and chain calculated reading.
- **Coordinate –** Axis of the selected chain
- **Ref Enabled –** Displays if the reference offset is enabled, the amount of offset and where it is applied in the chain. This would be the position of the reference point in the chain, all points would have this value added to them.
- **Initial Data –** Opens the initial data window, this allows the user to select a date / time or value to use as a reference when relative data is selected. The reference value will be subtracted from the current value to display change in deflection.

2.2.11.a NEW / EDIT CHAIN VIEW

Chains are built or edited using this window. The user selects channels from the channel list, selects the orientation and the required calculation. The displayed chain is of a typical 12 point IPI with 3 meter bays. The sensors are calculated (added) from the bottom (deepest) up and displayed using the Z (vertical) coordinate data. The first point is the top of the bottom sensor; the fixed reference is the bottom of the bottom sensor. Channels that are assigned to any chain will display a check mark to the left of the position column. Pushing the Calculation Order Button will reverse the order of calculation; cumulative deflection would be calculated from the top down. If this was required, the fixed reference would be changed to zero position and each Z location would need to be offset by -3 meters.

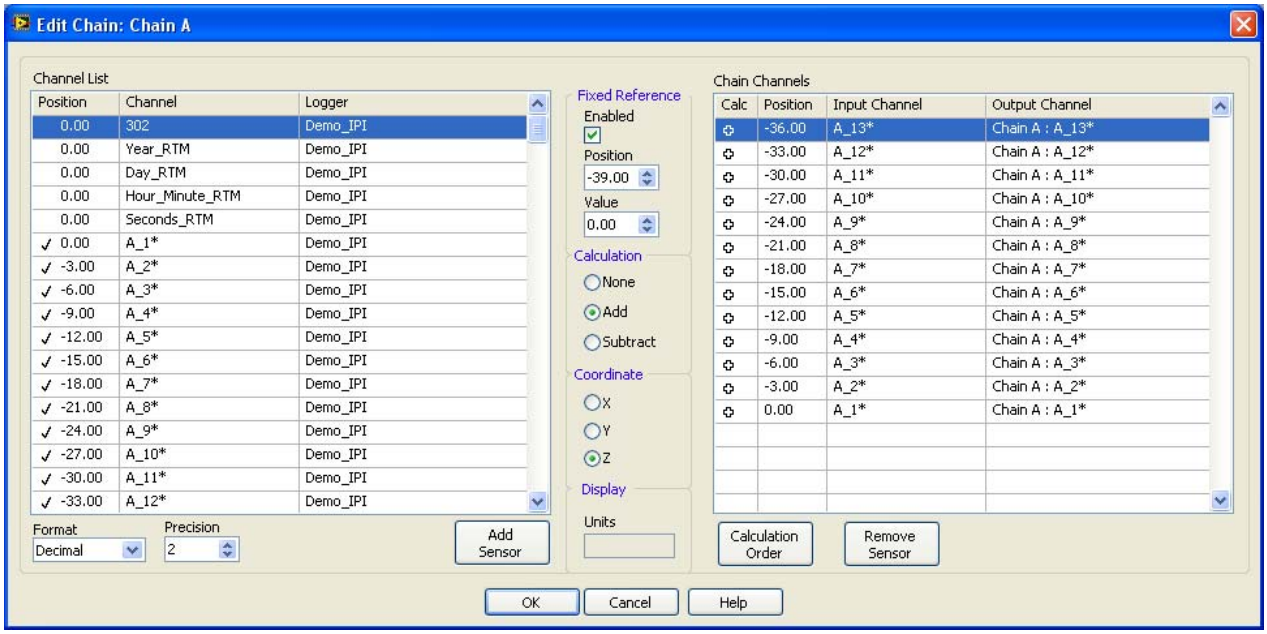


Figure 39: New / Edit Chain View

2.2.11.b INITIAL DATA / CHAIN VIEW

This window allows the user to select a date / time or value to use as a reference. The reference value will be subtracted from the current value to display change in deflection when Relative View is selected. The chain channel and logger channel are displayed in left boxes. The current initial data values are displayed in the right boxes. The user can either directly input a value or use the select sample button to choose a point in the current data file. When checked, the Locked check box locks the initial data to the current

value. To display additional channels in the chain, operate the up/down selector box in the upper left corner.

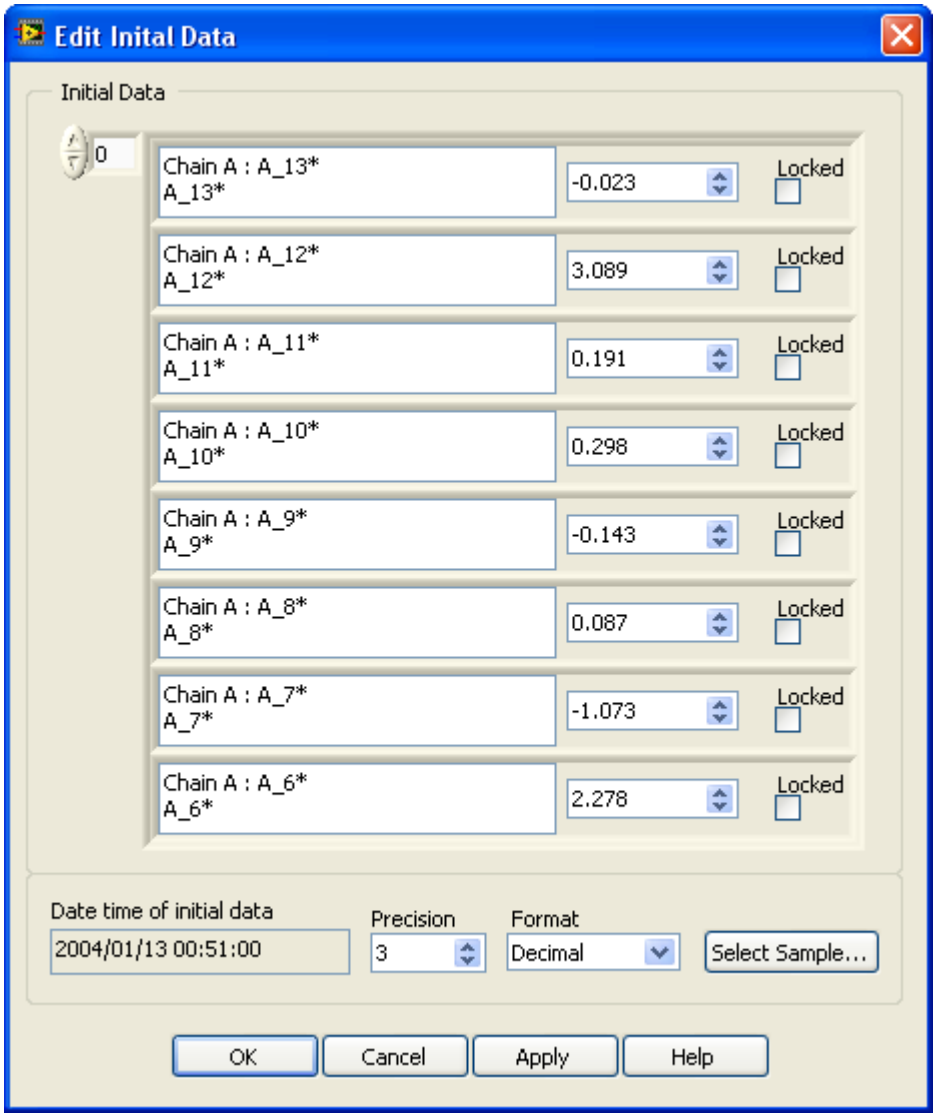


Figure 40: Edit Initial Data / Chain View

2.2.11.b.i Select Initial Data / Chain View

The Select Sample screen allows the user to select the initial data reference point from any where in the current data file. Simple click and drag the blue indicator on the time scale bar to the required position. Fine adjustments can be accomplished by clicking on the arrows at the ends of the graph. You can also enter a sample number directly. If the selected channel(s) are open in chain view, the display will automatically track to the selected sample.

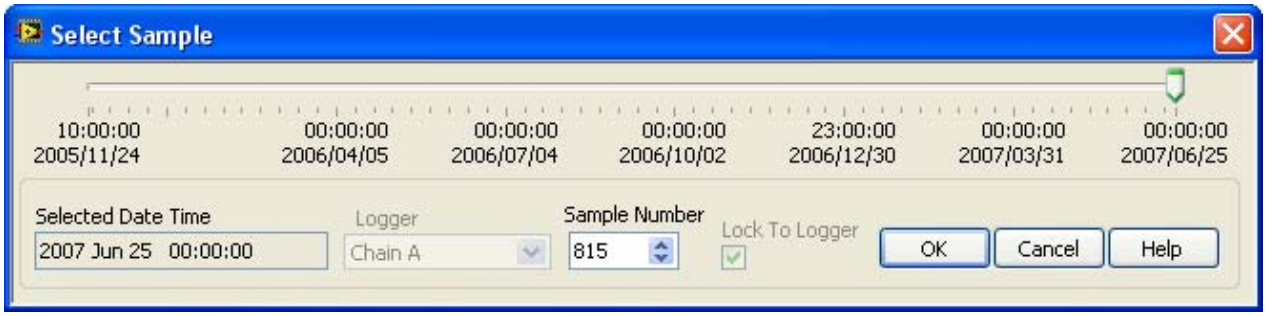


Figure 41: Select Initial Sample / Chain View

2.3 DATA MENU

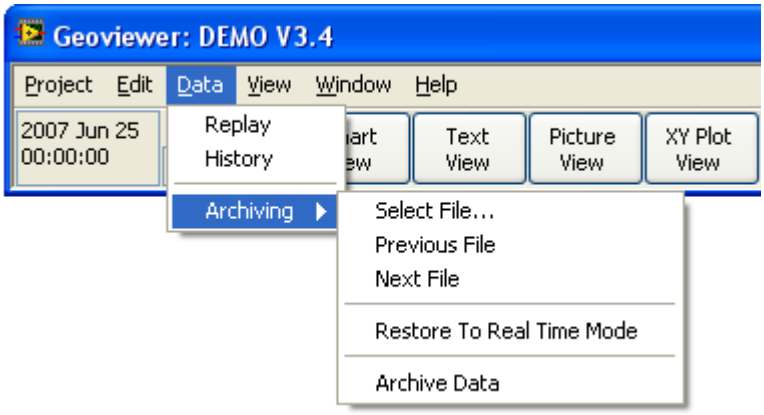


Figure 42: Data Pull Down Menu

- **Replay –** Allows the user to replay the current or archived data files in the current display setup at selectable speeds and starting points. The user can play back data in a time compressed format and watch changes in charts, text views and chains.
- **History –** Allows the user to select a point in the current or archived data files and display the data in the current display setup.
- **Archiving –** Allows the user to archive the current data file, display archived data files in the current display setup or as they were archived and to return to real time mode from archived mode.

2.3.1 DATA / REPLAY

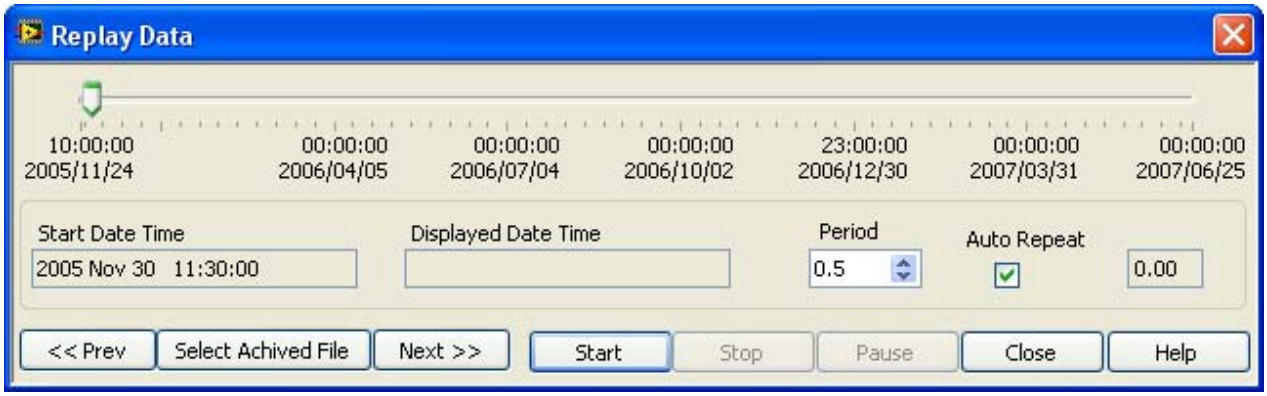


Figure 43: Data / Replay

Select the required start date/time by grabbing the blue indicator with the left mouse button and select start. The time displays the current time of displayed data and the selected stating time.

- **Period –** Select the period in seconds when the replay will move on to the next scan. The box on the right side is a count down timer of the period
- **Auto Repeat –** When checked the selected data range will continuously play in a loop.
- **Time to Next Sample –** The box to the right of the Auto Repeat check box displays the time remaining till the next sample
- **Start / Stop / Pause –** Push Buttons to control replay
- **Prev / Select Archived File / Next –** Select an archived file to replay, then go to the next or previous archive.

2.3.2 DATA / HISTORY

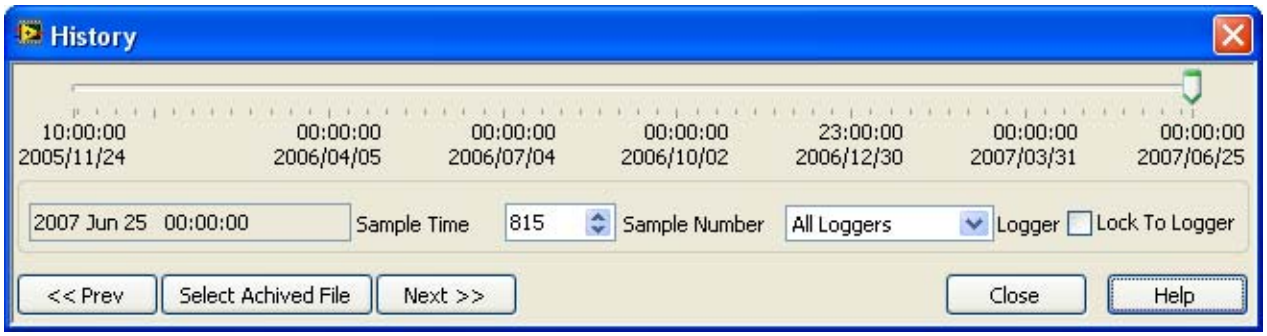


Figure 44: Data / History

Select the required sample number or date/time by grabbing the blue indicator with the left mouse button or enter directly the sample number. The user can scroll through the data file one sample at a time by using the up/down arrows beside the Sample Number Indicator. History can be linked to Chart and Text data displays (in the Chart / Text View menu's) so that displayed data is synced to the History Time Bar.

- **Period –** Select the period in seconds when the replay will move on to the next scan. The box on the right side is a count down timer of the period
- **Auto Repeat –** When checked the selected data range will continuously play in a loop.
- **Sample Time –** The date and time of the selected sample is displayed.
- **Logger –** Sets the time bar display to sample times from either all loggers or a particular logger.

- **Sample Number –** The sample number of the selected sample will be displayed. To select a specific sample number enter the number in this indicator.
- **Lock to Logger –** Locks the selection to only sample times that are present in the current data file for the selected logger.
- **Prev / Select Archived File / Next –** Select an archived file to replay, then go to the next or previous archive.

2.3.3 DATA / ARCHIVE DATA

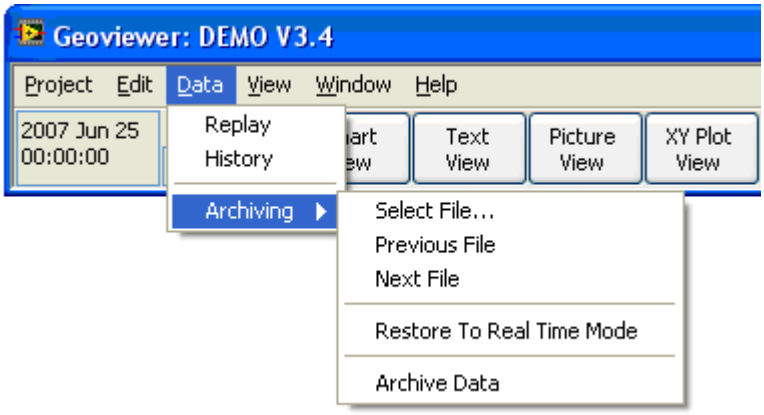


Figure 45: Data / Archive Data

- **Select File… –** Select an archive file to view
- **Previous / Next File –** Select the next or previous of the current archive file.
- **Restore to Real Time Mode –** Leave viewing archived data and return to real time.
- **Archive Data –** The current Geoviewer file will be archived as a " *.arc" file that contains all data from all loggers, calibration constants, chart layouts etc.. A complete project can be re-created from an archived file.
  - When you archive a project, Geoviewer asks if you also want to archive the current data source files (raw data files such as CR10 *.DAT). Normally the answer is Yes which renames the current data files. PC208 or Loggernet will automatically create new data files (*.Dat) the next time data is collected from the logger.
  - Geoviewer will complete the archive the next time new data is received. The current data file will then contain one data sample.
  - Archived file naming convention
    - Geoviewer – Project Name_year-mnth-day-h-rmin-sec.arc
      e.g. demo v3 _20040113005011.arc
    - Data Files – Logger Name_year-mnth-day-h-rmin-sec.dat
      e.g.Demo_TEPC_20040113005011.dat
    - Date and time correspond to the first sample time in the file

2.4 VIEW MENU

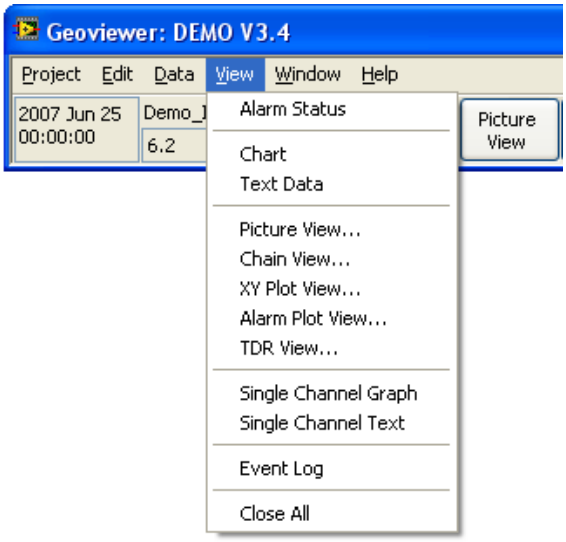


Figure 46: View Pull Down Menu

- **Alarm Status –** Displays the status of all alarms and warnings, allows the user to clear current alarms and alarm counts.
- **Picture View –** Allows the user to select which pictures to view
- **Chain View –** Allows the user to select which Chain to view
- **Chart –** Opens the Chart View window
- **Text data –** Allows the user to select which logger or chain to open the text file viewer with.
- **Single Channel Graph –** Opens the Single Channel Graph window
- **Single Channel Text –** Opens the Single Channel Text window
- **Close All –** Closes all open display windows.

2.4.1 VIEW / SINGLE CHANNEL GRAPH

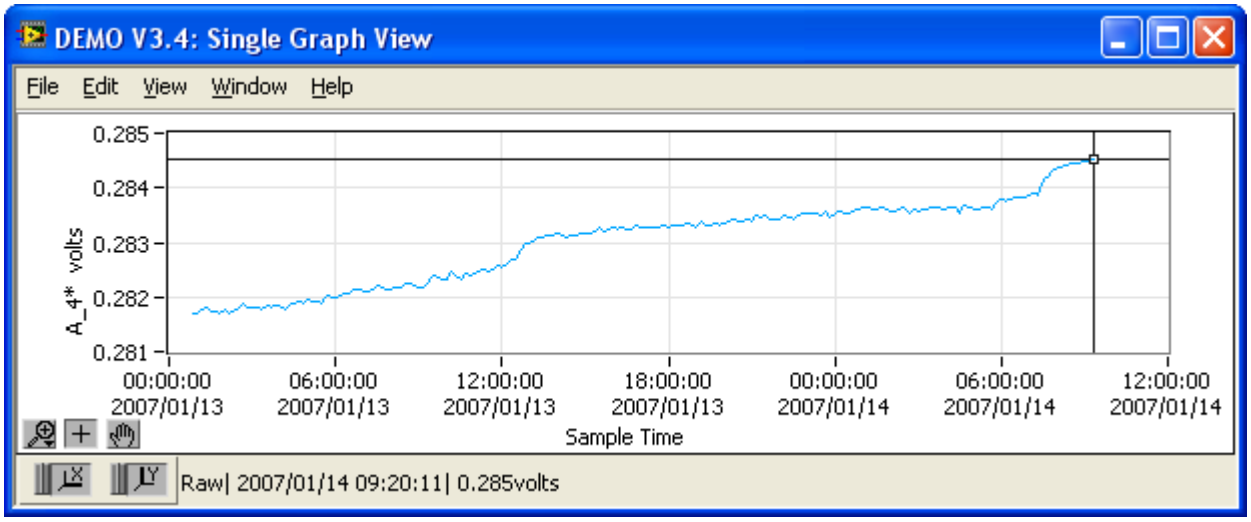


Figure 47: Single Channel Graph

The Single Channel Graph operates in the same manor as the Chart View multi-channel graph (Please See Section 3.1 for information on menu operation) except that it can be called by double clicking on channel indicators in Picture Views and by selecting the View / Single Channel option in the Chain View Window. This is very handy for quickly checking the history of a channel.

3 PUSH BUTTON COMMANDS

Push button commands allow the user to quickly select required display formats

Figure 48: Push Button Commands

- **Chart View –** Opens the Chart View window
- **Text data –** Allows the user to select which logger or chain to open the text file viewer with.
- **Picture View –** Allows the user to select which pictures views to edit or view
- **Chain View –** Allows the user to select which Chain to view
- **Alarms –** Displays the status of all alarms and warnings, allows the user to clear current alarms and alarm counts.
- **Information Display Box –** This box displays important information about the setup and status of the project. For example, Archiving Disabled, Com Time Alarm and if archived data is currently being viewed.

3.1 CHART VIEW

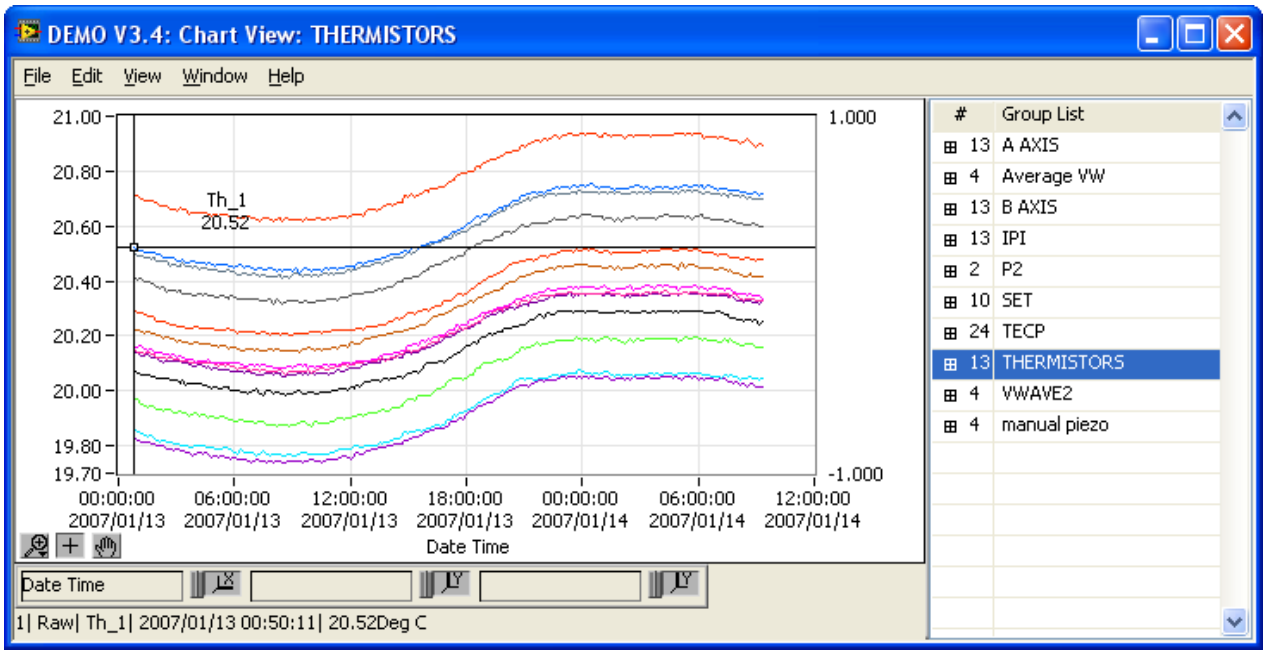


Figure 49: Chart View Window

The Chart View window is used to display a time-based plot for multiple channels. Each channel can have its own plot properties and be linked to one of two axes. Multiple channels can be grouped together and automatically displayed. A cursor is used to determine the exact position of any data point on a plot, The time and data value of the cursor are displayed in the bottom left corner. As new data is read in, the plot can be updated automatically. The graph can be zoomed, paned, scaled and annotated as required.

3.1.1 CHART VIEW / RIGHT CLICK EDIT MENU

Some of the Chart View parameters can be edited by right clicking anywhere on the chart to bring up the following command window.

Figure 50: Right Click Edit Menu.

All of the commands in this windows are explained later in this section except the Edit Axis Channels.

- **Edit Axis Channels –** Allows the user to select which axis the displayed channel is referenced to.

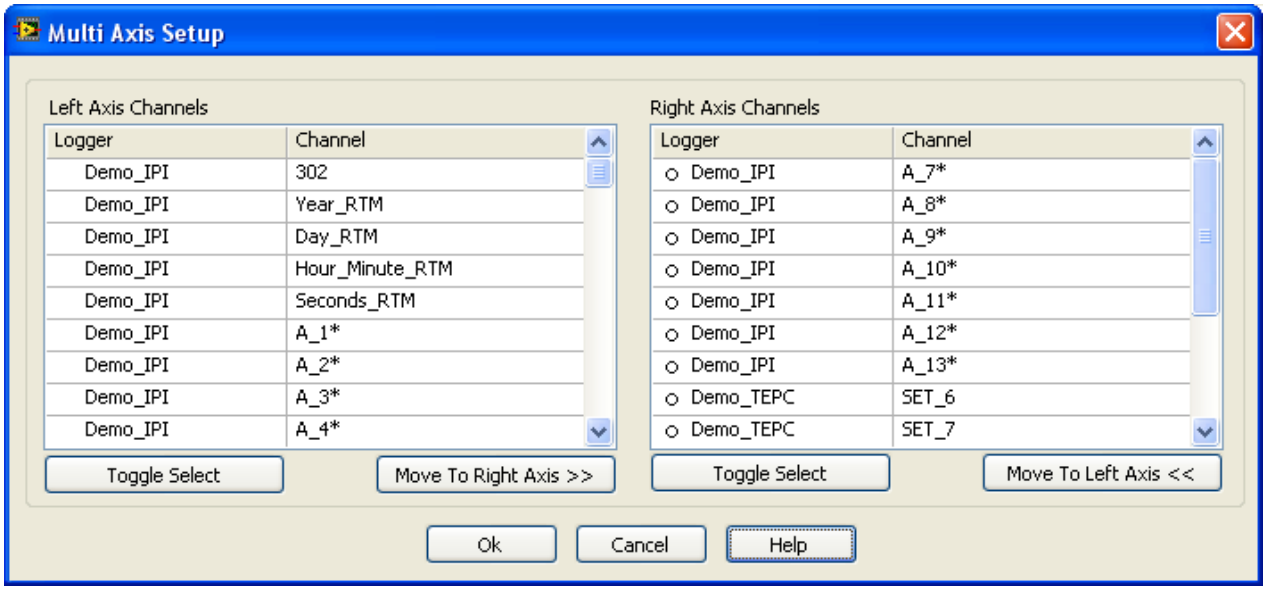


Figure 51: Edit Axis Channels

3.1.2 CHART VIEW / GRAPH DISPLAY OPTIONS

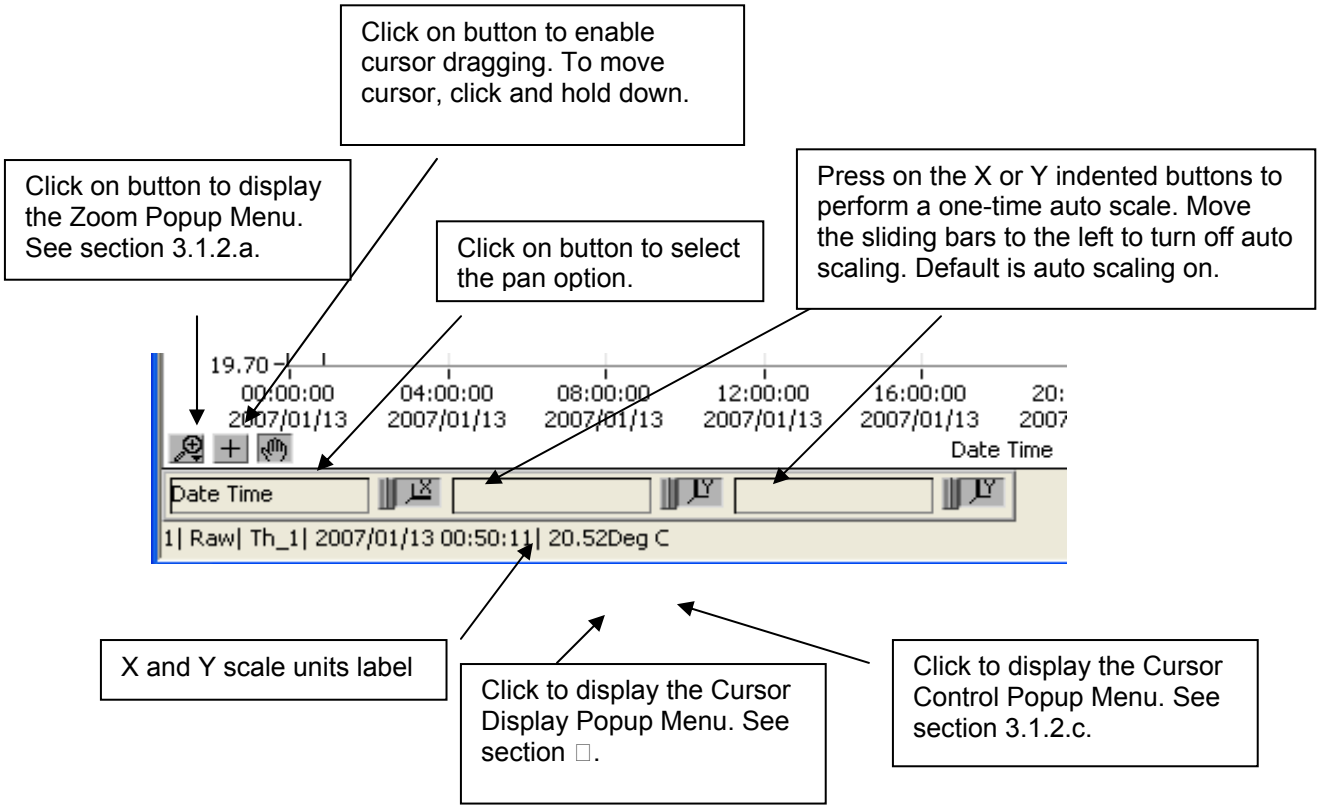


Figure 52: Graph Display Options

3.1.2.a CHART VIEW / ZOOM POPUP MENU

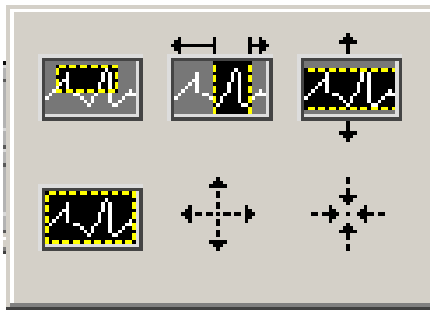


Figure 53: Zoom Popup Menu

The Zoom Popup Menu provides five different ways to zoom into a portion of the graph. Once a zoom mode has been selected, the mode remains until another mode is selected. The last zoom can be undone.

- **Zoom By Rectangle –** You can zoom into an area of the graph by dragging a selection rectangle around the area.
- **Zoom Horizontally –** Zoom into a horizontal section of the graph by dragging a selection rectangle horizontally. The vertical scale remains unchanged.
- **Zoom Vertically –** Zoom into a vertical section of the graph by dragging a selection rectangle vertically. The horizontal scale remains unchanged.

- **Auto Scale X & Y –** Auto scale both vertical & horizontal scales.
- **Zoom Into Point –** Zoom into a point by clicking on the graph at the required point. To zoom out, hold down the shift key and click.
- **Zoom Out Of Point –** Zoom out at a point by clicking on the graph at the required point. To zoom back in, hold down the shift key and click.

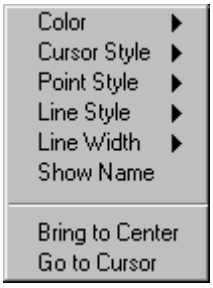


Figure 54: Cursor Display Popup Menu

3.1.2.b CHART VIEW / CURSOR DISPLAY POPUP MENU

- **Color –** Set the color of the cursor.
- **Cursor Style –** Select a type from a popup menu.
- **Point Style –** Select a type from a popup menu.
- **Line Style –** Select from solid, dashed, etc …
- **Line Width –** Set the thickness of the cursor.
- **Show Name –** When checked, the name of the selected sensors will be displayed above the cursor.
- **Bring Name –** Move the display region of the graph so that the cursor is visible.
- **Bring to Center –** Moves the cursor into the display region of the graph.
- **Go to Cursor –** Move the display region of the graph so that the cursor is visible.

3.1.2.c CHART VIEW / CURSOR CONTROL POPUP MENU

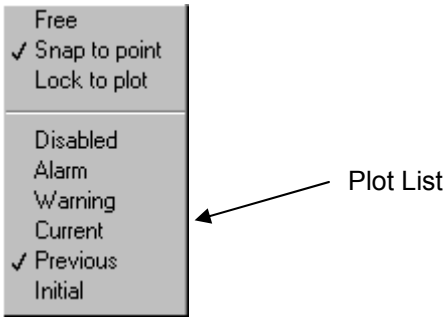


Figure 55: Cursor Control Popup Menu

- **Free –** When checked, the cursor is free to move anywhere in the graph area. Data point selection is disabled.
- **Snap to point –** When checked, the cursor will automatically move to the closest data point.
- **Lock to plot –** The cursor only moves to data points on the selected plot. To lock the cursor to another plot, select the required plot from the Plot List.
- **Plot List –** Displays a list of all plots. The plot that the cursor is on is checked.

3.1.2.d CHART VIEW / MANUAL Y AXIS SCALING

To manually change a Y axis scale, highlight the top or bottom scale value and enter the new scale value. Click anywhere else on the plot and the new scale will take effect. Note that if the auto scaling switch is enabled the chart will auto scale the next time it updates with new data.

3.1.3 CHART VIEW / FILE

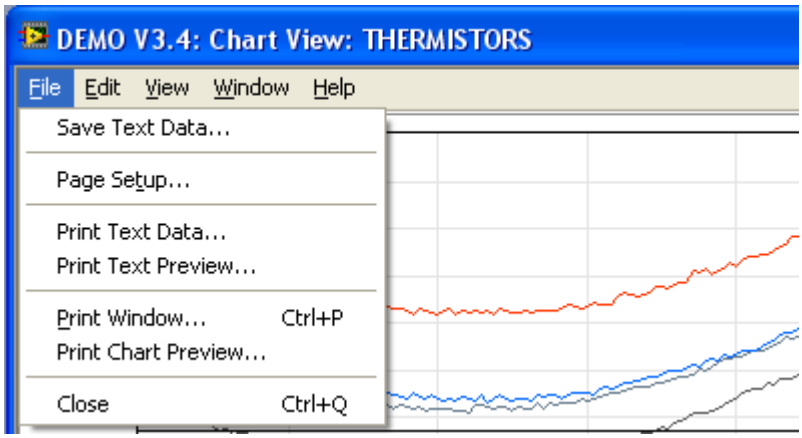


Figure 56: Chart View File Menu

The **File** menu consists of the following commands:

- **Save Text Data –** Save the displayed data as a text file with selectable channel delimiters and row Identifiers. This allows the importing of selected channels in other programs such as Excel.
- **Page Setup… –** Select page and printer options.
- **Print Text Data –** Allows the setup and printing of text data.
- **Print Window… Ctrl+P –** Print graph and all visible controls, a standard Windows Print window will open.
- **Close Ctrl+Q –** Close the chart view window.

3.1.3.a CHART VIEW / FILE / SAVE TEXT DATA / OPTIONS

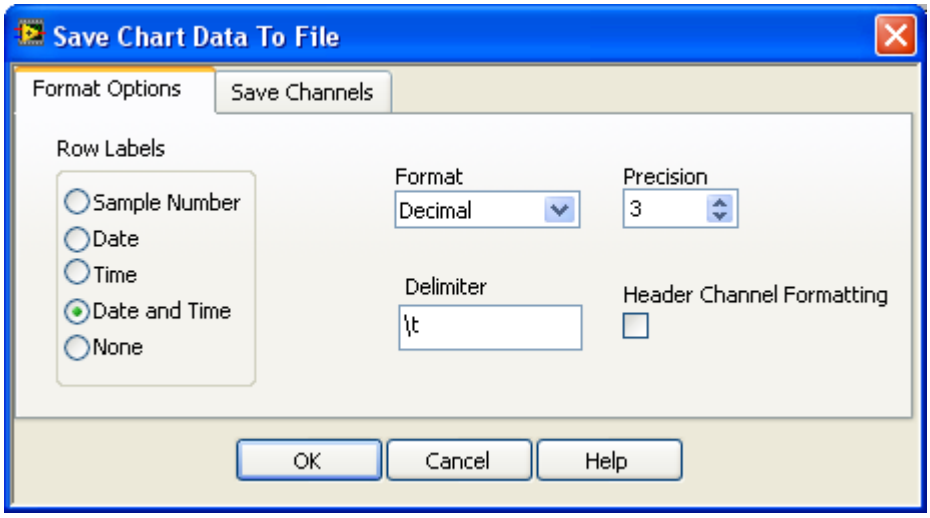


Figure 57: Save Chart Data to File

Select the Row Label format, delimiter (Channel separator character), Data Format, Precision and Channels to save. Select OK and a standard Windows Save As window will open, select file name and storage location and click OK. The file is now ready for importing and viewing in other programs.

3.1.3.b CHART VIEW / FILE / SAVE TEXT DATA / CHANNELS

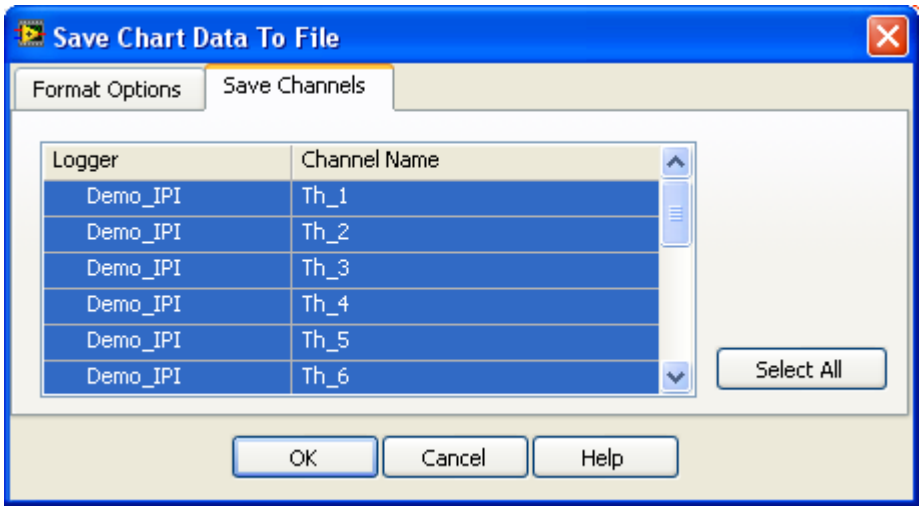


Figure 58: Save Chart Data to File / Save Channels

Select the channels that you want to save and click OK

3.1.3.c CHART VIEW / FILE / PAGE SETUP

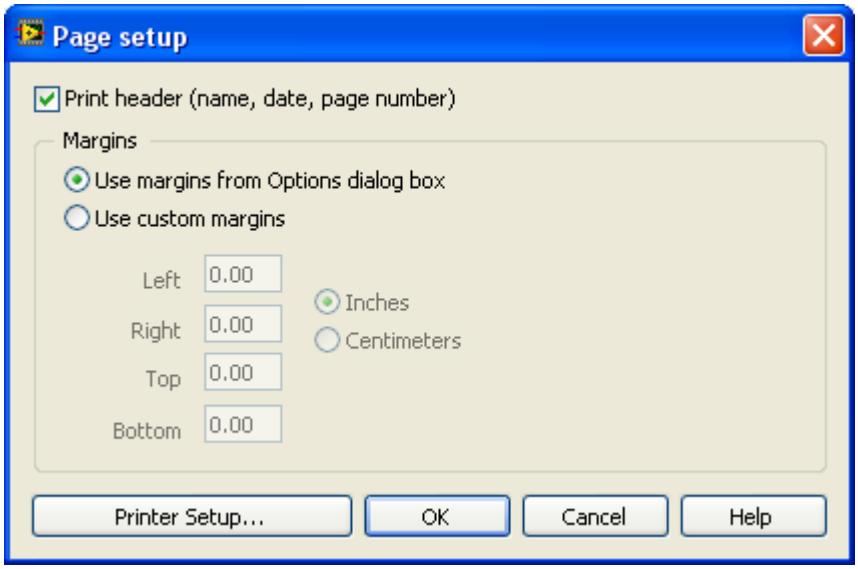


Figure 59: Page Setup

Select the Margins, Header if required and select OK. Select Printer setup and a standard Windows Printer Setup window will open, select OK to save the selections, Cancel to cancel.

3.1.3.d CHART VIEW / FILE / PRINT TEXT DATA

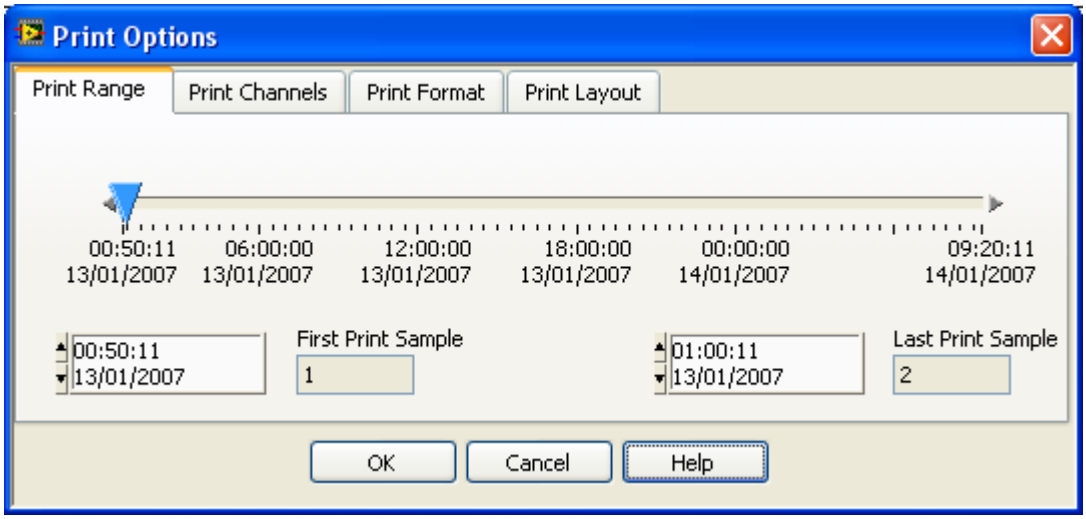


Figure 60: Print Text Data

The Print Options window is used to select a sample range of the text data to be printed.

- **Date Time Slider –** Shows the complete range of sampled data that can be printed. The two markers determine the range that will be printed. To move a marker, click and drag to the required position.
- **First Print Sample –** Displays the date time and sample number of the first sample to be printed. Click on the up and down buttons to change by one sample.
- **Last Print Sample –** Displays the date time and sample number of the last sample to be printed. Click on the up and down buttons to change by one sample.

- **Ok –** Press the Ok button to close the Select Print Range window and accept the print range that has been selected.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Select Print Range window and cancel the print job.

Select the Print Range, Print Format, Print Format and Print Channels & Select OK and the text data will be printed..

3.1.4 CHART VIEW / EDIT

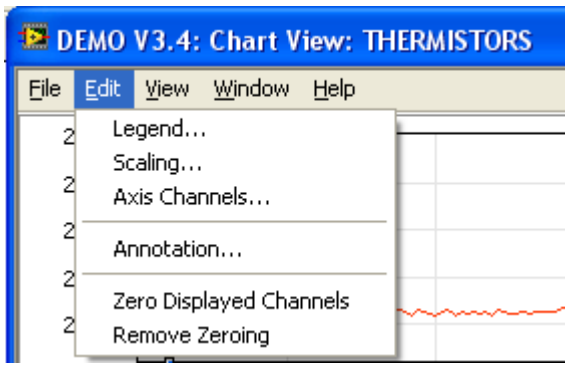


Figure 61: Chart View / Edit Window

The **Edit** menu consists of the following commands:

- **Displayed Channels –** Allows the user to select channels, or create or select groups of channels for display.
- **Scaling –** Enables the user to select formatting for the graph.
- **Legend –** Setup the display properties for each channel.
- **Labeling –** Enables labels, arrows, indicators……. to be placed on the chart view plot. When the chart window is closed and re-opened the labels will not appear on the chart. If Labels is the selected again the original labels will appear on the chart.
- **Zero Displayed Channels –** Zeros the selected channels at the cursor position.
- **Remove Zeroing –** Removes the Zero offset from the displayed channels.

3.1.4.a CHART VIEW / EDIT / DISPLAYED CHANNELS

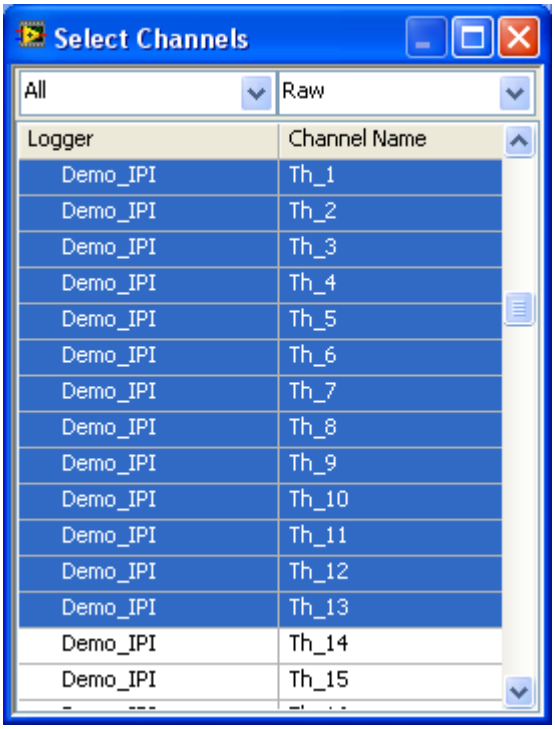


Figure 62: Select Channels

- **Channel Type –** Used to limit the type of sensor displayed in the Channel List box. Click on the control to display the Channel Type popup menu. Click on an item from the list to display only sensors of the selected type in the Channel List box. If there are no channels for the selected type, the last type will be reselected. If a Warning or Alarm item is selected, all channels that are in a trigger state will be displayed.
- **Data Type –** Click on the control to display the Data Type popup menu. Select a data type (Raw or Calculated) and all channels will be plotted in the selected type
- **Channel List –** Display a list of all channels that can be plotted. The type of channel listed is determined by the selection from the Channel Type control. To plot a channel, select an entry from the list. Multiple channels are selected by holding down the shift or control keys and clicking the required files. A number channels can be grouped together and assigned to an entry in the Group List box. Selecting the entry will automatically select all the channels. The symbols to the left in the Logger Name box indicated which Y axis the channel is associated with.
- **Edit Group –** Allows the creation and editing of groups
- **Create Group –** Creates a group from currently selected channels.

3.1.4.a.i Chart View / Edit / Channel Groups

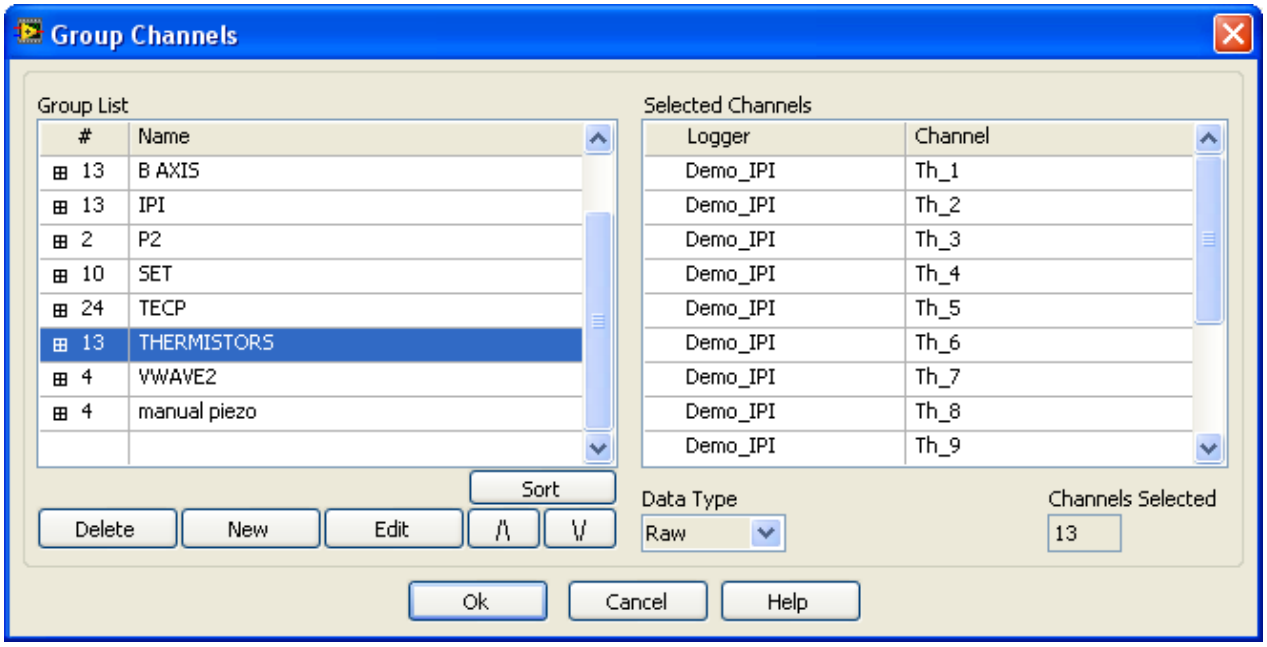


Figure 63: Group Chart Channels window

The Group Chart Channels window is used to group a number of channels together so they can be automatically plotted in the chart view window. Each entry in the Group List box contains a pointer to list of channels. When an entry is selected, the corresponding channels in the Channel List box will be selected. A new entry can be added or an existing entry can be deleted or changed.

- **Group List –** Displays a list of all groups that have been created.
- **Channel List –** Shows the channels that are associated with a group that has been selected in the Group List box.
- **Channels Selected –** The number of channels currently selected in the Channel List box.
- **Delete –**To delete a group, select the group from the Group List box then press the delete button.
- **New –** Press the New button to create a new group. The Edit Group window will be displayed.
- **Edit –** To modify an existing group, select the group from the Group List box then press the Edit button. The Edit Group window will be displayed.
- **Ok –** Press the Ok button to close the Group Chart Channels window and save any changes that have been made.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Group Chart Channels window. Any changes made will not be saved.

3.1.4.a.ii Push Button Commands / Chart View / Edit / Scaling

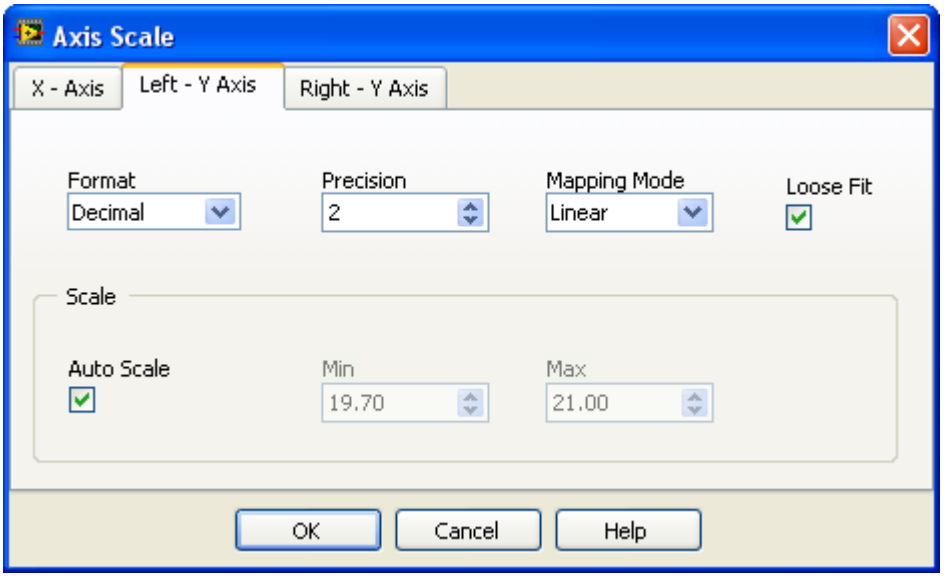


Figure 64: Scaling

- **Format –** The following numeric formats are available, decimal, scientific, engineering, binary, octal, hexadecimal, relative time, absolute time. The default is decimal.
- **Precision –** Set the number of significant figures. A value between 0 and 6 can be chosen.
- **Mapping Mode –** Set the scale to display data using linear or logarithmic scale.
- **Loose Fit –** When checked, displays a little blank space on both ends of the plotted data.
- **X-Axis Scrolling –** When checked, old data will scroll off the screen when new data is read in. The required time span is input in the Span window.

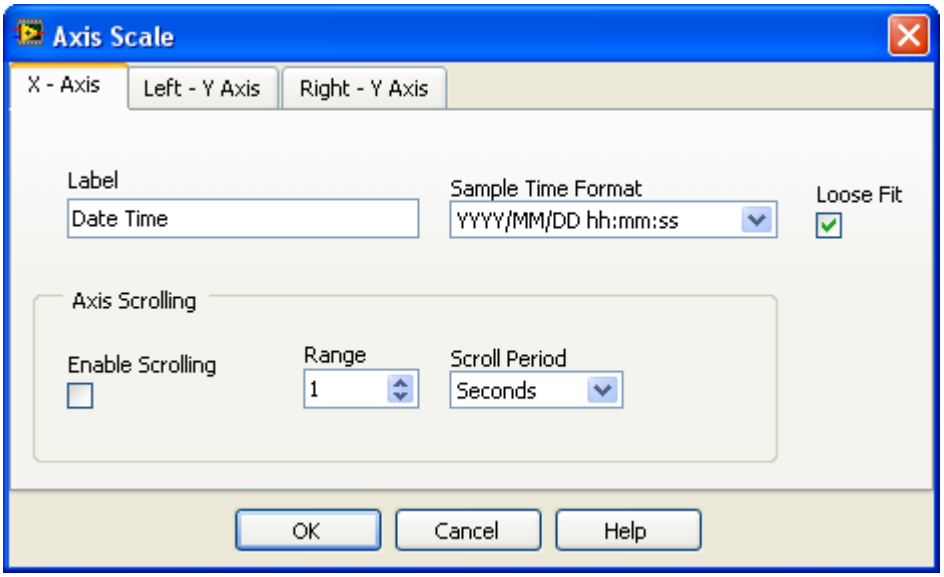


Figure 65: X-Axis Scrolling

3.1.4.a.iii Chart View / Edit / Legend

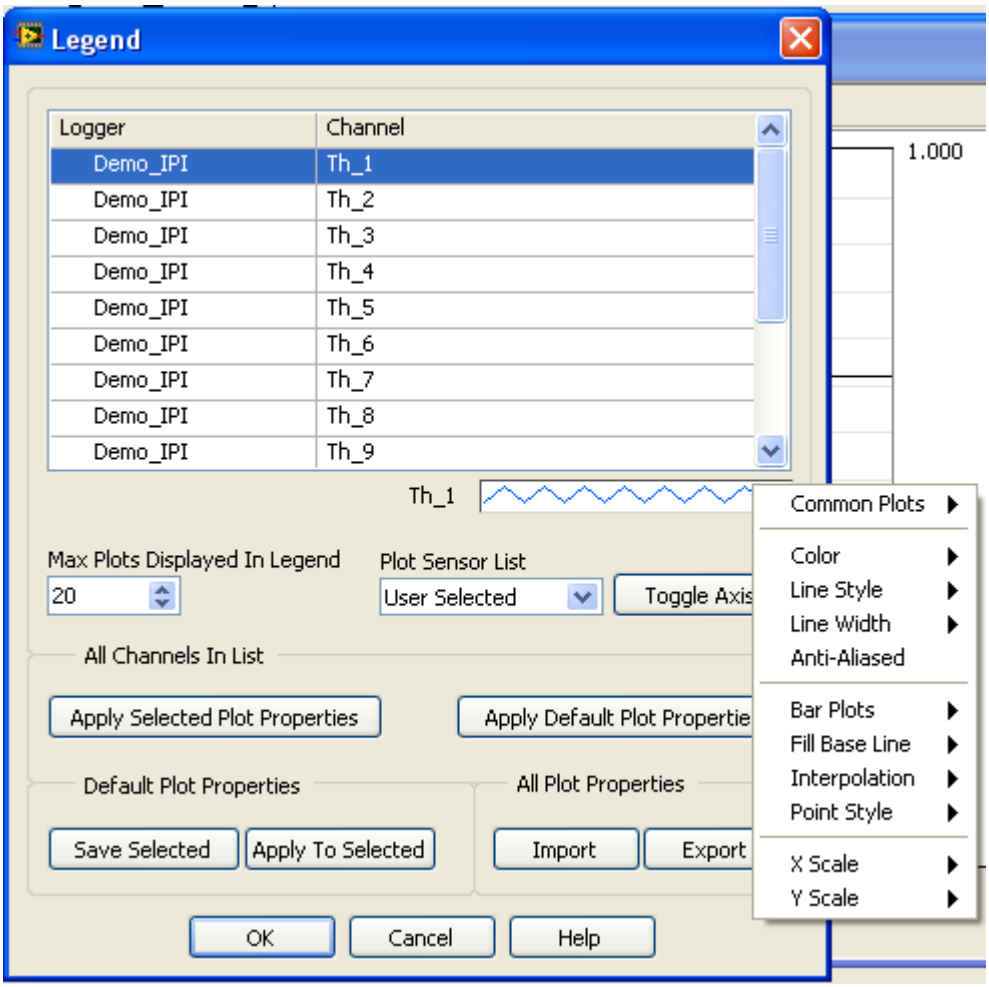


Figure 66: Legend

The Legend window is used to setup display properties for each channel. Each channel can have its own unique display properties.

- **Plot List –** Displays all the channels from the type selected in the Plot Sensor List.
- **Selected Plot –** The selected plot is displayed in the edit widow along with the current line style and color.
- **Popup Menu –** To edit the line properties left click on the button at the end of active channel window and the pop up window shown will be displayed. The user can then select graph properties for the channel.
- **Plot Sensor List –** Determines the channels that are to be displayed in the Plot List. Click on the control to display the popup sensor selection menu. The default selection is User Select, which lists all of the channels that are being plotted in the chart view. Selecting another type will list all sensors of the selected type. If there are no sensors for a selected type, the previous type will be reselected.
- **Max Plots in Legend –** When the legend is displayed in the chart view, the number of plots listed can not exceed this number.

- **Apply current plot properties to all channels in list –** The plot properties for the selected plot will be applied to all of the channels listed in the Plot List.
- **Ok –** Press the Ok button to close the Legend window and save any changes that have been made.
- **Cancel –** Press the Cancel button or the <ESC> key to close the Legend window. Any changes made will not be saved.

3.1.4.a.iv Chart View / Edit / Labeling

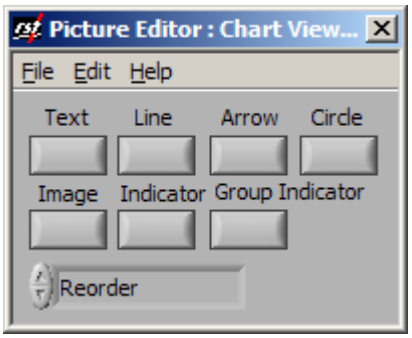


Figure 67: Labeling

The Add Labeling window is used to add labeling to the chart view plot. When labeling is being displayed, cursor movement is disabled. The labels are automatically saved when the Add Labeling window is closed. All labels can be modified when the Label window is open. To modify a label, the label must first be selected. A label is selected by clicking on it. A text box is selected if a thick gray border surrounds it. Lines and arrows are selected if small square boxes are displayed on either end. When a label has been selected, it can be moved or deleted.

- **Add Text –** Enables a text box to be added to the plot. To add a text box, click on the Add Text button, click on the plot at the required location, then type in the text. After a text box has been created the text can be changed. To change the text, select the text box, and then enter the new text.
- **Add Line –** Enables a line to be added to the plot. To add a line, click on the Add Line button, click and hold down on the plot at the required start position, drag the mouse to the end position, then release the mouse. After a line has been created it can be resized. To resize, select the line, and then drag the square end marker to the new position.
- **Add Arrow –** Enables an arrow to be added to the plot. To add an arrow, click on the Add Arrow button, click and hold down on the plot at the required start position, drag the mouse to the end position, then release the mouse. The arrow is drawn from head to tail. After an arrow has been created it can be resized. To resize, select the arrow, and then drag the square end marker to the new position.
- **Reorder –** Moves the selected item to the front or back of the drawing order. An item at the front of the order will always be visible. An item at the back of the order may only be partially visible. To change the drawing order of an item, select the item, click on the Reorder control, and select either Move to Front or Move To Back.
- **Edit –** Allows the editing of label properties, coping and deleting of one or all labels.

3.1.4.a.v Push Button Commands / Chart View / Edit / Labels Edit

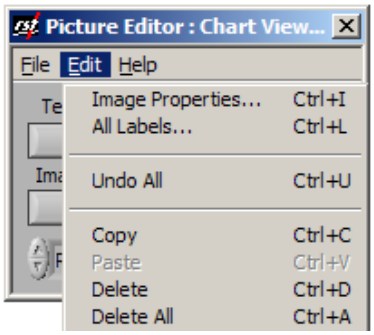


Figure 68: Edit Labeling

- **All Labels –** Opens a selection box where an active label type can be selected for editing
- **Undo All –** Undo's all that has been done since the last save.
- **Delete –** Deletes the selected item from the plot. The item must be selected before opening the edit window. To select an item click on it. Text boxes and indicators are selected if they surrounded by a thick gray border. Lines and arrows are selected if small square boxes are displayed on either end.
- **Delete All –** All items placed on the plot are removed.

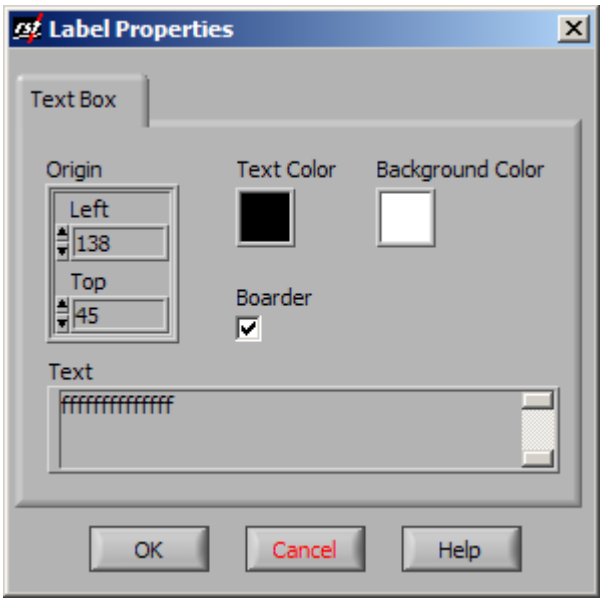


Figure 69: Label Properties

- **Boarder –** Text boxes are drawn with a board around the text. This board can be removed by deselecting the boarder check box.
- **Foreground –** Used to set the color for a line, arrow or text in a text box. To display a color selection window, left click on the control.
- **Background –** Used to set the background color for a text box. To display a color selection window, left click on the control.

3.2 PUSH BUTTON COMMANDS / CHART VIEW / VIEW

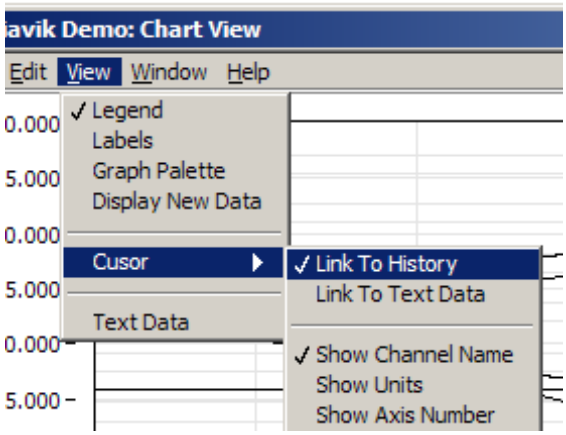


Figure 70: Chart View / View Window

The Chart View / View window is used to customize the current display and to turn on or off chart features.

- **Legend –** When checked, the legend is shown. Plot properties can be temporarily changed. To make permanent plot properties changes for all channels, select the Legend command. There is a limit to the number of items in the legend.
- **Labels –** When checked, the user input labels are shown
- **Graph Palette –** When checked, the graph zoom and cursor controls are shown.
- **Display New Data -** When checked the Chart will automatically rescale to display new received data.
- **Cursor –** Displays the cursor graphing properties. When Link to History is checked the cursor will track the indicator on the time. If Link to Text Data is checked the text data display will track the cursor and the cursor will track the text data display. When Show commands are checked, the checked information is displayed with the cursor.
- **Text Data –** Displays the graphed channels in text format.

3.3 TEXT DATA

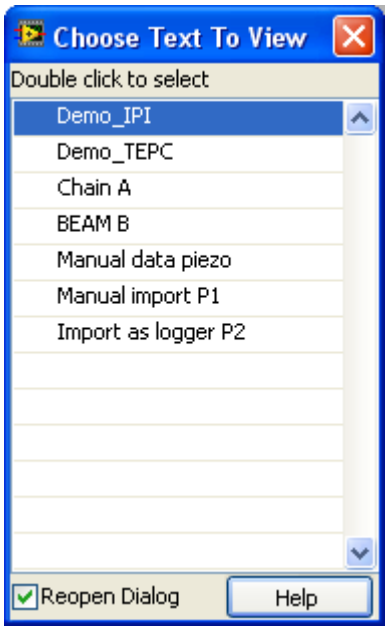


Figure 71: Select Logger to View Data Window

The Select Logger to View Data window allows the user to select which logger to display text data from. Multiple Text Data Display windows can be open at the same time.

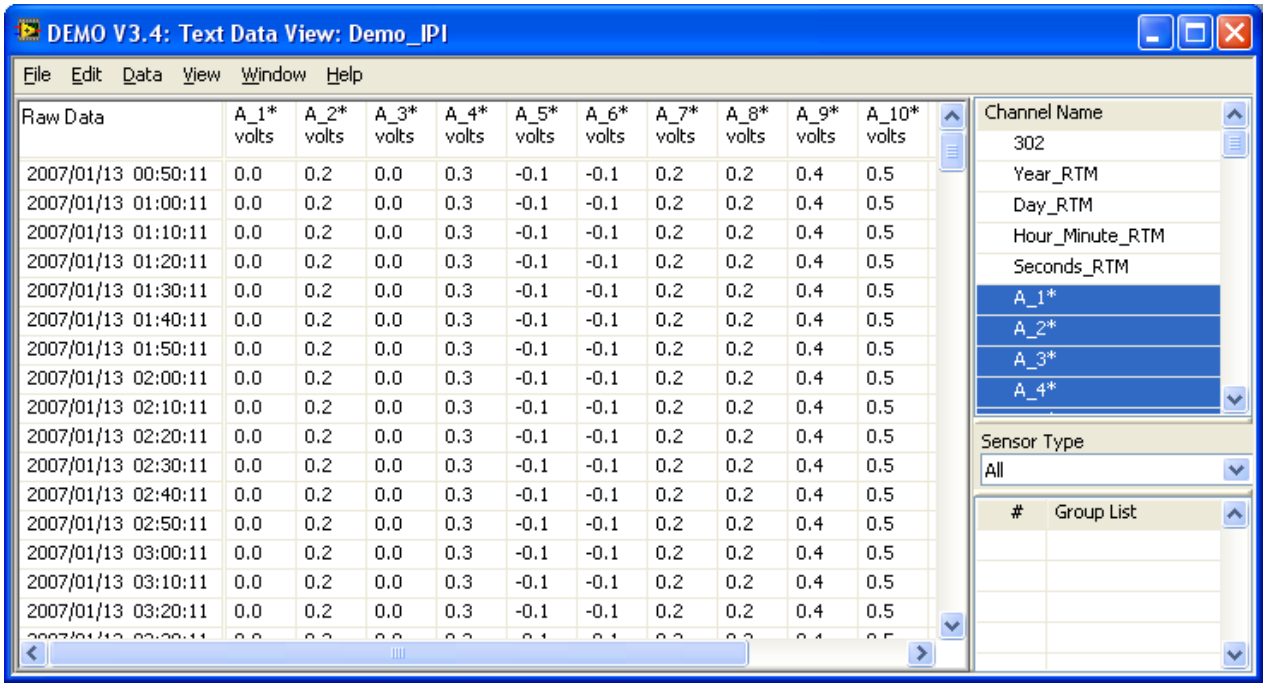


Figure 72: Text Data View Window

The View Data window is used to view, print, and save to file, tabular text data.

3.3.1 TEXT DATA / FILE MENU

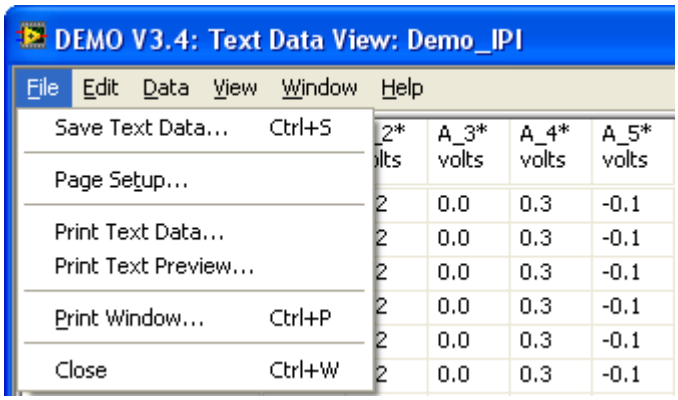


Figure 73: Text Data View / File Window

Please See Section 3.1.3

3.3.2 TEXT DATA / EDIT MENU

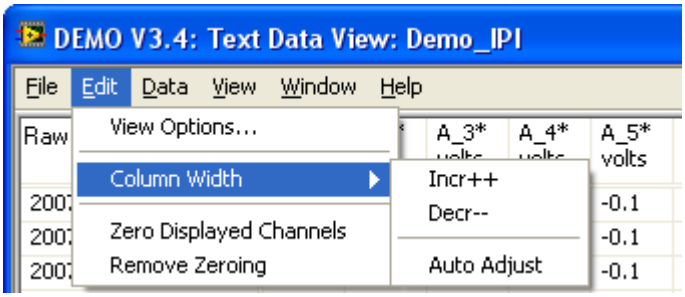


Figure 74: Edit Menu

The **Edit** menu consists of these commands:

- **Displayed Channels –** Select or change channels to view
- **View Options**- Select row label format, data format and displayed significant figures.
- **Column Width** – Increase or decrease the current data column width.
- **Zero Displayed Channels –** Zero's the displayed channels using the 1st row currently in the display window as the zero offset. i.e. Scroll until the required zero time and date is displayed in the top left window, then selected zero displayed channels.

3.3.2.a TEXT DATA / EDIT / OPTIONS…

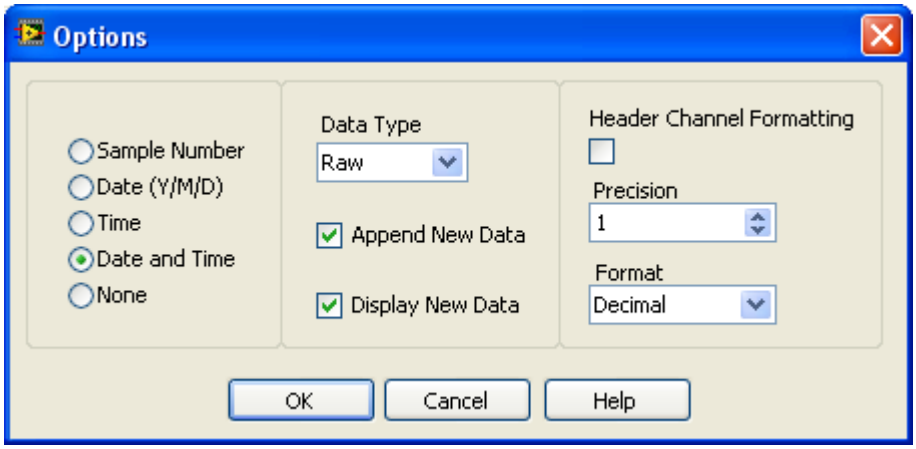


Figure 75: Options window

The Options window is used to select display properties.

- **Date Time radio buttons –** Select row display format
- **Data Type –** Select Raw or Calculated Data
- **Precision –** The number of significant figures to display with listed, saved or printed data.

3.3.2.b TEXT DATA / EDIT / DISPLAYED CHANNELS…

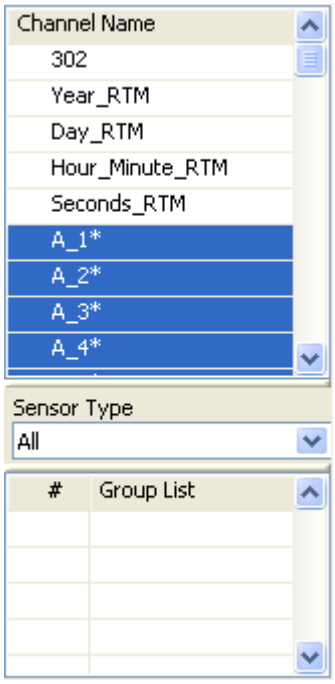


Figure 76: Select Channels window

The Select Channels window is used to choose the channels that will be listed, printed or saved to file. To select multiple channels hold down the control or shift key and click on the required channels. To change the order of the selected channel, highlight the channel and use the up / down arrows.

3.3.3 TEXT DATA / VIEW MENU

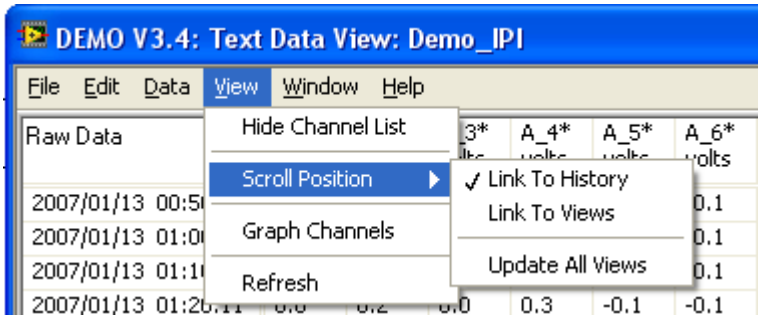


Figure 77: View Menu

- **Refresh –** Update the list with any new data that may have been read in.
- **Link To History –** When checked, the window will display data starting at the sample selected in the History control
- **Link to Chart –** When checked, the top sample in the text display window controls the cursor position in the chart view window. The cursor will track the text data.
- **Graph Channels –** Graph the selected channels in Chart View

3.4 PICTURE VIEW

Picture View allows pictures to be displayed or created and saved for later viewing. A picture consists of an image file (bitmap, JPEG or PNG), on top of a colored window with added lines, arrows, text boxes and sensor indicators. An indicator displays current data from any selected sensor and can also graph the data when double clicked. The picture file to which the image and indicators are to be associated must first be created in Edit Picture view (See Section 2.2.10) To edit a picture view select the view from the drop down list clicking on the Edit / View menu button and add the required drawing items. A picture is automatically saved if a new picture is selected from the Views list or if the Picture View window is closed. All picture items can be modified. To modify a drawing item, the Edit View must be open and the item selected by double clicking on it, right click and select properties. The Item can also be selected by Edit / All labels in the Edit / View window and selecting from the drop down list. Text boxes and indicators are selected if they surrounded by a thick gray border. Lines and arrows are selected if small square boxes are displayed on either end. When an item has been selected, it can be also be moved or deleted.

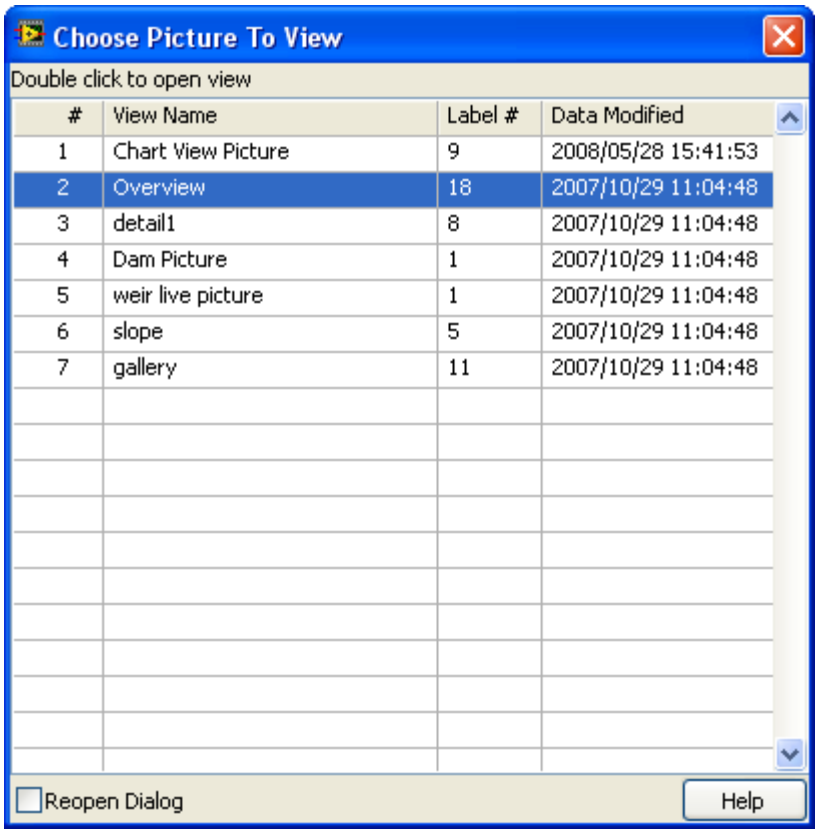


Figure 78: Select Picture to View Window

The Select Picture to View window displays a list of all pictures that have been added by the user in the Edit / Picture View Drop Down Menu Command. User can then add Images (JPG, BMP drawings or pictures) to which Indicators, Text, Arrows and shapes can be added. This window also allows the user to select which pictures to display. Multiple Picture View Display windows can be open at the same time.

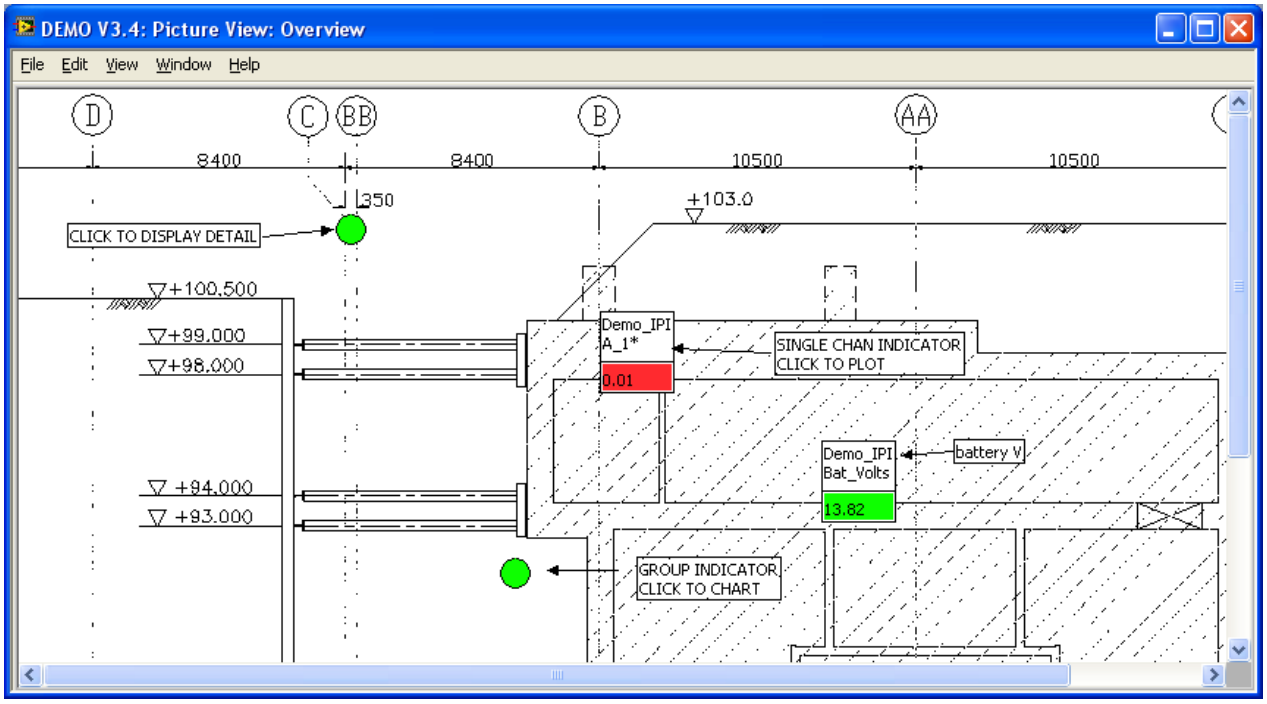


Figure 79: Picture View Window

- **File –** Select page and printer options.
  - **Page Setup –** Allows the setup of printer and page margins. (see Section 3.1.3.c Chart View / File / Page Setup)
  - **Print Window… Ctrl+P –** Print graph and all visible controls, a standard Windows Print window will open.
  - **Close Ctrl+Q –** Close the Picture view window.
- **Edit** – Opens the Edit View window.
- **Window** – Selects the view to display on top and to set or lock the size of the current window.

3.4.1 PICTURE VIEW / PICTURE EDITOR MENU

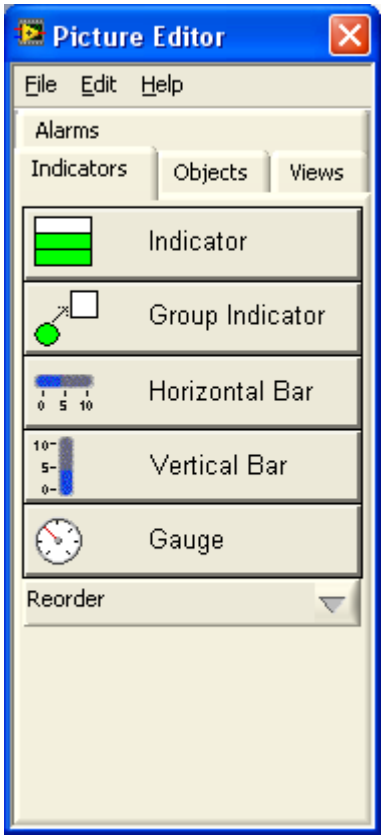


Figure 80: Picture Editor Menu

The **Edit** menu consists of these commands:

- **File –** Saves the labels for the current view
- **Edit**- Select and edit, copy, paste or delete labels and view or change image properties.
- **Reorder** – On overlapping items, selects which item is on top.
- **Item Push Buttons** – Select the type of item to be added to the picture and then click on the desired location in the picture.
    - **Text / Line / Arrow / Circle** – Add or edit a text box, line, arrow or circle to the current Picture View
    - **Image** – Add or edit an image to the current Picture View. An image can be a bitmap, JPEG or PNG of any drawing, schematic or picture that helps the viewer analyze the data.
    - **Indicators** – Displays the current value of any channel in the project. The indicator will change colour when the channel is disabled or goes into warning or alarm. An Indicator can be programmed to open a single channel chart or text view when it is selected with the left mouse button. Multiple Indicators may be added to each picture view. Double clicking on an Indicator will open a single channel graph of the selected sensor
    - **Group Indicator**- A group indicator can open another picture view, chain view, chart or text data view. The group indicator will change colour when any of the referenced channels is disabled or goes into warning or alarm. Multiple Group Indicators may be added to each picture view.

3.4.1.a PICTURE VIEW / PICTURE EDITOR MENU / EDIT

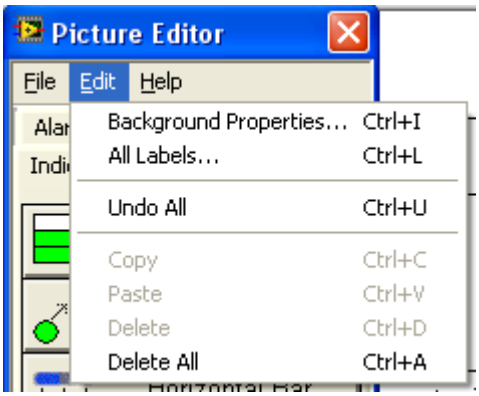


Figure 81: Picture Editor Edit command

- **Image Properties –** Allows the selection of an image to be added or displays information about the current image (File Location, bit depth, height, width and position). To save memory and speed up operation, Geoviewer automatically reduces the image bit depth to one, this can be edited to another value in this window
- **All Labels…** - Displays a list of all items in the current picture view. Select the required item and select Edit, an Item (text, indicator or group indicator) dependent Edit window will open.

3.4.1.a.i Picture Editor / Edit Indicator

The Edit Indicator window allows the user to associate a data channel with an indicator and set the indicator properties and actions.

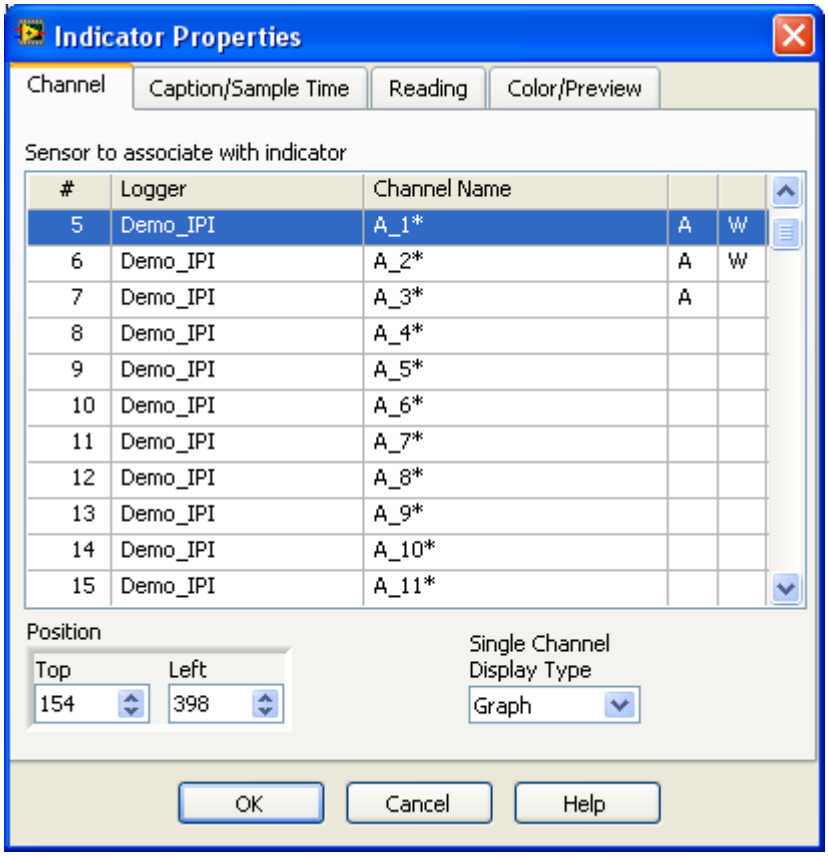


Figure 82: Add or Edit Indicator Window

3.4.1.a.ii Picture Editor / Edit Group Indicator

The Edit Group Indicator window allows the user to associate another picture view, chain view, chart or text data view with a group indicator and set the group indicator properties and actions.
Select the view and data types and the channels or view to be displayed when the group Indicator is selected. Text for a caption explaining the indicators function can be added in the bottom Caption text box.

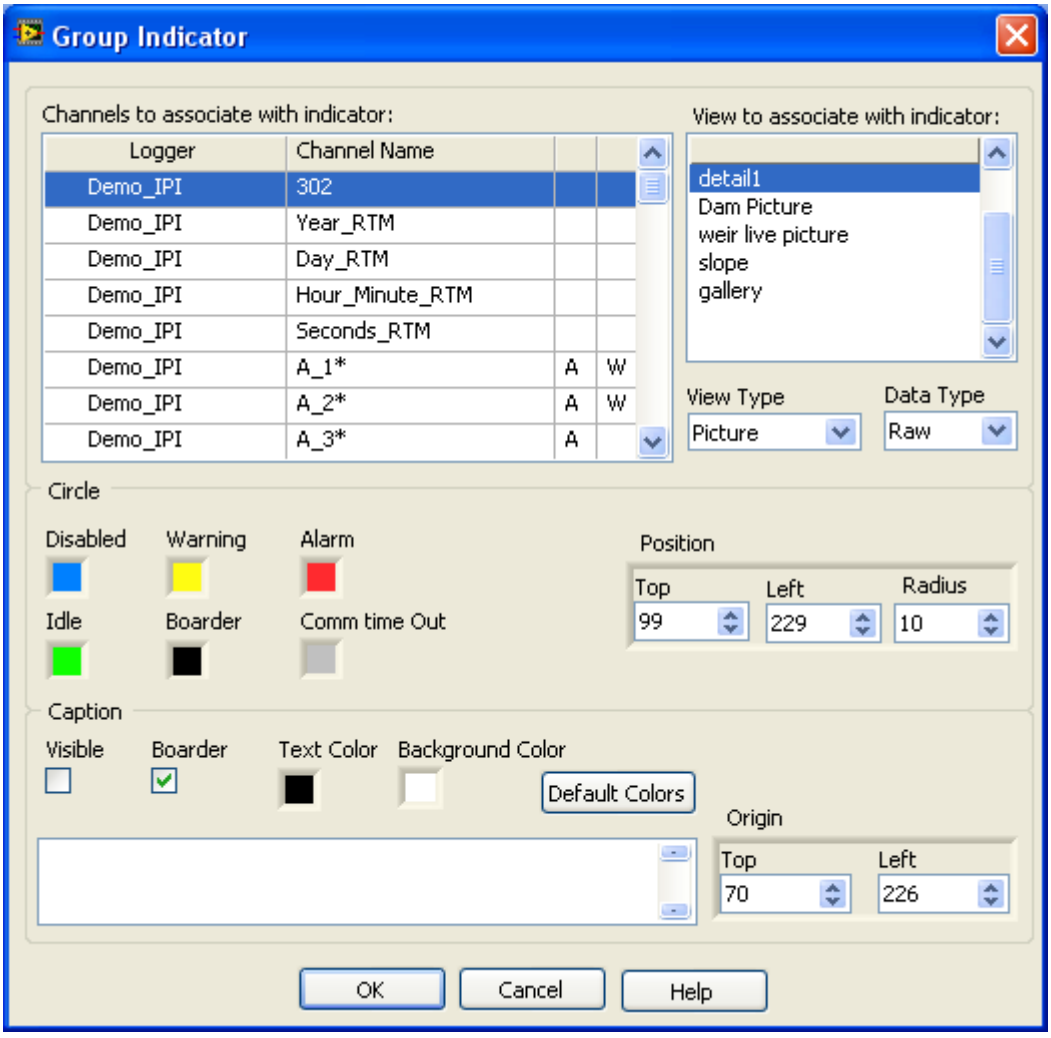


Figure 83: Add or Edit Group Indicator Window

3.5 CHAIN VIEW

The Chain View window displays a list of all chains that have been added by the user in the Edit / Chain View Drop Down Menu Command. Multiple Chaine View Display windows can be open at the same time.

The selected Chain View displays a Deflection verses Position (distance from a reference point) plot of the current, average, previous and initial data. Data can be displayed in Absolute (chain profile) or Relative (Change in deflection from initial and previous data). The current plot displays the latest sampled data. The previous plot displays a user selectable previously taken sample. The initial plot displays the reference points for the sensors. The cursor is used to select data points. Move the cursor by clicking on the cursor center point and dragging it. The cursor will automatically snap to the closest data point. Information about the selected data point is displayed in the Plot Information box as the cursor is moved.
Three status plots are also displayed, alarms, warning, and disabled. These plots are displayed on top of the current plot. The alarm and warning plots are only displayed if a channel has been setup as a trigger and the current sensor data has exceeded the limit set for the channel. A disabled channel is only displayed if the channel has been manually disabled.

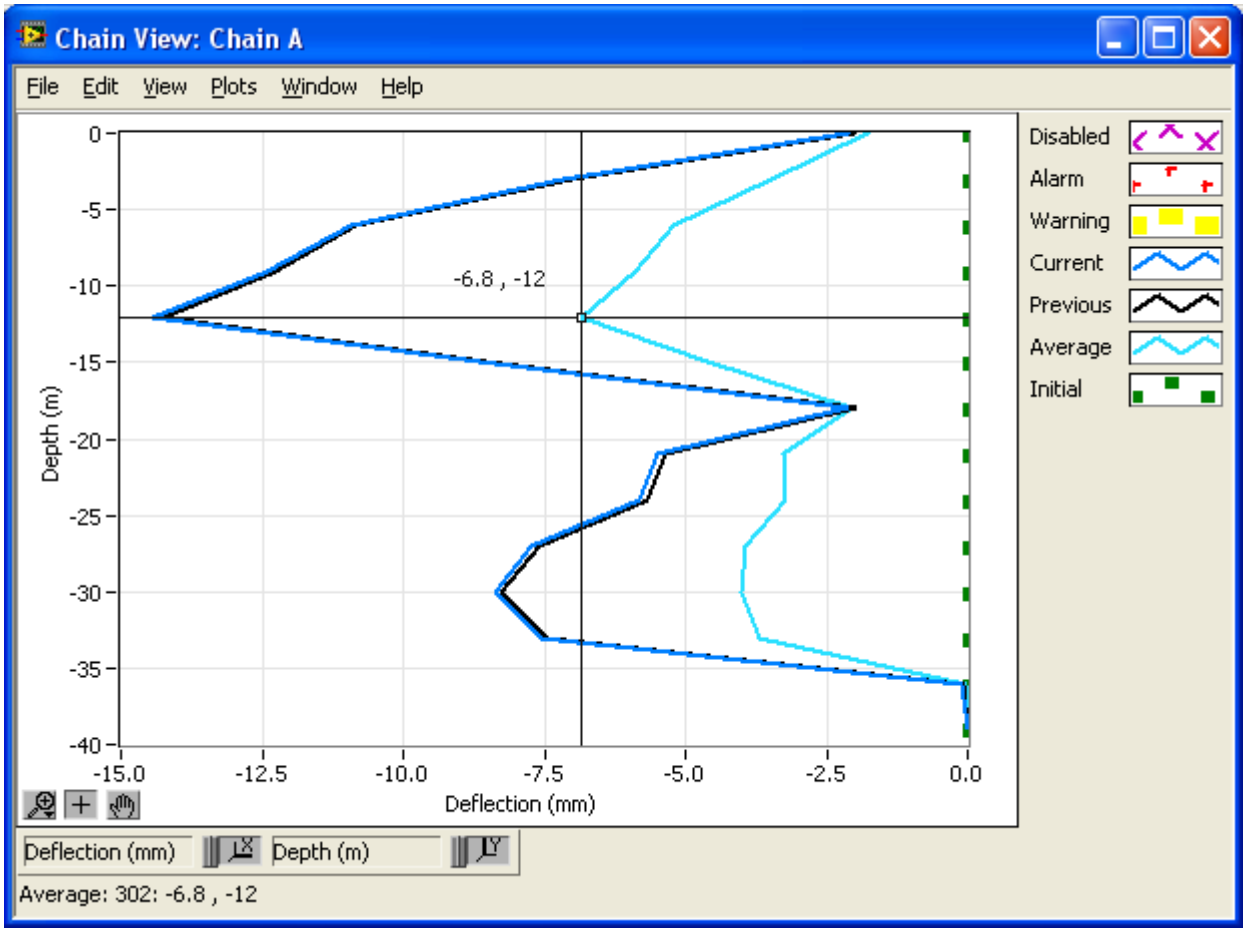


Figure 84: Chain View

3.5.1 Push Button Commands / Chain View / File Menu

Please See Section 3.1.3

3.5.2 Push Button Commands / Chain View / Edit Menu

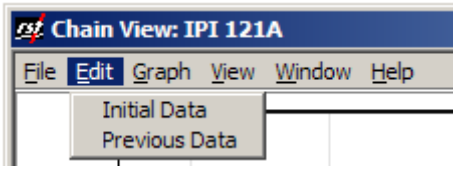


Figure 85: Chain View / Edit Menu

The **Edit** menu consists of these commands:

- **Initial Data –** Select or change reference date/time or enter value. See Section 2.2.11.b
- **Previous Data** - Select a previous sample that will be displayed with the current data. This is useful for monitoring shorter changes. The time difference between the two plots will remain constant, it

will track the current sample time. i.e. If the previous data selected was 24 hours prior to the current it will update every time a new sample is collected. To select a tracking interval, input a sample number, enter the interval in seconds or position the cursor on the time bar.

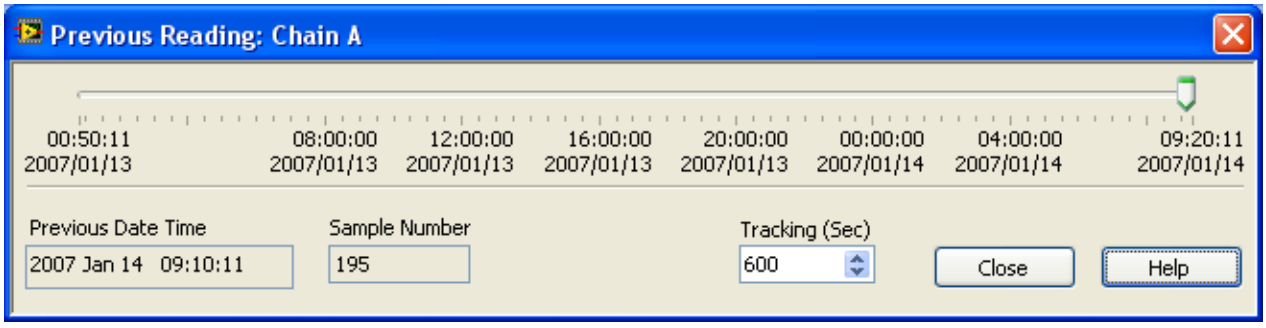


Figure 86: Chain View / Select previous Data

3.5.3 PUSH BUTTON COMMANDS / CHAIN VIEW / GRAPH MENU

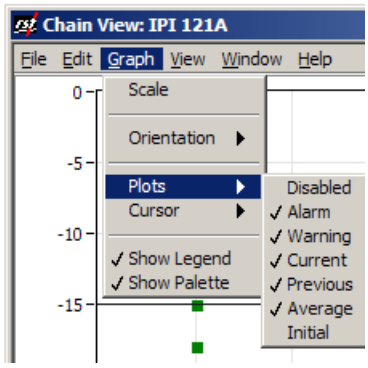


Figure 87: Chain View / Graph Window

The Graph window is used to select display properties.

- **Scale –** Select axis format. (Format, Precision and mapping mode) To change the axis labels, edit the text boxes at the bottom of the main chain view window.
- **Orientation –** Select Vertical (IPI's) or Horizontal (Tilt Beams). Switches the distance axis to vertical or horizontal.
- **Plots –** Select which plots to display.
- **Cursor –** Select cursor display options. (show units, reading or channel name)

3.5.4 PUSH BUTTON COMMANDS / CHAIN VIEW / VIEW MENU

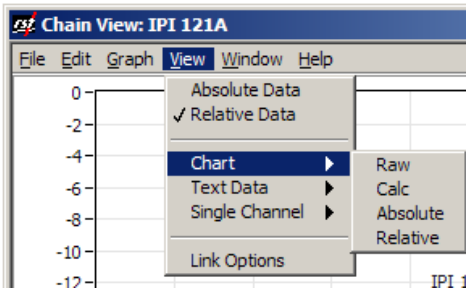


Figure 88: Chain View / View Window

The Graph window is used to select display properties.

- **Absolute / Relative Data –** Select to display absolute (profile) or relative (change in deflection) data in the current plot
- **Chart / Text Data / Single Channel –** Display the data from the current plot in graphical or text format. Data can be displayed in raw, calculated absolute or relative formats.
- **Link Options –** Select the default setting for displaying the current plot in graphical or text format

3.6 ALARMS

Please See Section 2.2.7

4 NEW PROJECT SETUP

The following section explains how to create a new project in Geoviewer. All information entered now can be modified at a later time.

1) From the Geoviewer main menu select "Project/Options". The current project will be closed.

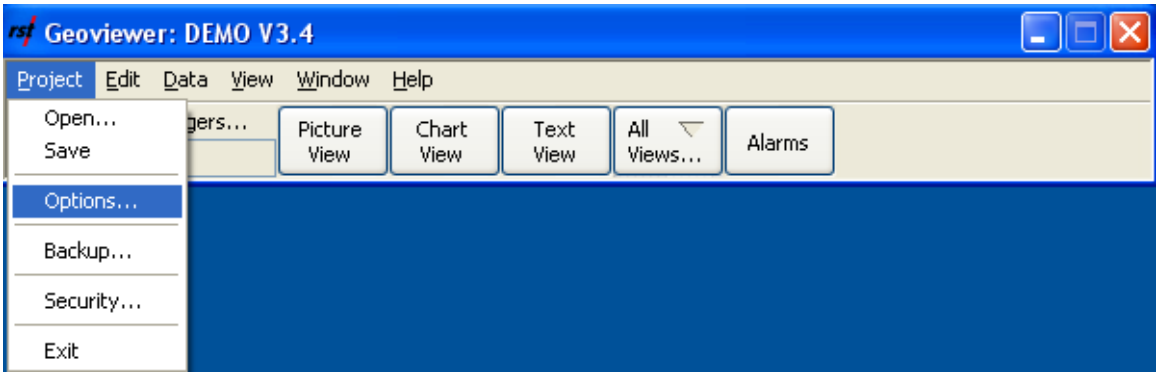


Figure 89: Open Project Option Window to Create New Project

2) The "Project Options" dialog will be display. Press the "New" button.

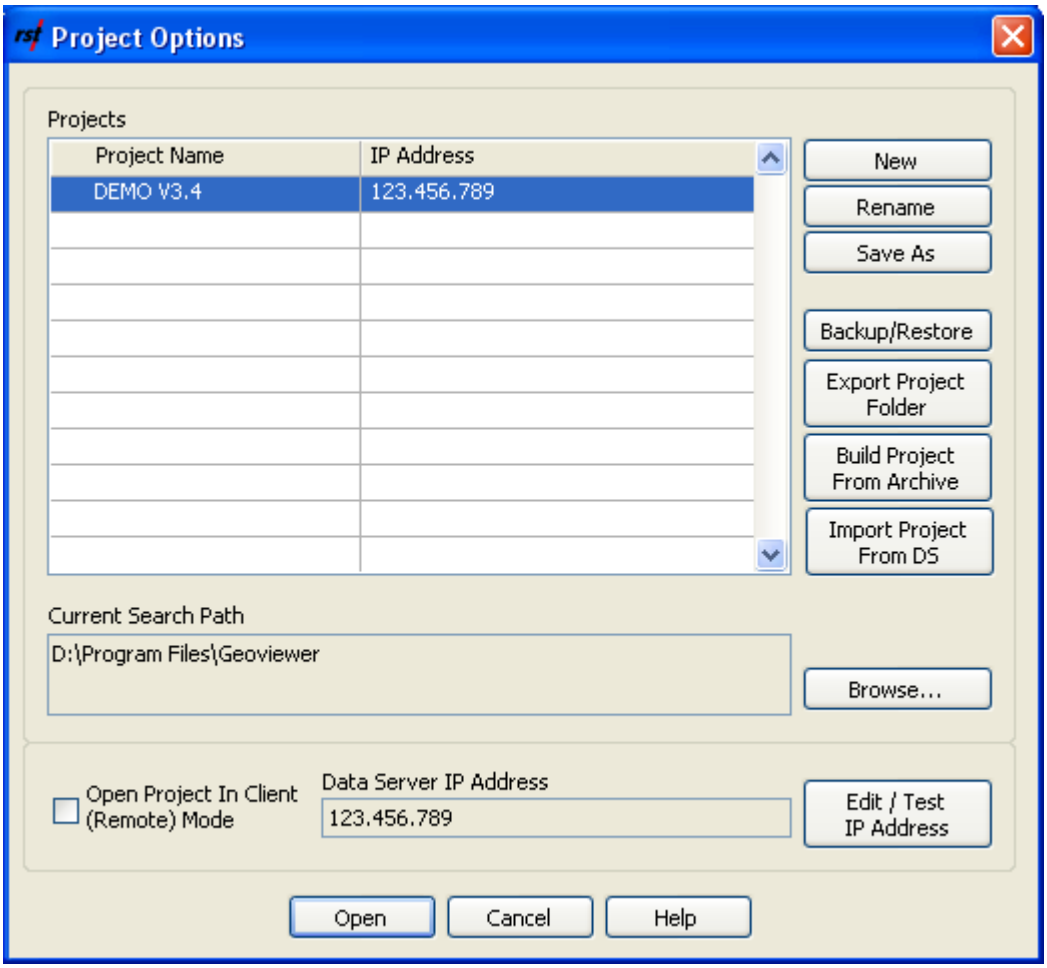


Figure 90: Project Options Window

3) The "Enter Project Name" dialog will be display. Enter the name of the project and press the "Ok" button. The project can be renamed at a later time.

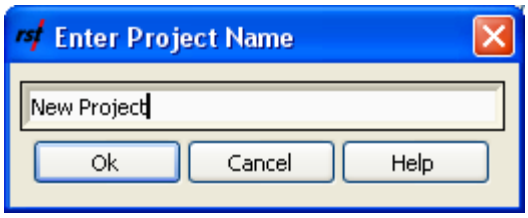


Figure 91: Enter Project Name

4) The new project will be added to the project list. To open the project, select the project from the "Projects" list and press the "Open" button.

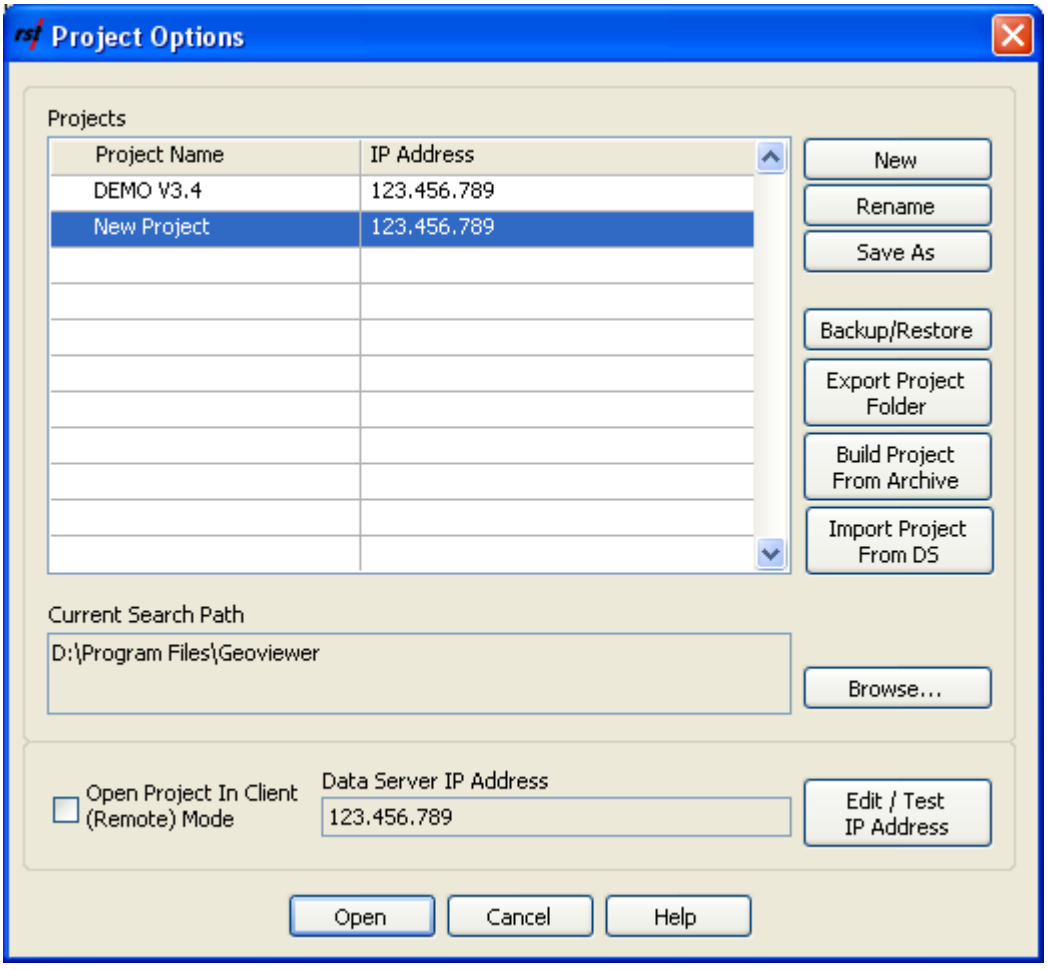


Figure 92: New Project Created

5) The project will be opened. Data logger data and sensor information must be entered into the project. From the Geoviewer main menu select "Edit/Logger".

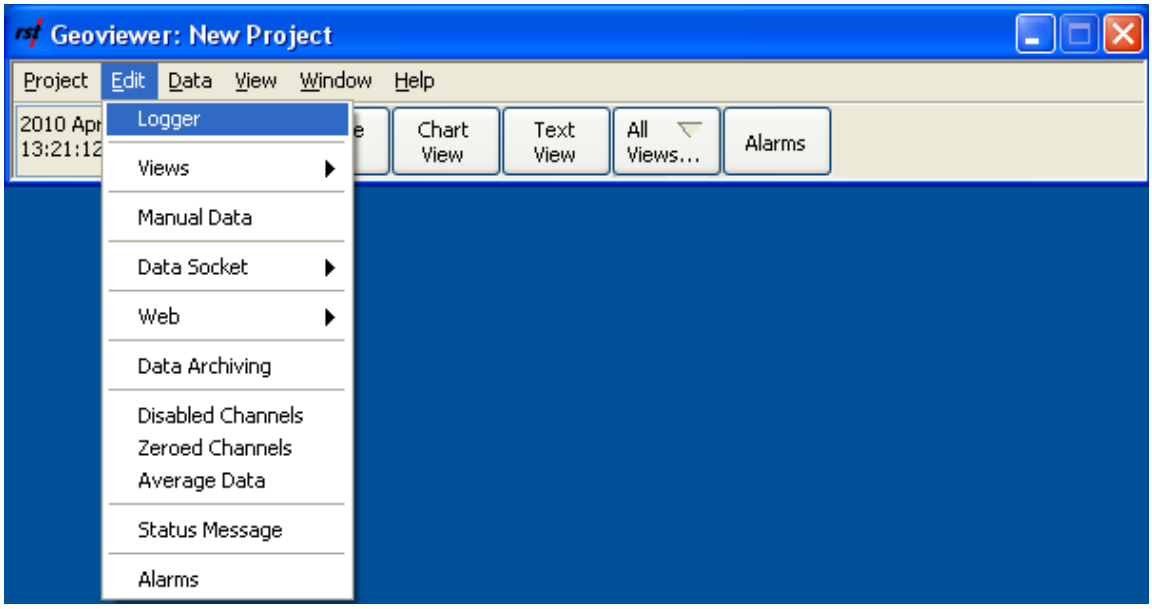


Figure 93: Open Logger Window

6) The "Logger" dialog will be displayed. The new project was created with a default logger. A new logger must be added. From the "Logger" list, select a location where the new logger should be inserted and press the "New" button.

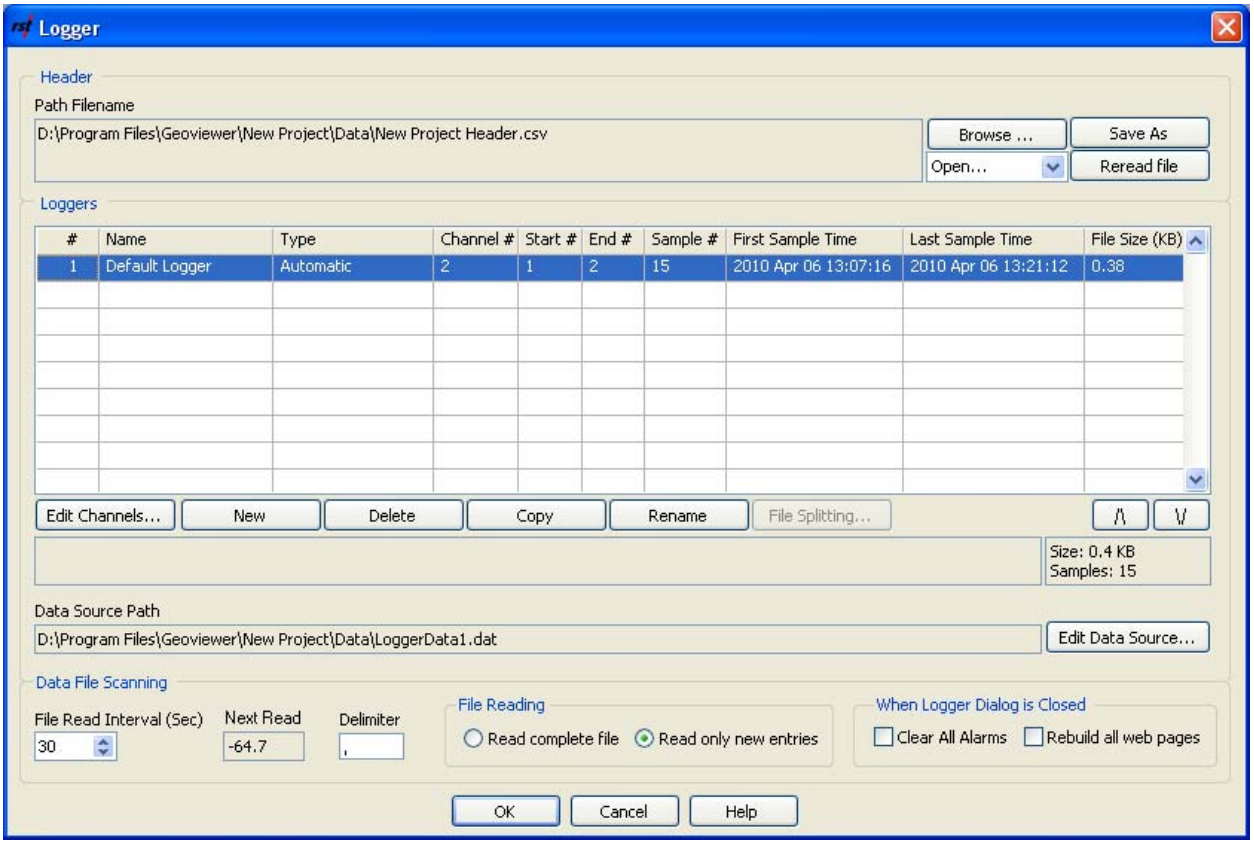


Figure 94: Logger Window

7) The "Add New Logger" dialog will be displayed. Select the type of logger and data file to be added. The default is "Automatic" and "CR1000, header in data file". Press the "Next >" button when done.

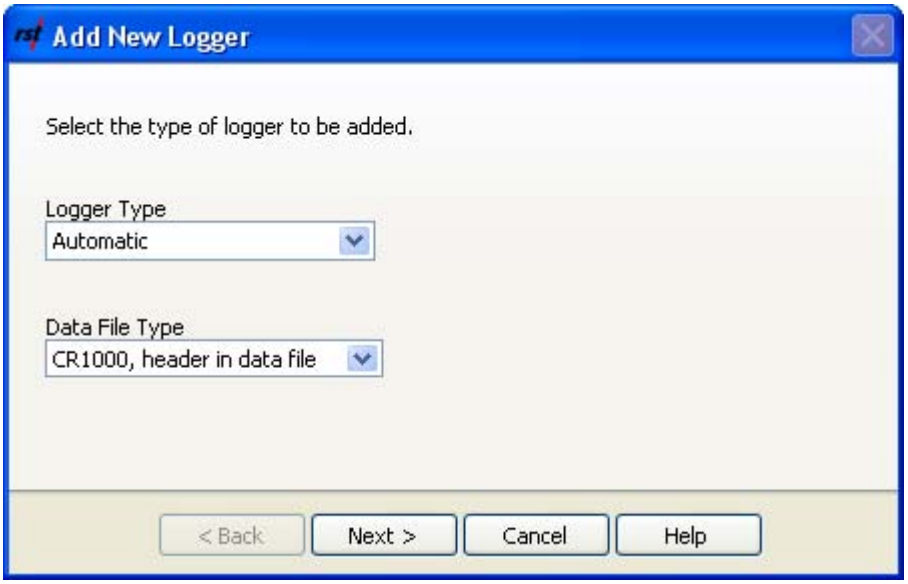


Figure 95: Select Type of Logger to Add

8) The logger name, the number of channels, and the location of the logger data file can next be entered. Press the "Rename…" button to change the name of the logger.

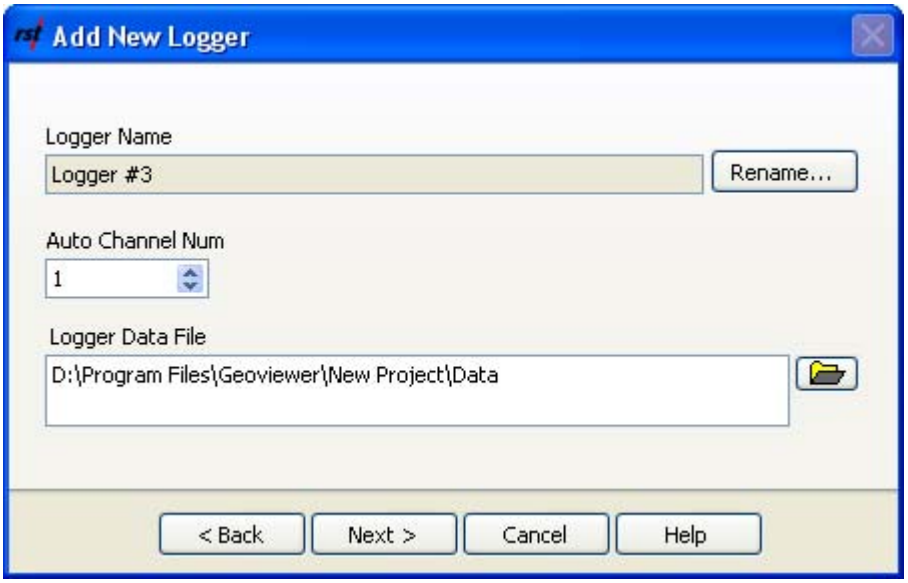


Figure 96: Enter New Logger Information

9) The "Enter Logger Name" dialog will be displayed. Press the "Ok" button when doe.

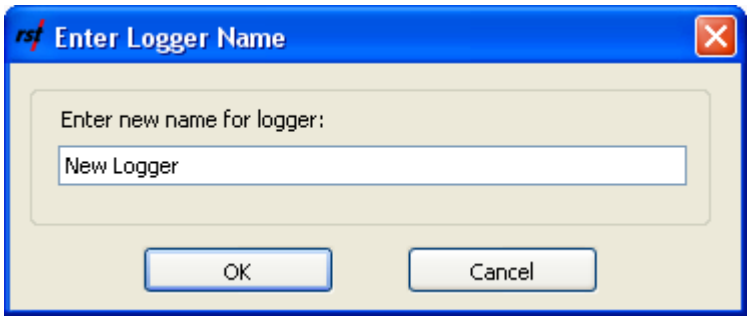


Figure 97: Enter Logger Name Window

10) To select the "Logger Data File", click the Browse icon and navigate to the location of the ".dat" or ".csv" file collected from your logger. The number of channels in the logger data file can be entered now in the "Auto Channel Num" box or in the next step. Press the "Next >" button when done.

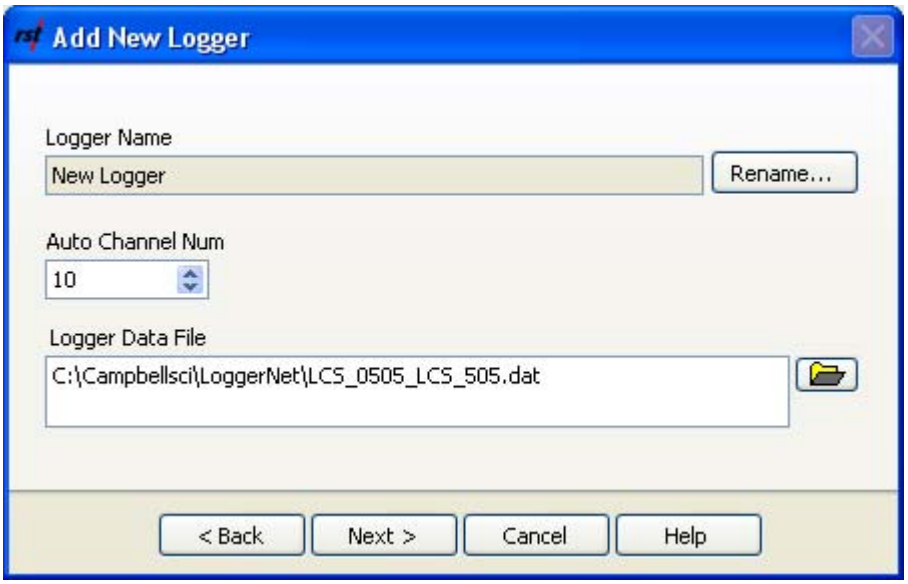


Figure 98: New Logger Information Added

11) The "Channel List Editor" dialog will next be displayed. For each channel information must be entered. If the data file type is "CR1000, header in data file", names can be automatically assigned to all of the channels. The channel number will also be updated. Press the "Names" button.

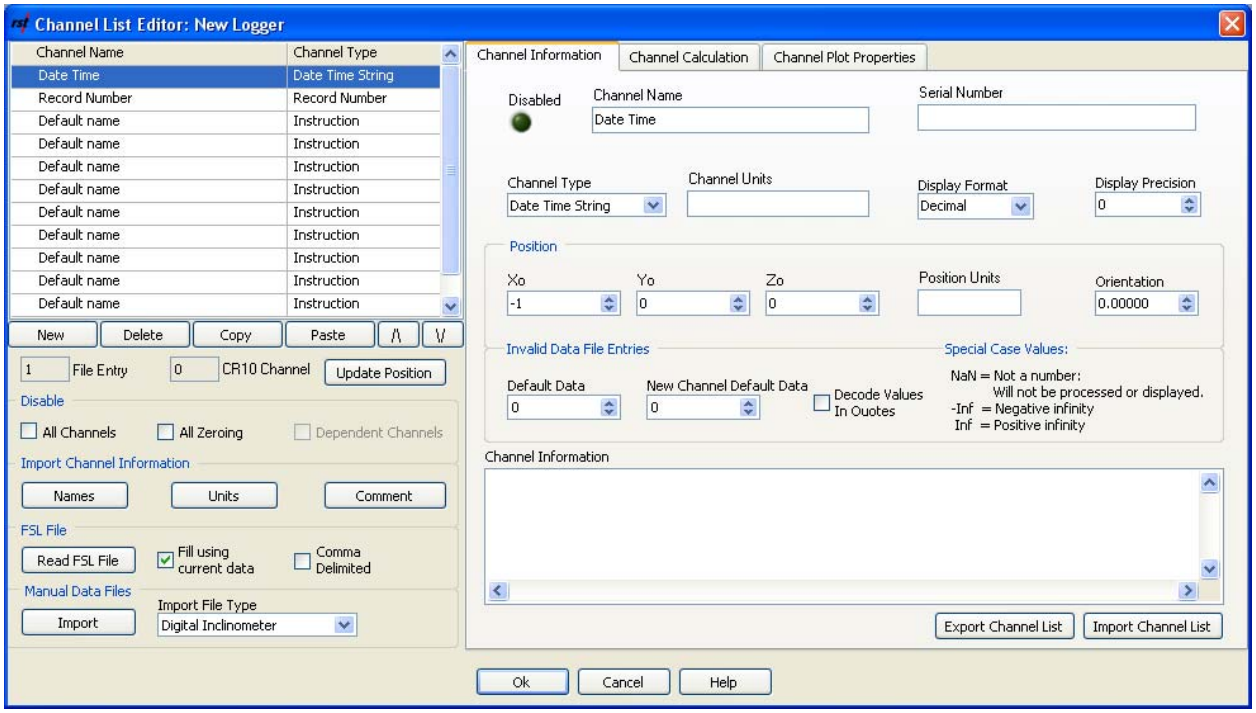


Figure 99: Channel List Editor: New Logger

12) The "Select Row To Import Channels From" dialog will be displayed. Select the row that contains the channel names and press the OK button.

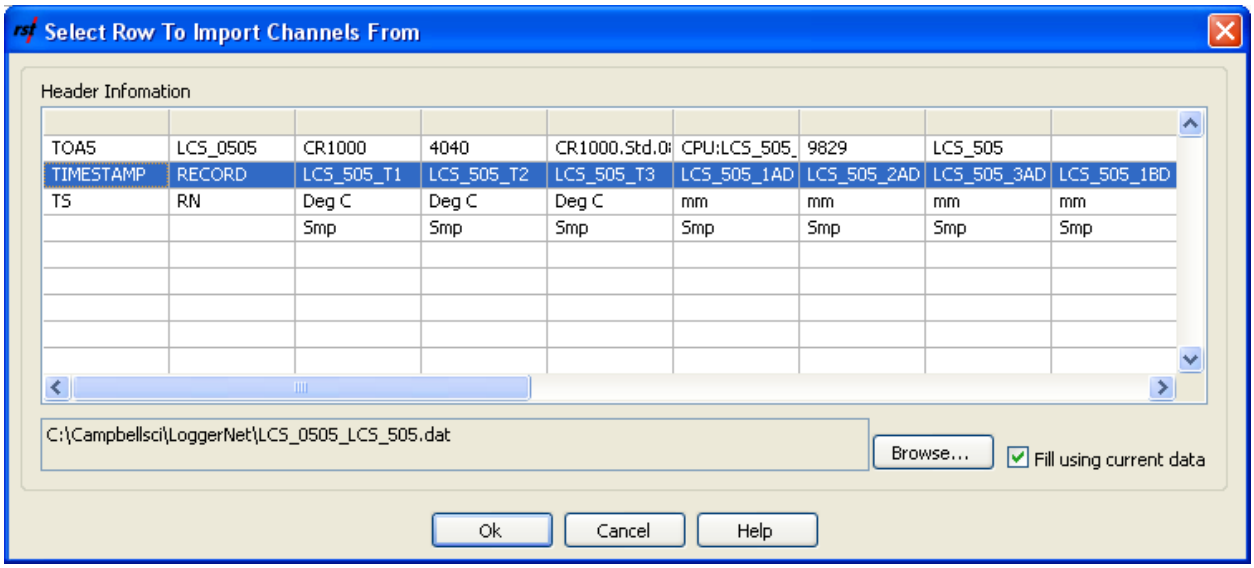


Figure 100: Select Row to Import Channels from Window

13) The name for each channel will be imported. If there are more names than channels, new channels will be created. For each channel in the list, enter the relevant information in the 3 tabs "Channel Information", Channel Calculation" and Channel Plot Properties". Details on how to setup the required information can be found in section 2.2.1.f. Press the "Ok" button when done

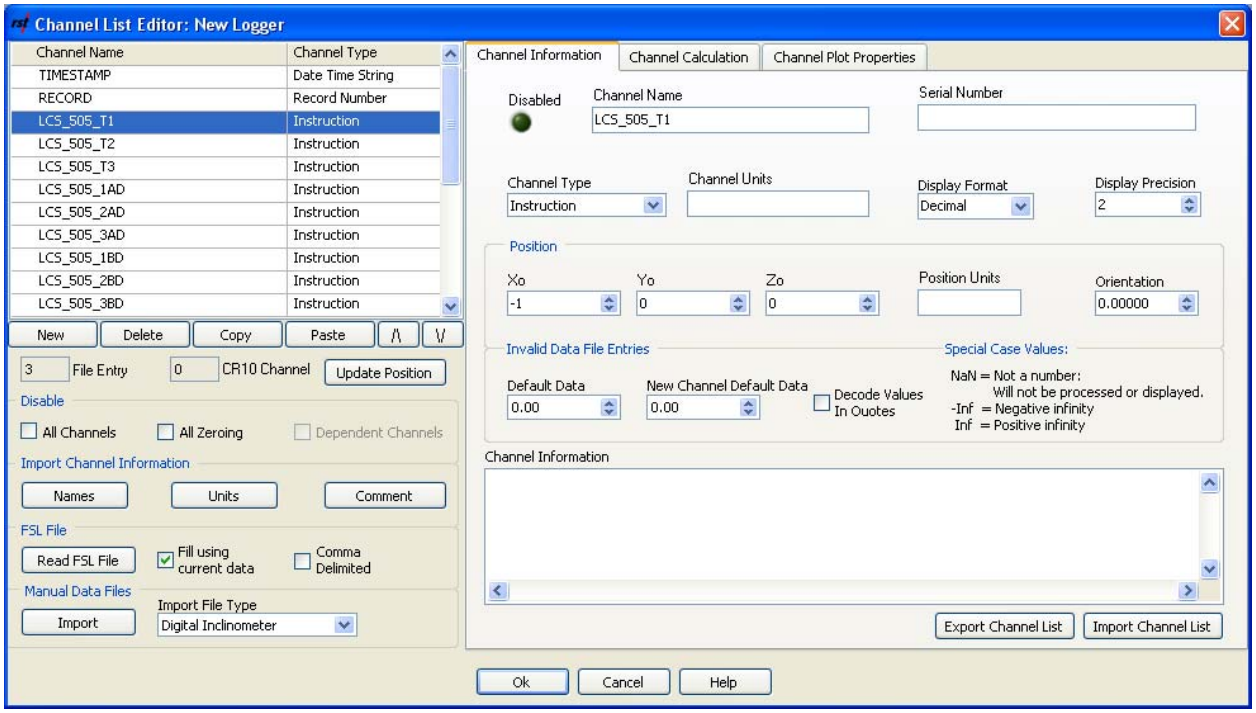


Figure 101: Channel List Imported

14) The new logger will be added to the "Loggers" list. The default logger can be deleted. Press the "Ok" button when done.

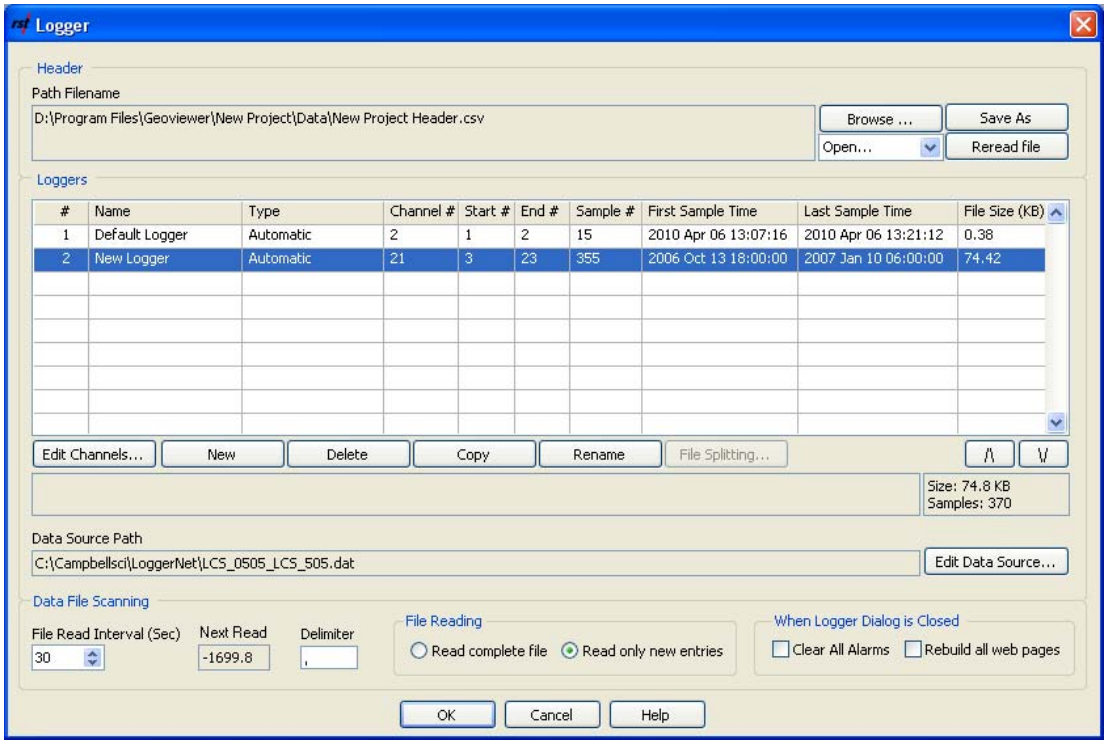


Figure 102: Loggers List Updated With New Logger

5 IMPORT TH2016 READOUT DATA

The following section explains how to import TH2016 thermistor string data into Geoviewer. A logger must be created for every thermistor string that will be imported in to Geoviewer. The information for the loggers can be extracted from a TH2016 data file, a TH2016 configuration file or a TH2016 Geoviewer file. The imported information consists of a date time stamp and a temperature channel for each thermistor point in the string. This information will be saved in a data file, one data file for each logger. After the loggers and data files have been created, data can be imported into the logger's data files. Geoviewer does not alter any of the TH2016 data or configurations files, it only copies the data to import. The host TH2016 program assigns a unique ID number to each thermistor string. This ID number is used to link a TH2016 thermistor string to a logger in Geoviewer. It is import that every thermistor string data entry has the same ID number otherwise data meshing will occur; data from two strings will be combined together in Geoviewer. Consult RST Instruments Ltd. for information.

1) From the Geoviewer main menu select "Edit/Logger"

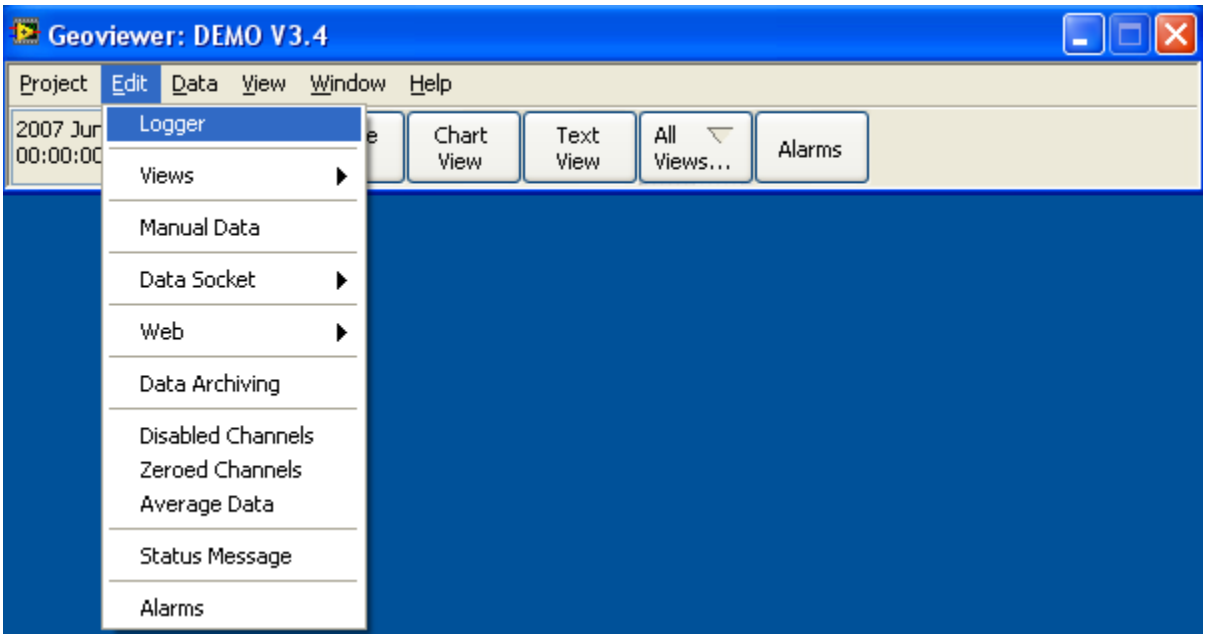


Figure 103: Open Logger Window

2) From the "Logger" window select a location where the new loggers will be inserted and press the "New" button.

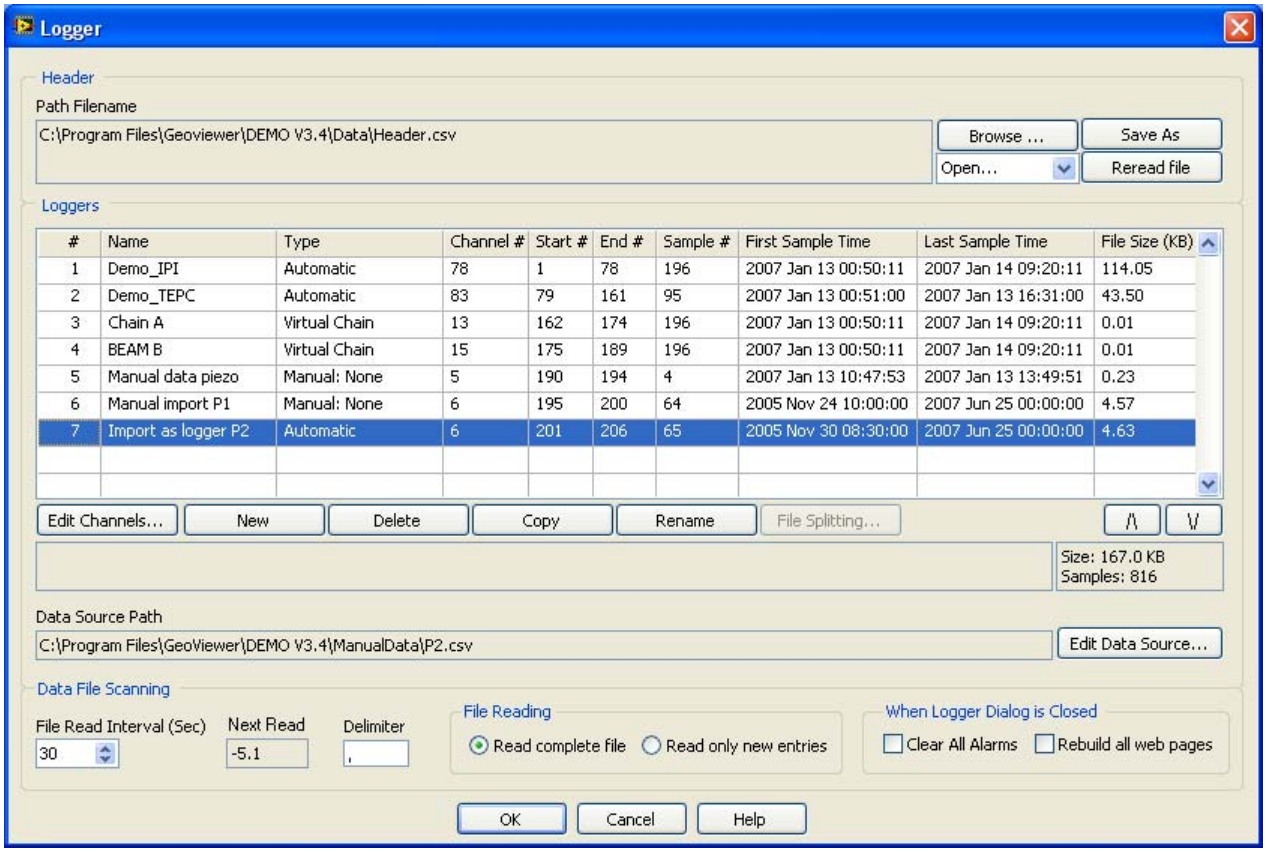


Figure 104: Logger Window

3) From the "Add New Logger" window select "Manual" for "Logger Type" and "CR1000, header in data file" for "Data File Type". Press the "Next >" button when done.

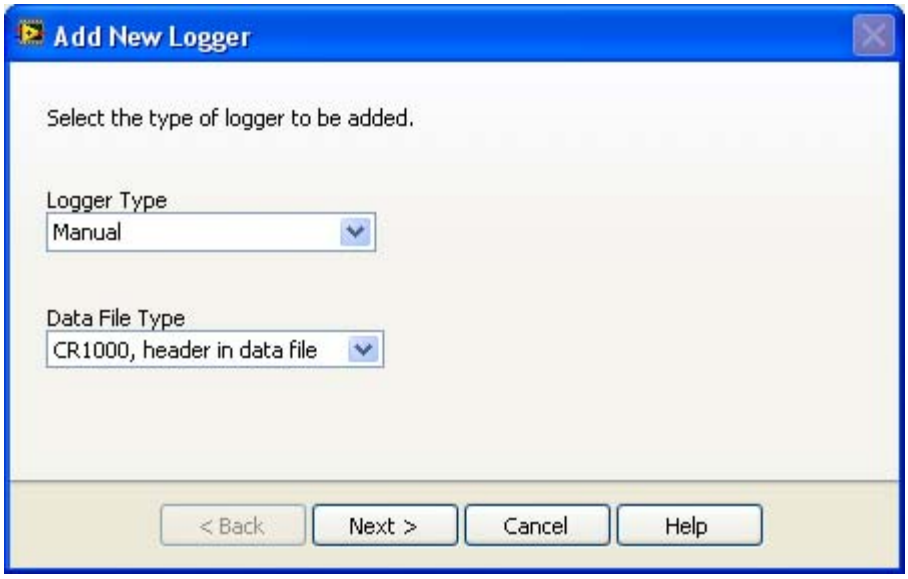


Figure 105: Select Type of New Logger

4) From the "Add New Logger" window select "TH2016 – Thermistor String" as the "Import File Type". Press the "Next >" button when done.

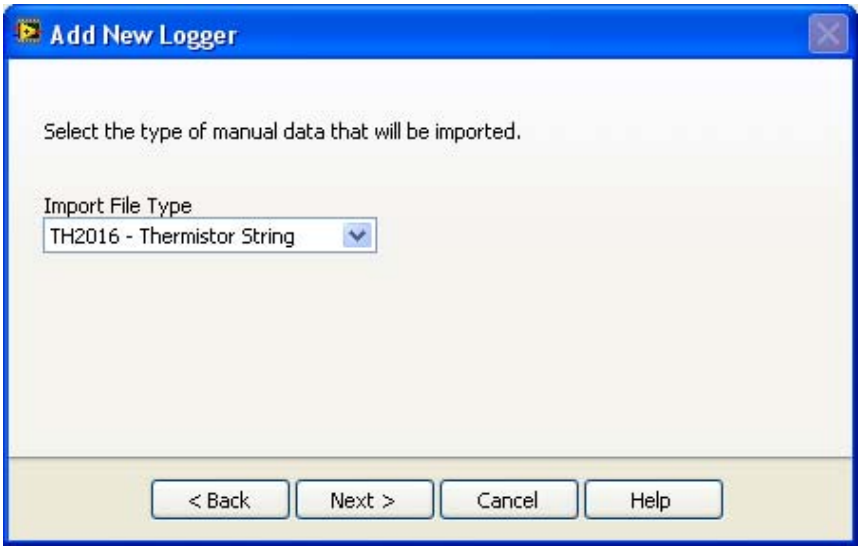


Figure 106: Select TH2016 File Type

5) From the "Add New Logger" window select the type of file that will be used to create the loggers. The following files can be used when importing logger information.

- **RST TH2016 data file** – This file is created by the TH2016 HOST program after it has downloaded data from the TH2016 readout. The file may contain data from multiple thermistor strings. Each unique string will be assigned to a new logger.
- **RST TH2016 configuration file** – This file is created by the TH2016 HOST program to hold configuration information about the thermistor strings. The file may contain configuration information for multiple thermistor strings. Each unique string will be assigned to a new logger.
- **Geoviewer compatible TH2016 data file** – This file is created by Geoviewer to hold information about the thermistor string. The file contains information about one thermistor string.

Press the "Next >" button when done.

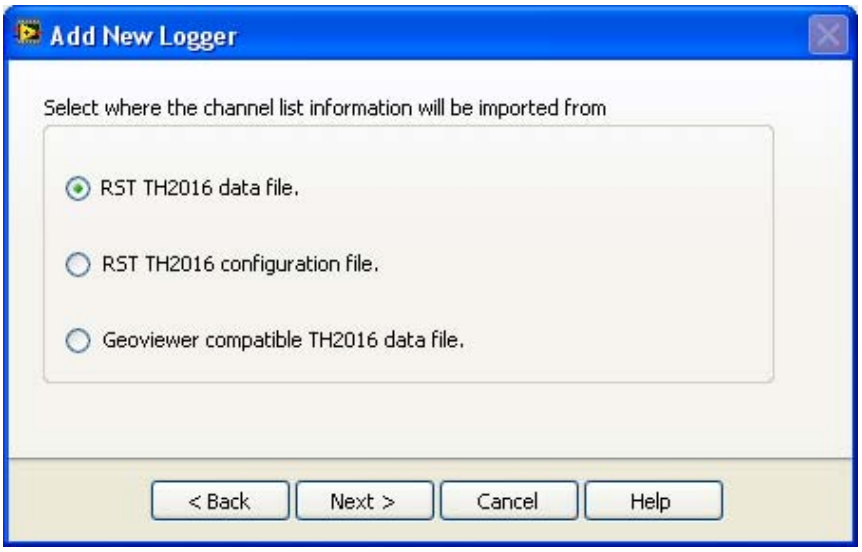


Figure 107: Selecting Import File Type

6) Browse the file to import, select and press the "Ok" button.

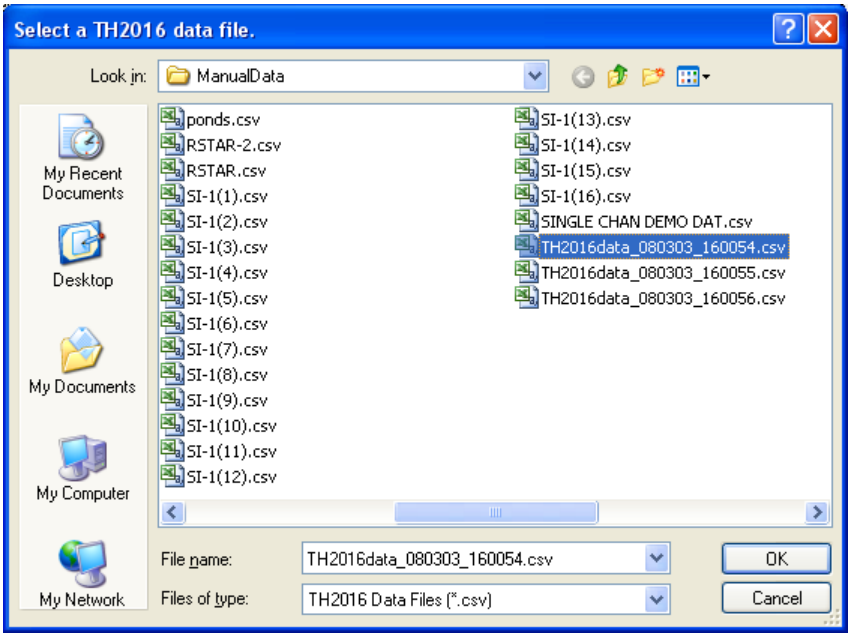


Figure 108: Browse to String Information File

7) After the file has been decoded, the "Add TH2016 Loggers" window will be displayed. The window contains a list of all new TH2016 thermistor string loggers that can be imported. If a logger had previously been created from a decoded thermistor string, it will not be displayed. Select the strings to be imported by using the mouse pointer and the SHIFT and/or CTRL keys. Press the "Ok" button when done. A progress bar will be displayed to indicate the loggers that are being created.

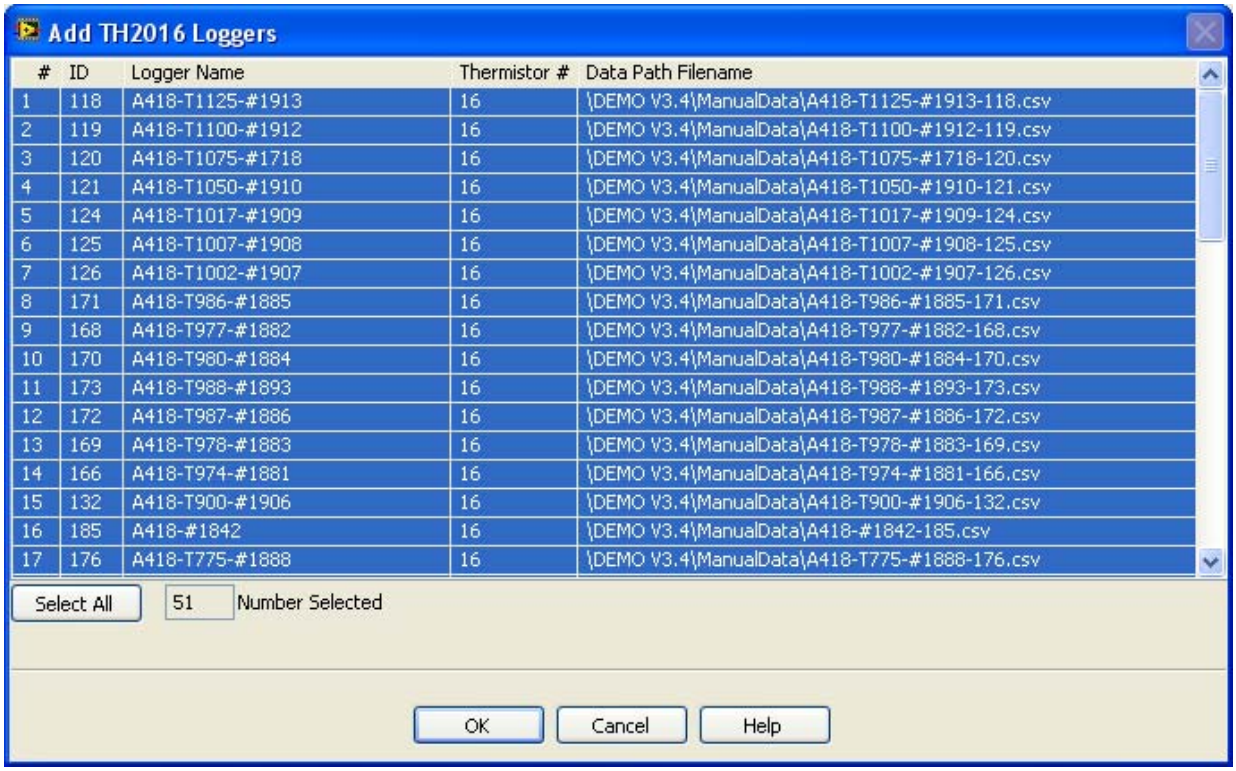


Figure 109: Selecting Thermistor Strings to Import

8) After all of the loggers have been created, the "Logger" window will be displayed with all the new loggers displayed in the "loggers" list. A Geoviewer data file with thermistor string information

created for each logger. If the import file type was a "Geoviewer TH2106 compatible data file" then the data will be automatically read in. Press the "Ok" button when done. Wait for the Geoviewer channel list and data file to be built.

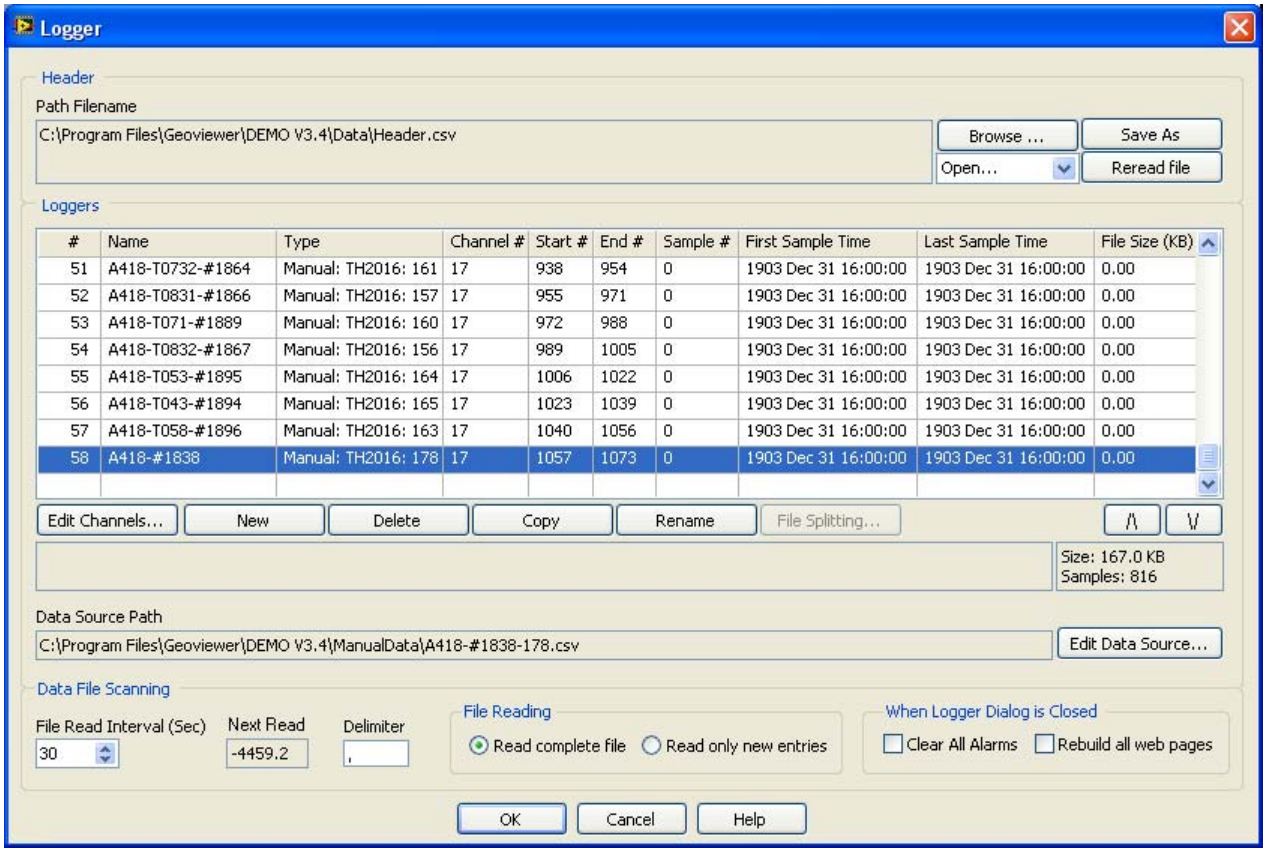


Figure 110: Logger Window with New TH2016 Loggers Displayed

9) From the Geoviewer main menu select "Data/Import/TH2016 Thermistor Data"

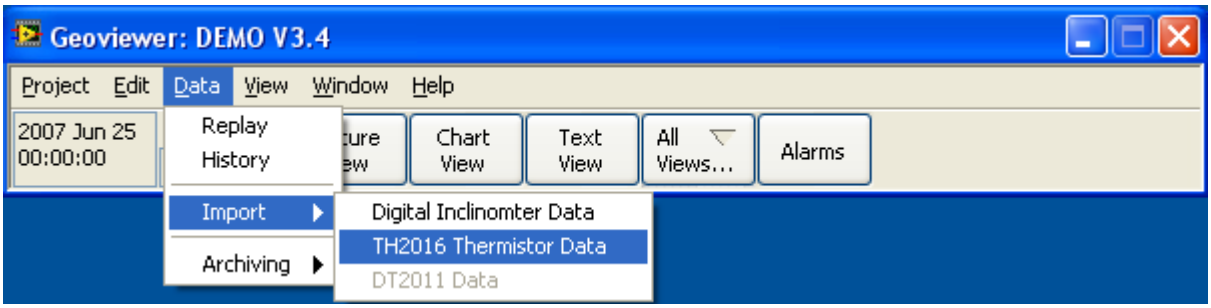


Figure 111: Open Import TH2016 Readout Data Window

10) The "Import TH2016 Readout Data" window will be displayed. There are three lists displayed.

- **TH2016 Data Files list** – A List all valid data files found in the selected "TH2016 Import Path" folder.
- **TH2016 Readout Data** – The list will display all of the decoded data from a file selected in the above list.
- **Loggers** – Shows a list of all loggers. Non TH2016 loggers will display a X to the left and will be disabled.

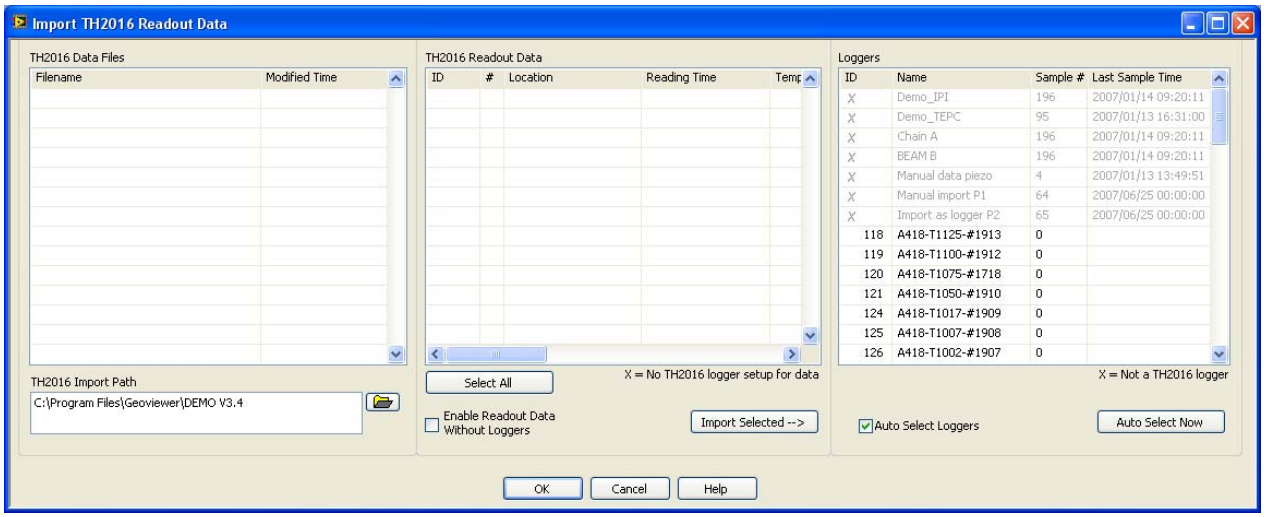


Figure 112: Import TH2016 Readout Data

11) Click on the folder icon next the "TH2016 Import Path" control. The following window will be displayed. Navigate to the required data file folder and press the "Select Folder" button.

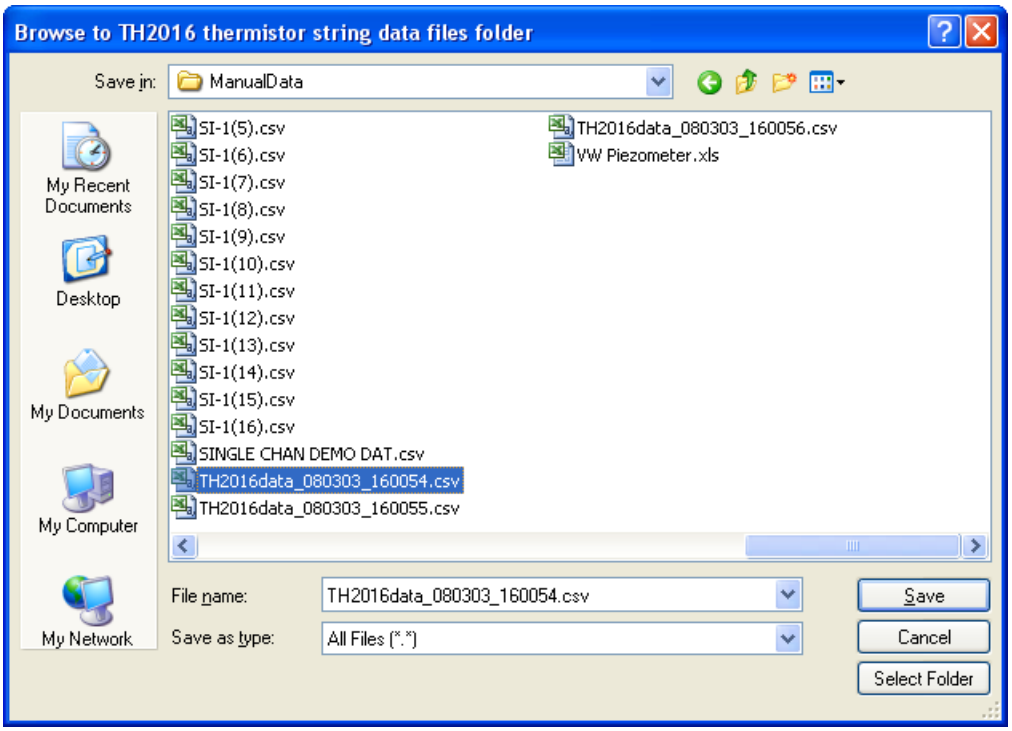


Figure 113: Browse to TH2016 Data File Folder

12) The "Import TH2016 Readout Data" window list boxes will be updated with the data files found and decoded. Select the data file to import from the "TH2016 Data Files" list. All data entries will be automatically selected along with the associated loggers. Deselect any data points that should not be imported. If a data entry does not have a logger associated with it, the data entry will have an X displayed to the left and will be disabled. Press the "Import Selected→" button when done. The "Logger" list will be updated with information about the imported data. Data from other data files can also be imported at this time. No information will be written to the Geoviewer logger data files until the "Ok" button is pressed.

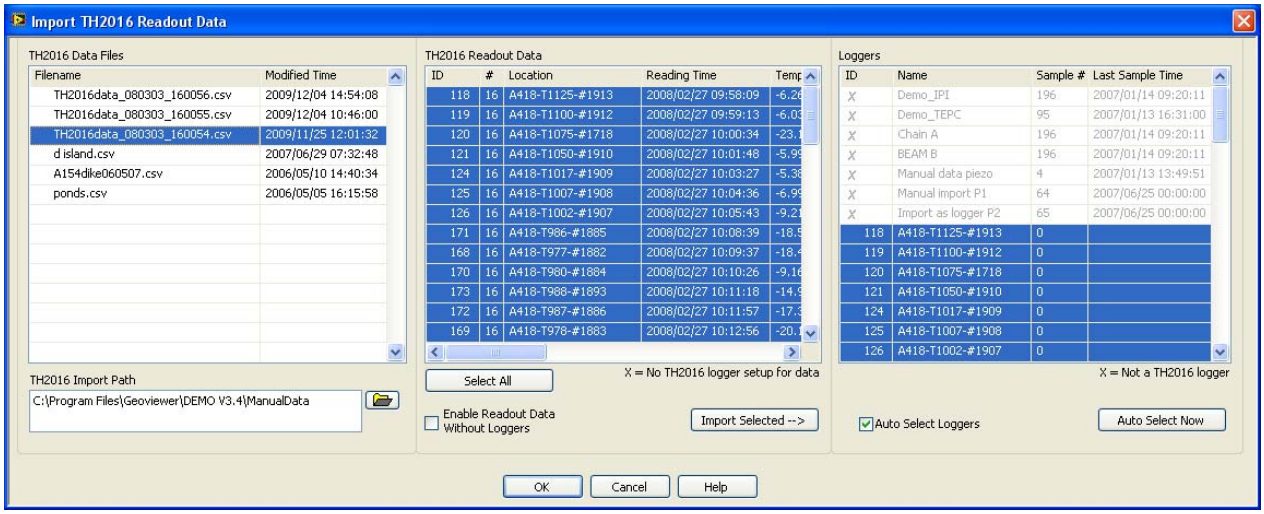


Figure 114: Select Data to Be Imported

5.1 GEOVIEWER TH2016 DATA FILE

The data files from the TH2016 readout can not be directly read into Geoviewer. A TH2016 data file may contain multiple data points from different thermistor strings. A Geoviewer data file contains data from a single thermistor string. From within Geoviewer a TH2016 data file can be imported and then saved to Geoviewer compatible files. Manual data can be imported into Geoviewer but it must be converted to the Geoviewer format. The following is a sample Geoviewer data file.

```
**** RST Geoviewer TH2016 Data File ****

Version, 3.7.17
Created, 2010/04/23,14:05:10
Location, A418-T086-#1868
ID, 158
Thermistor Type, 5K
Thermistor Number, 8
Depth, 0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,
Correction, -0.020,0.110,0.020,0.020,0.000,0.060,0.030,0.020

Date Time,Temp1,Temp2,Temp3,Temp4,Temp5,Temp6,Temp7,Temp8,R1,R2,R3,R4,R5,R6,R7,R8
,°C,°C,°C,°C,°C,°C,°C,°C,Ohms,Ohms,Ohms,Ohms,Ohms,Ohms,Ohms,Ohms

"2008/02/27 10:45:37",-7.61,-7.45,-8.42,-9.67,-10.95,-11.73,-12.06,-12.22,24291,24241,25421,27207,29136,30512,31028,31277
"2008/02/27 10:58:16",-6.03,-5.59,-6.33,-7.56,-8.61,-9.07,-9.28,-9.32,22323,21960,22728,24269,25655,26391,26646,26691
```

Figure 115: Sample Geoviewer TH2016 Data File

The data file consists of two parts, a header or file information portion and a sample data portion. The header portion is used by Geoviewer when a logger is created and linked to the data file. The header and sample data entries are comma separated. The start of the sample data is determined by the first valid numeric value or valid date/time. The following gives a brief explanation of the required entries in the header. Addition information can be added to the header.

- ****** RST Geoviewer TH2016 Data File **** –** File identifier label.
- **Version** – Version of Geoviewer used when data file was created.
- **Created –** Date Time when the data file was created, format = YYYY/MM/DD hh:mm:ss.
- **Location –** Name of logger when data file is imported into Geoviewer.
- **ID –** Unique number that Geoviewer uses to distinguish one data set from another.
- **Thermistor Type –** Type of thermistor used: 3K, 5K, 10K, and 2250.
- **Thermistor Number –** Number of thermistor points in the string.
- **Depth –** The depth of each thermistor point in the string. Used by Geoviewer when profile views are setup and displayed.
- **Correction –** The required temperature correct for each thermistor point in the string.
- **Date Time, Temp1...Temp8, R1…R8 –** Channel names.
- **,°C.., °C, Ohms..,Ohms** – Channel units.
- **"2008/02/2710:45:37",-7.61...-12.22, 24291…31277 –** Data sample point # 1.
    - **"2008/02/2710:45:37" –** Sample date time in format "YYYY/MM/DD hh:mm:ss"
    - **-7.61 –** Temperature reading #1
    - **12.22 –** Temperature reading #8
    - **24291 –** Resistance reading #1
    - **31277 –** Resistance reading #8
- **"2008/02/2710:58:16",-6.03…9.32, 22323…26691 –** Data sample point # 2.

6 RING LOGGER SETUP

1) From the Geoviewer main menu select "Edit/Logger"

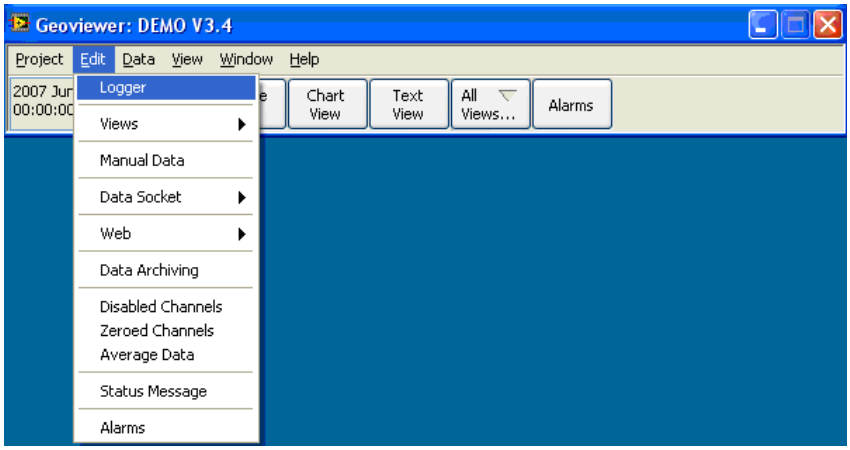


Figure 116: Open Logger Window

2) Select a logger from the "loggers" list where the new logger will be inserted after. Press the New button.

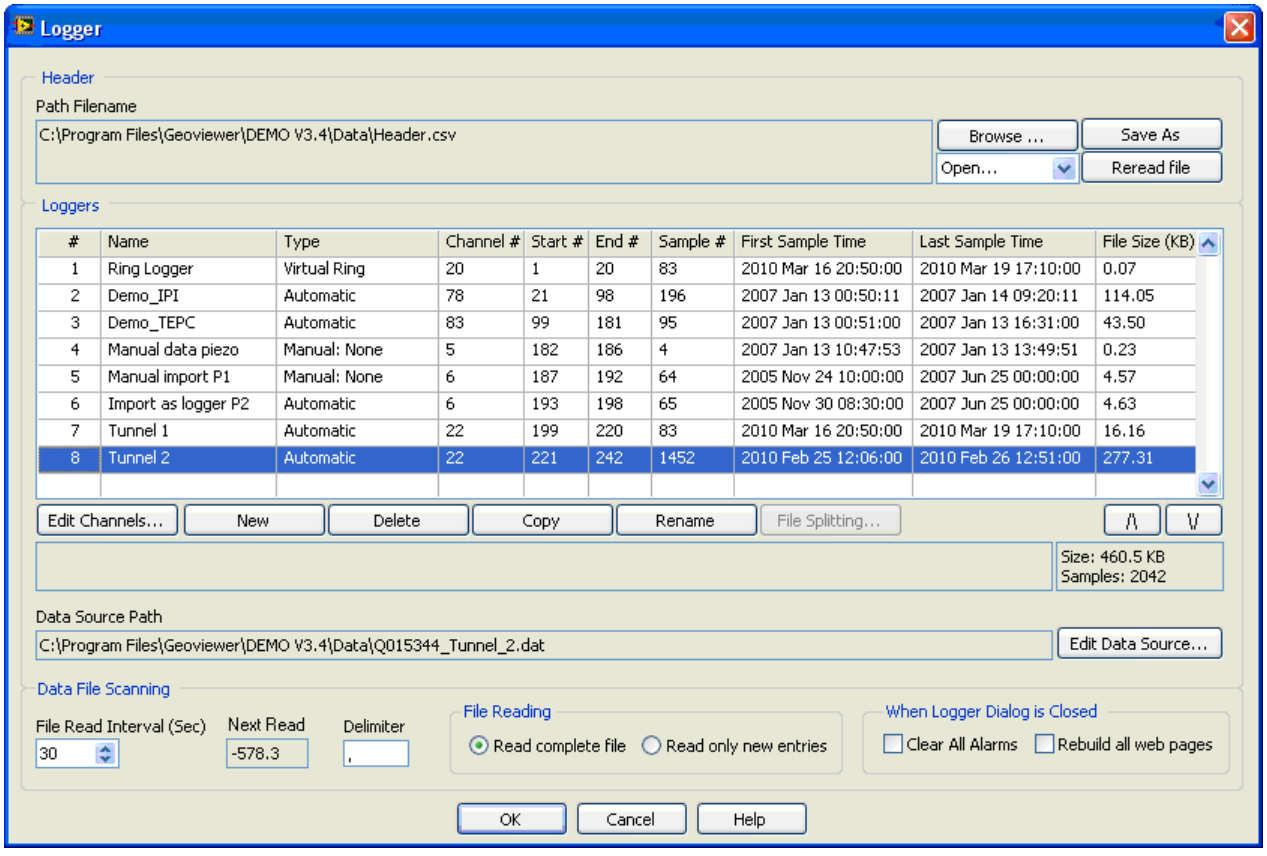


Figure 117: Logger Window

3) The "Add New Logger" dialog will be displayed. Select the "Virtual Ring" as the logger type and click the "Next >" button.

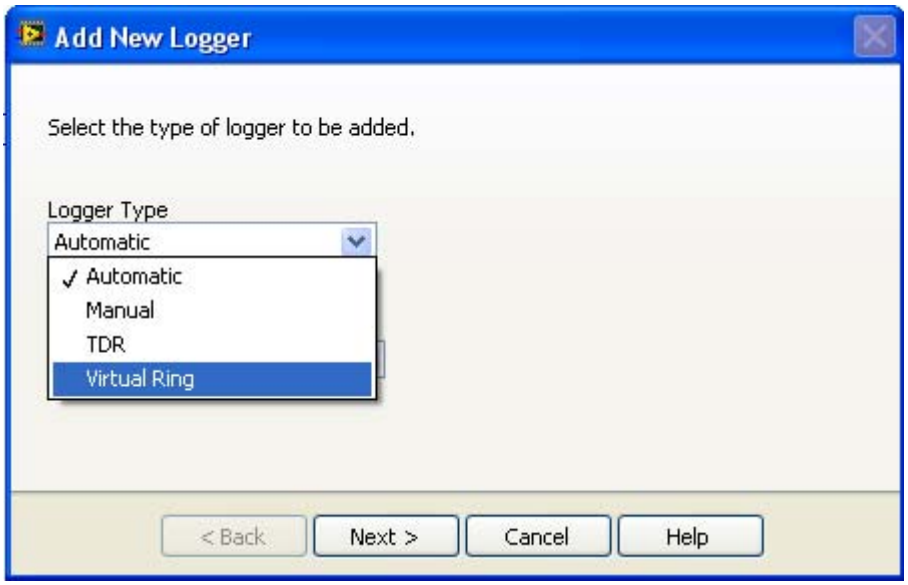


Figure 118: Select Virtual Ring Logger Type

4) The next dialog will allow the ring logger name and the total number of concrete segments of a full ring to be entered (including the segments that don't have a tilt meter). The segment number can not be changed at a later time. If a different segment number is required, a new ring logger must be created. Click the "Next >" button when done.

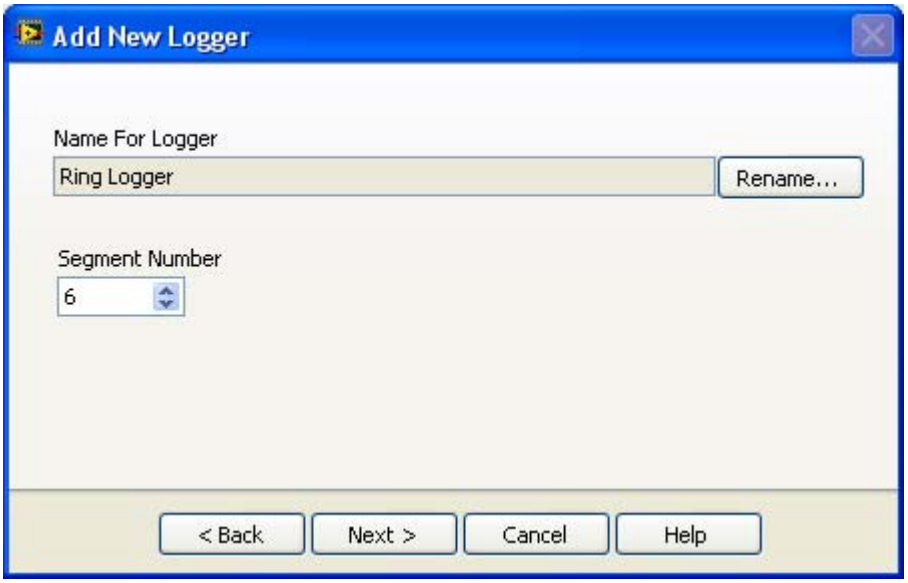


Figure 119: Ring Logger Information

5) The "Channel List Editor" window will be displayed. The channels for the ring logger will be automatically created and displayed. For each segment a horizontal and vertical displacement channel will be created. Channels for the reading date time, and ring center point will also be created. The properties for each channel can be changed from their default values. The channel name, channel units, and display format can be updated for each channel. The initial ring segment positions can be entered directly into the "Position" group variables, but the simplest way is to use a ring setup dialog. Press the "Update Position" button to use this method.

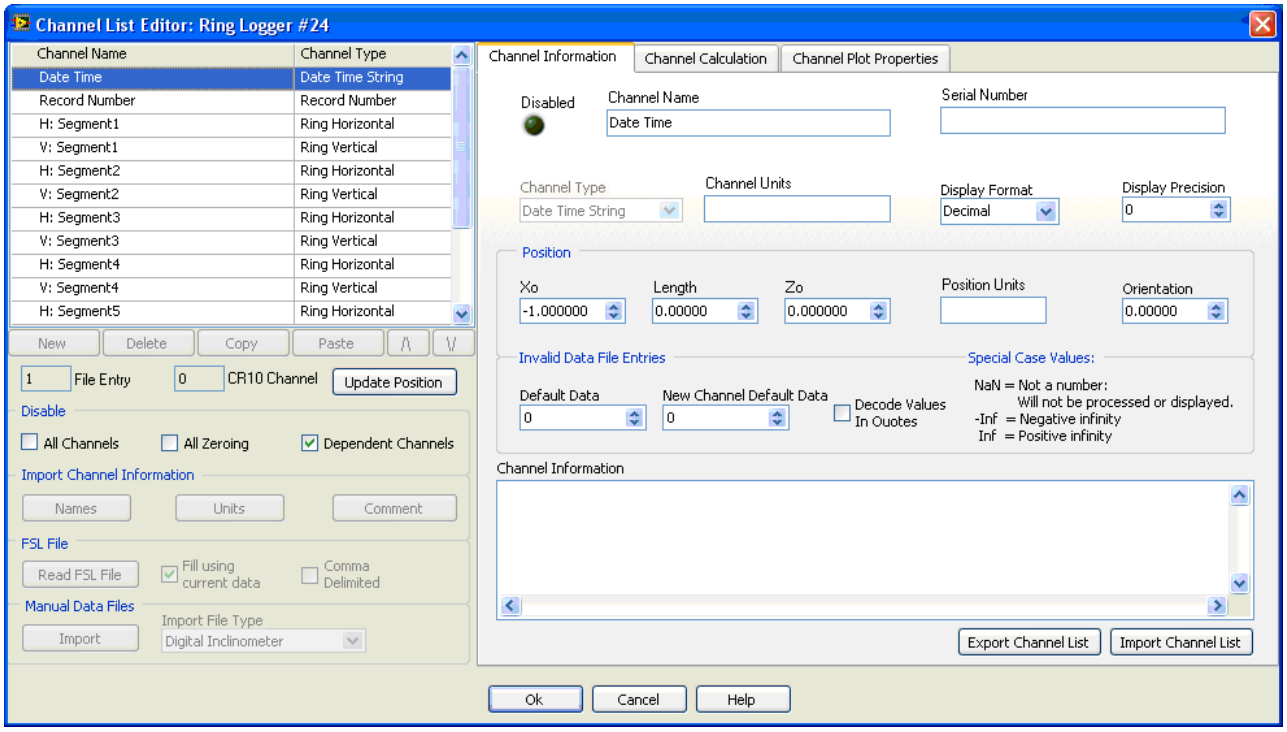


Figure 120: Channel List Editor Window

6) The "Set Ring Initial Position" window will be displayed. Enter the radius and arc angle for each segment. IMPORTANT: the Start Angle box sets the position of the first segment in the ring from which calculation of convergence will be originated. After the information has been entered, press the "Recalculate" button. Press the "OK" button when done.

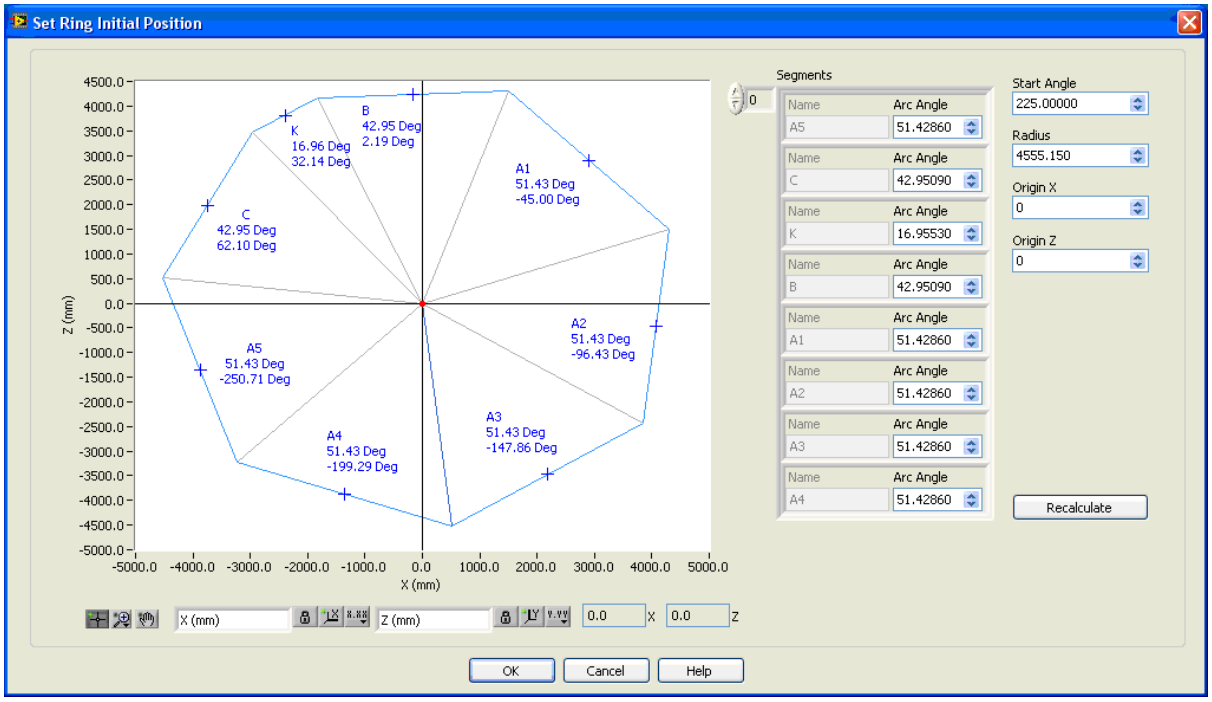


Figure 121: Set Ring Initial Position Window

7) The channel list editor will be automatically updated with the calculated position values. Press the "OK" button when done.

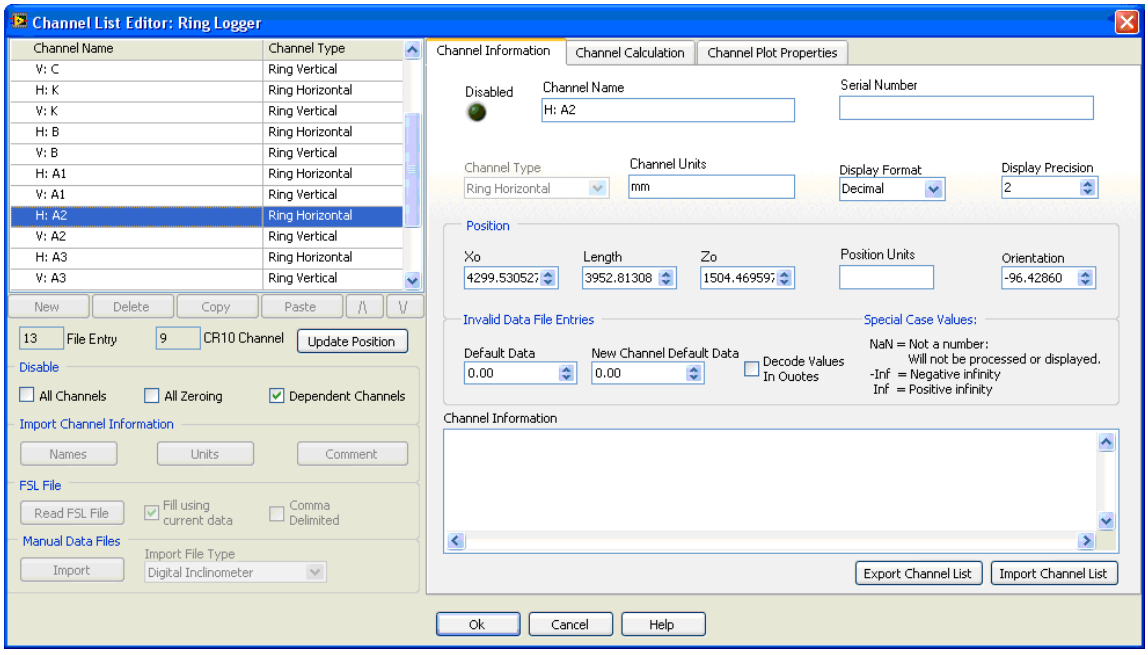


Figure 122: Channel List Position Updated

8) The new ring logger has now been created. Press the "OK" button to save the new logger.

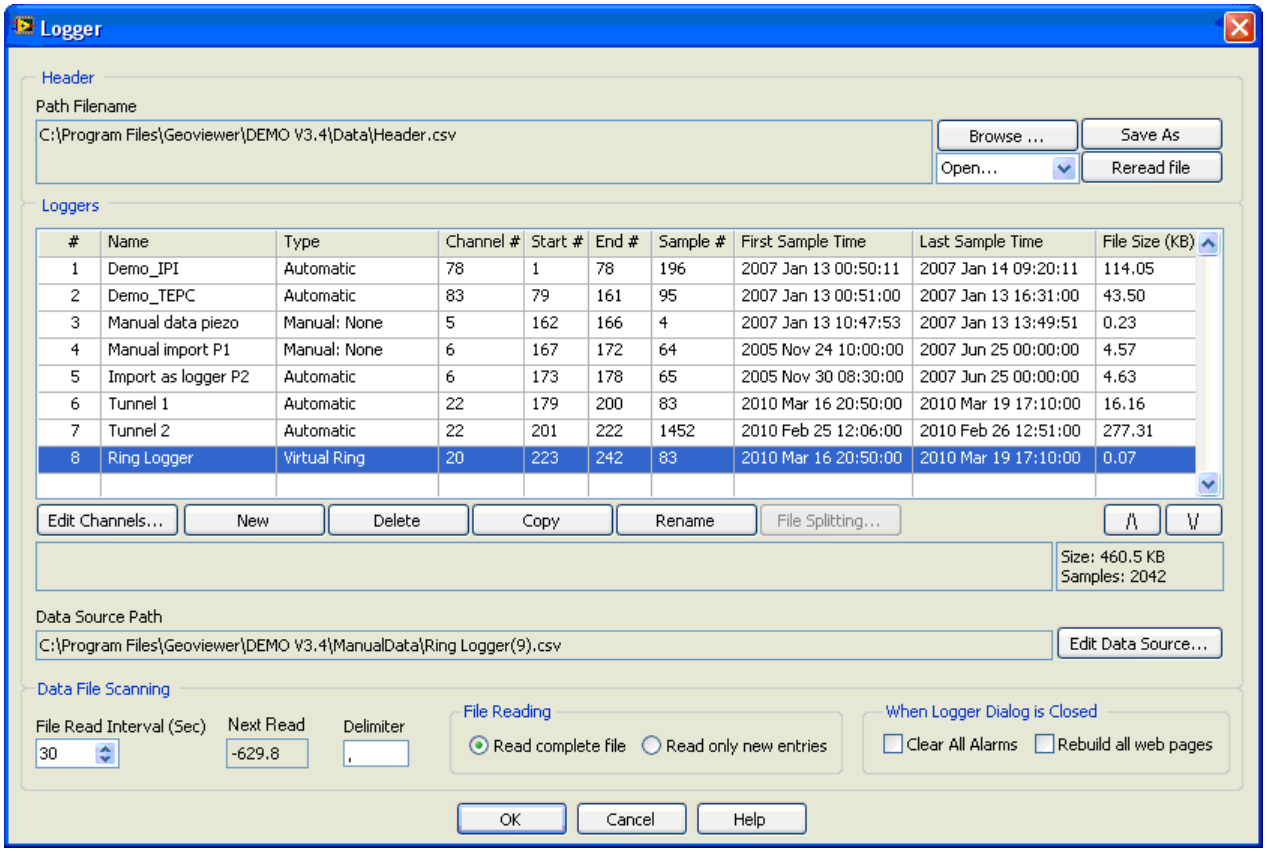


Figure 123: List Updated With New Ring Logger

9) After the ring logger has been created, sensors must be assigned to the segment channels. From the Geoviewer main menu select "Edit/Views/Ring".

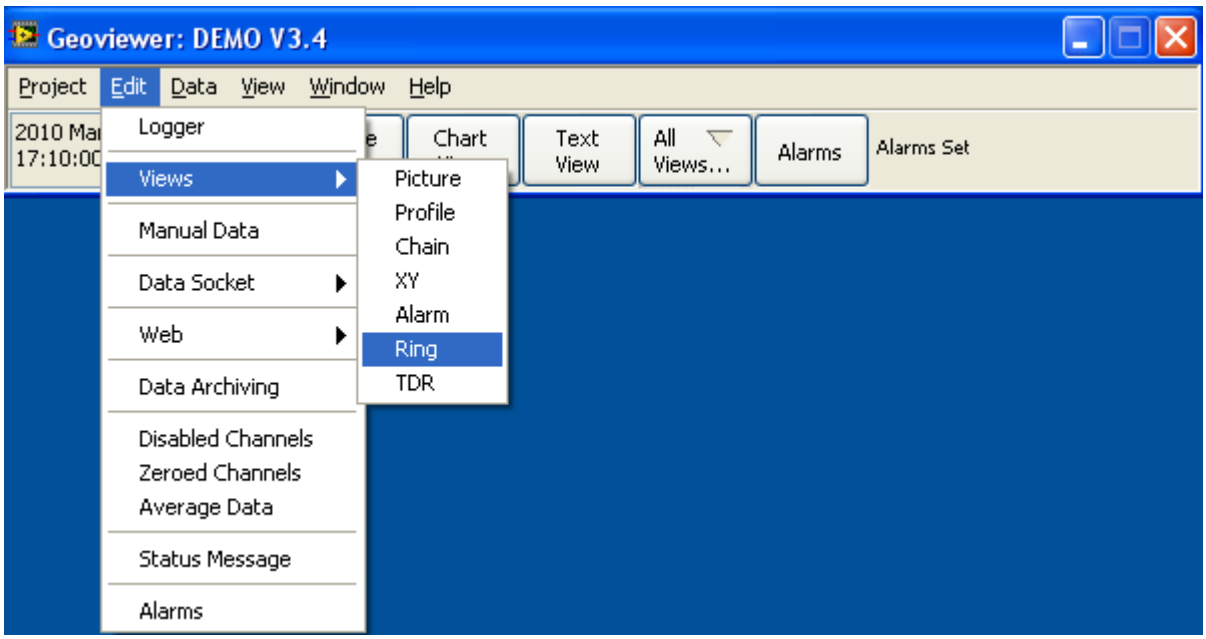


Figure 124: Open Edit Ring Views Window

10) The "Edit Ring Views" window will be displayed. This window is used to assign sensors to the ring channels. Select a segment from the "Sensors In Ring" list and press the "Select Sensors" button.

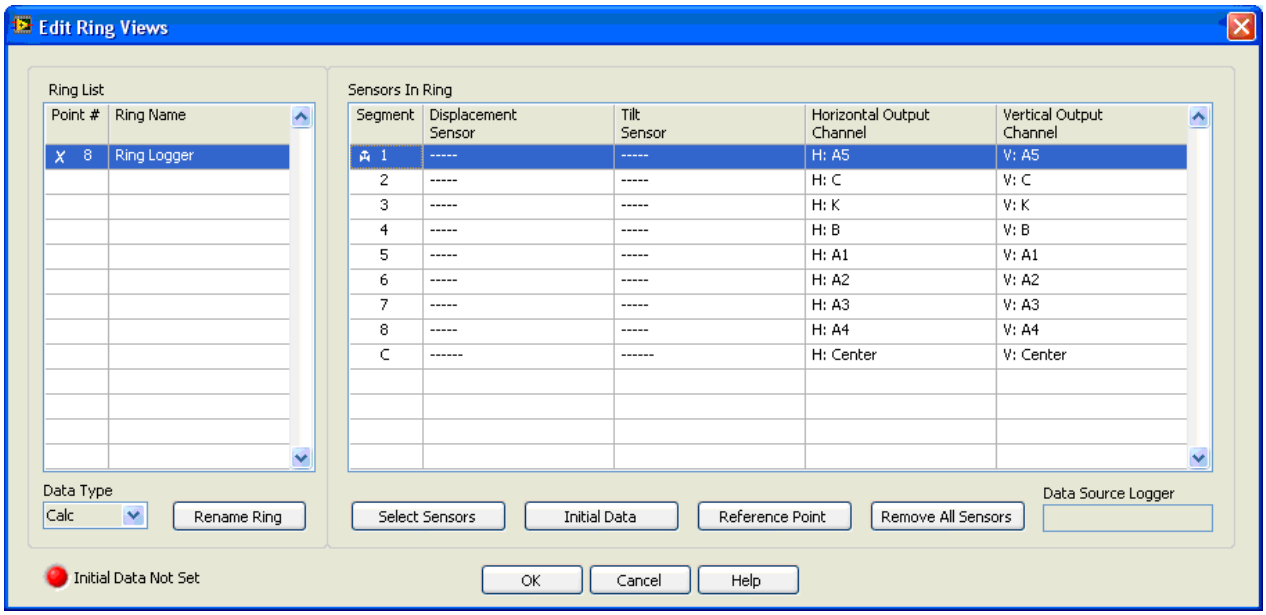


Figure 125: Select Ring Segment to Edit

11) The "Select Ring Segment Sensors" window will be displayed. A displacement and tilt sensor can be assigned to each segment. If a sensor has not been installed, then click the "Sensor Not Used" checkbox. All sensors must be from the same logger. Press the "OK" button when done.

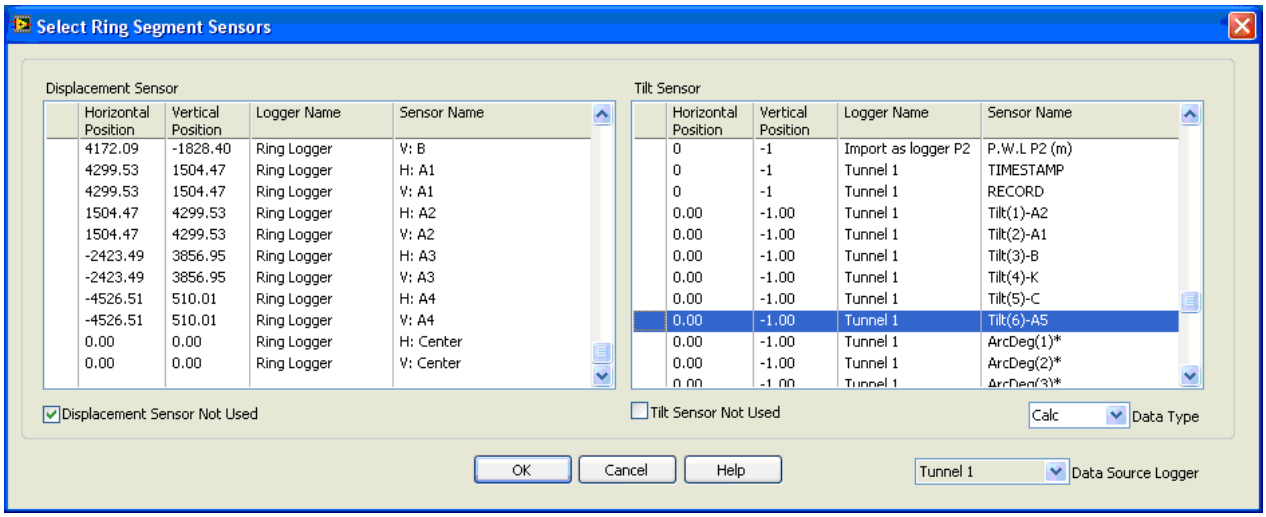


Figure 126: Select Ring Segment Sensors

12) The "Edit Ring Views" list will be updated with the sensor selection.

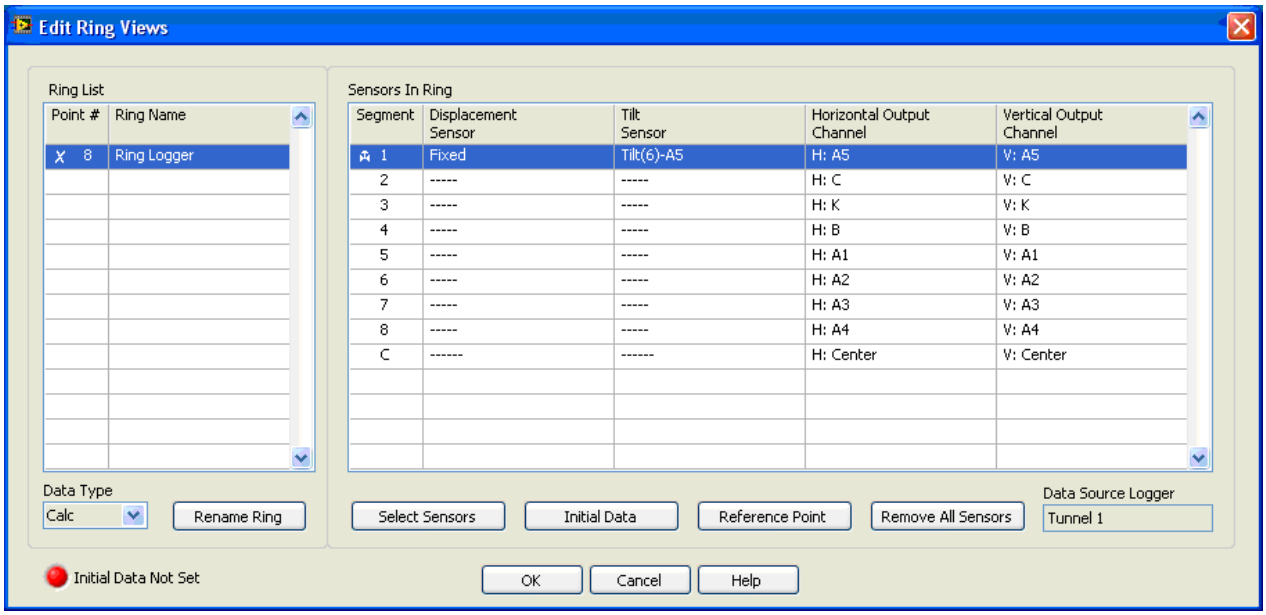


Figure 127: Updated Edit Ring Views Window

13) Repeat for the remaining segments. The center channel does not have a sensor associated with it. To account for sensor misalignment during installation an initial data sample must be selected. Press the "Initial Data" button.

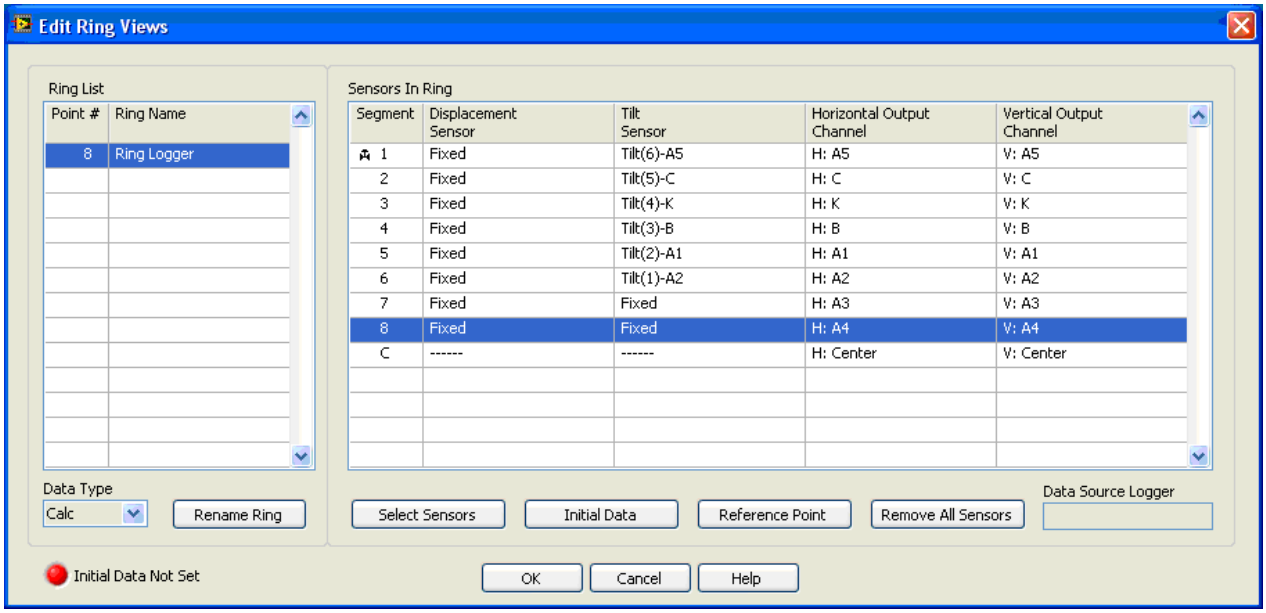


Figure 128: All Sensors Assigned to Ring Segments

14) The "Select Initial Ring Data" dialog will be displayed. Values can be directly entered, or a sample from the logger data set can be selected. Press the "Select Sample…" button.

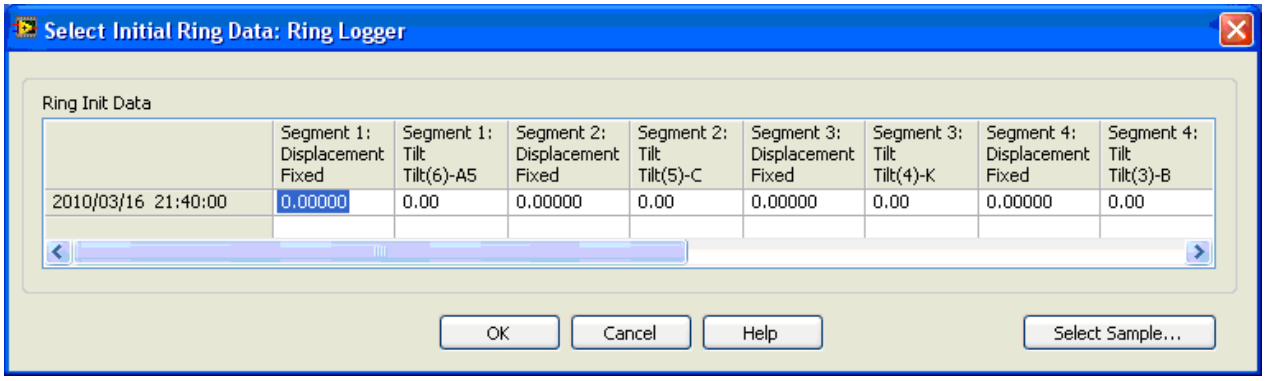


Figure 129: Select Initial Ring Data Window

15) The "Select Sample" and the "Text Data" dialogs will be displayed. To select a sample enter the number in the "Sample Number" edit box or move the slider bar to the required date time. As the sample is changed, the selected sample will be displayed as the top item the "Text Data" view. The "Text Data" view can be modified in any way while the "Select Sample" dialog is open. Press the "OK" button when done.

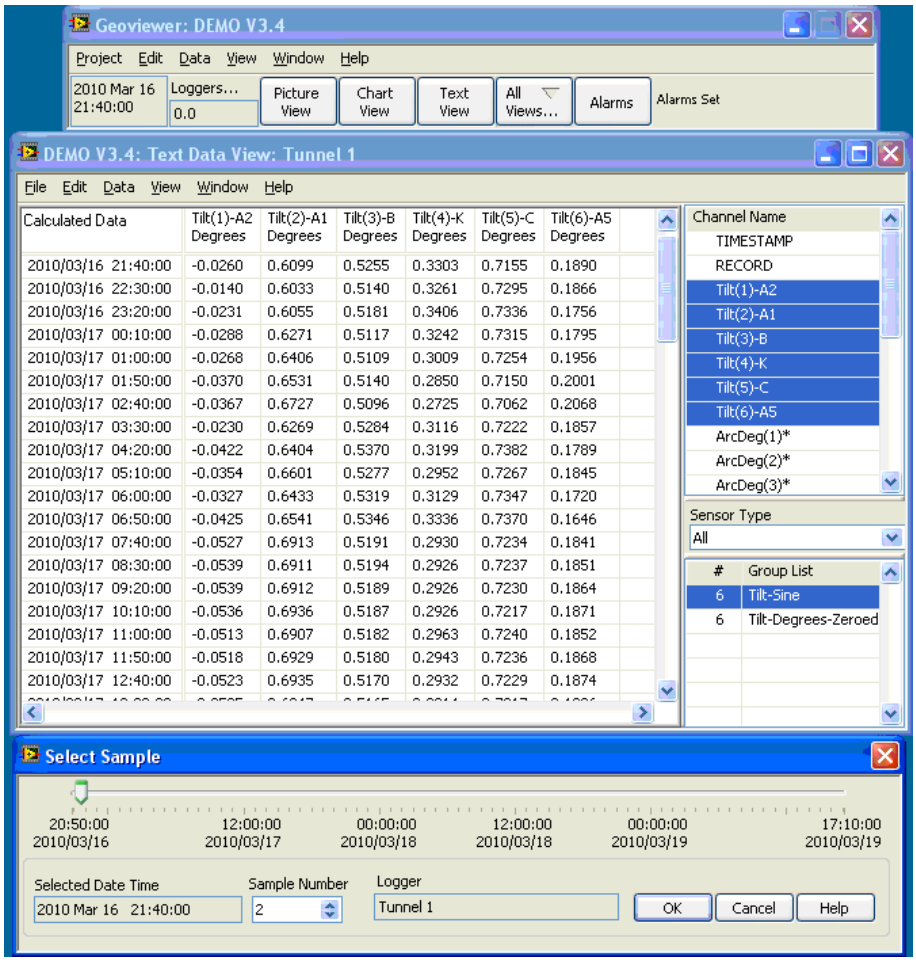


Figure 130 : Select Initial Ring Data

16) The "Select Initial Ring Data" dialog will be updated with selected sample data. Channels that have not been assigned a channel will be set to zero. Press the "OK" button when done.

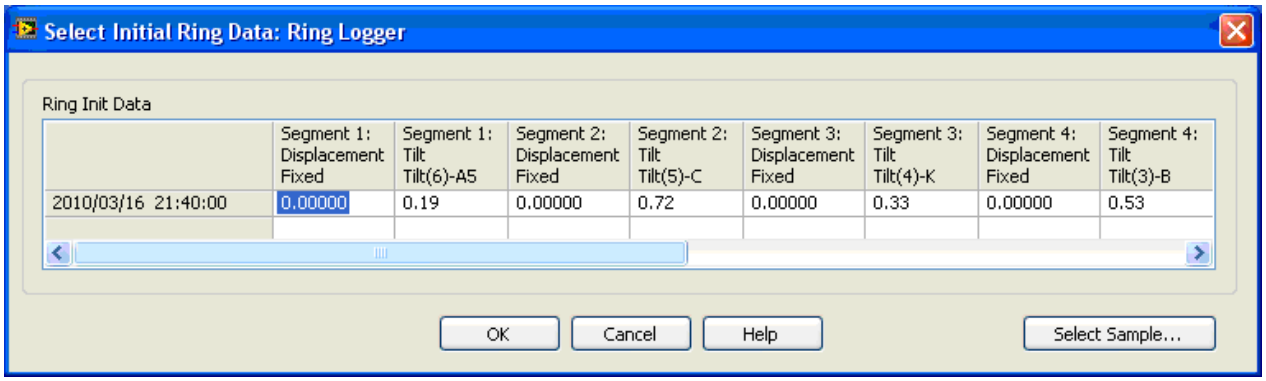


Figure 131: Updated Select Initial Ring Data Window

17) The ring logger is now setup. Ring logger data will now be automatically calculated and new data will be appended when ever new data is read in from the sensor logger. Press the "OK" button to save the ring settings.

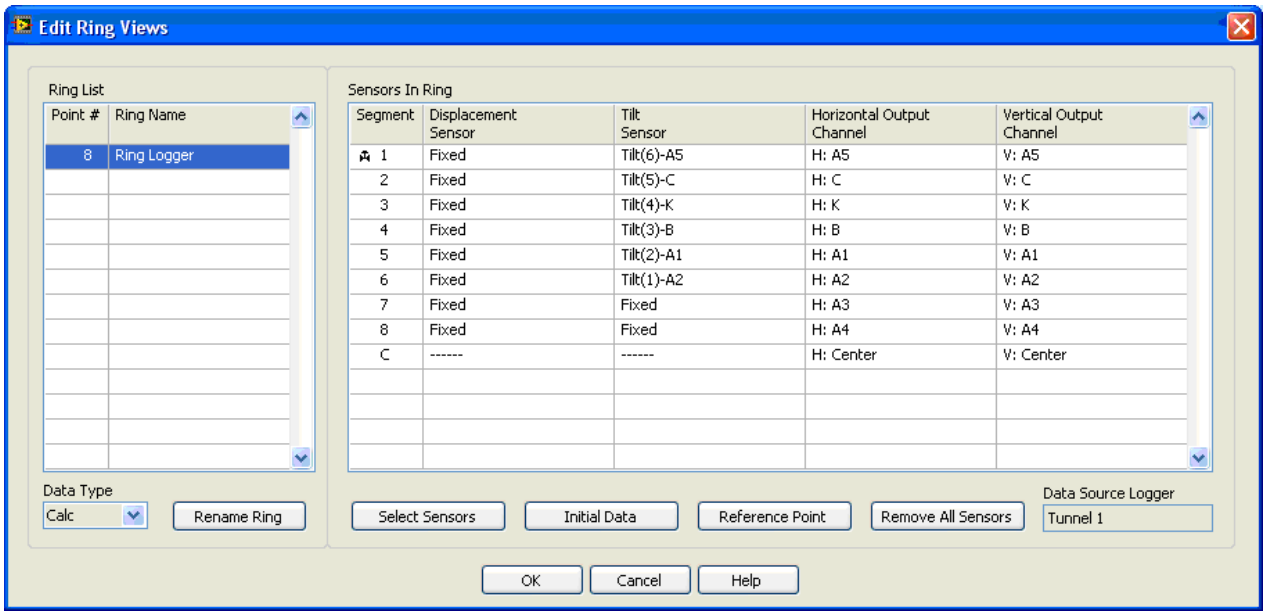


Figure 132: Ring Logger Channels Setup

18) Now that sensors have been assigned to the ring logger, a ring view can now be displayed. From the Geoviewer main menu select the menu item "View/Plots/Ring".

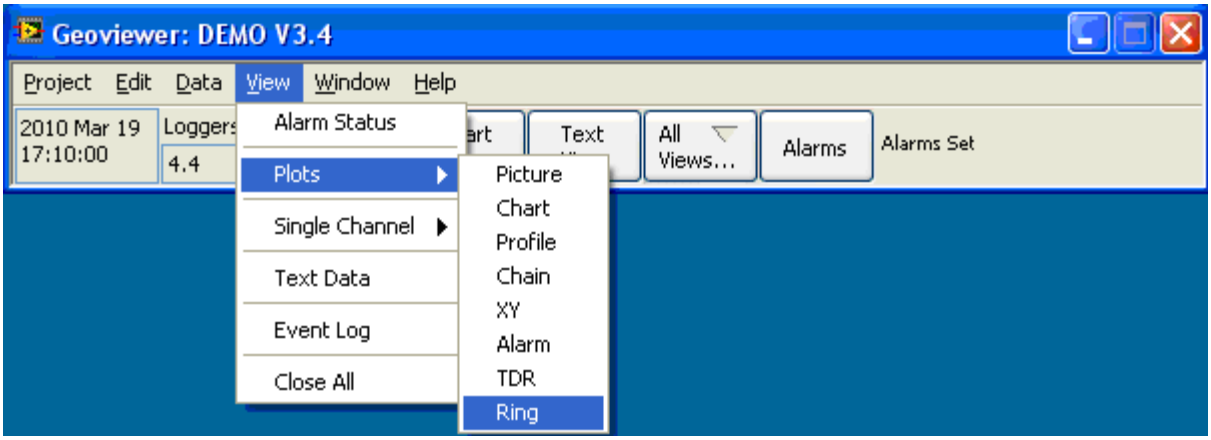


Figure 133: Open Ring View

19) The "Ring view will be displayed. Ring display properties can be setup and saved in groups.

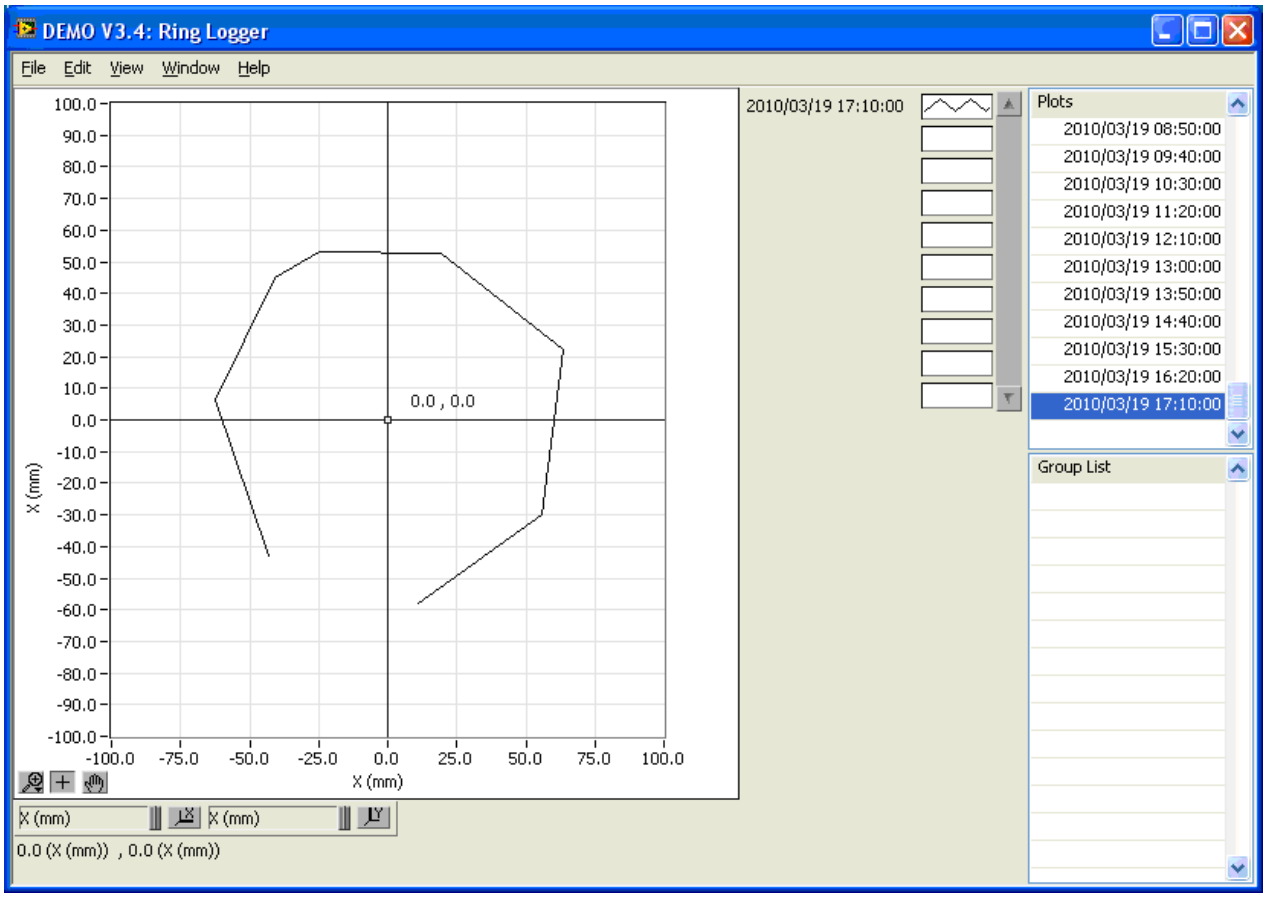


Figure 134: Default Ring View

20) The following view has been setup, and can be accessed at any time by clicking on the Relative group item.

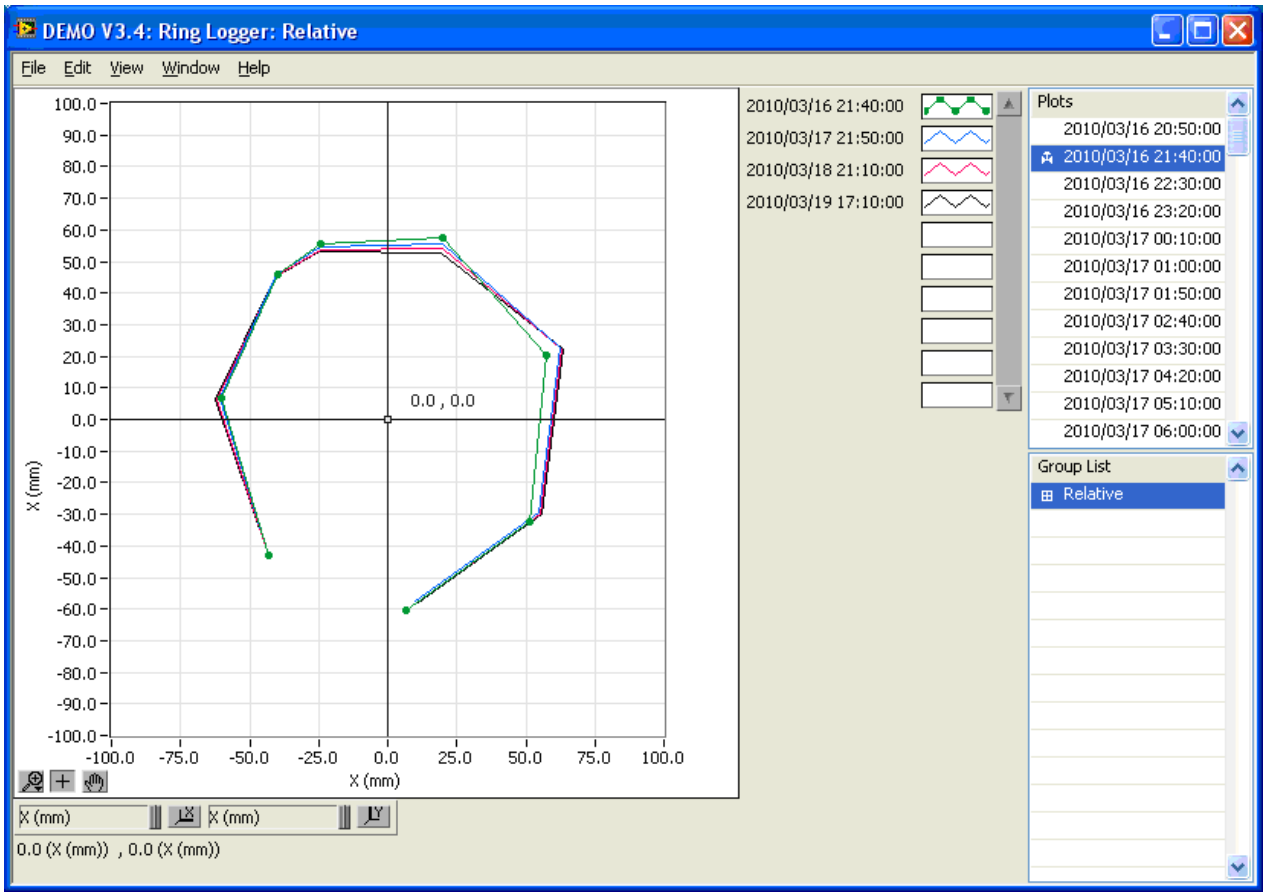


Figure 135: Ring View Group

7 IMPORTING MANUAL DATA FROM EXCEL SPREAD SHEETS

7.1 GEOVIEWER MANUAL DATA FILE FORMAT

1) The file must be saved in standard csv format.
2) Data from a excel worksheet can be directly exported to this format. The file can contain a header portion.
   - Any information can be placed in the header.
   - There is no limit to the number of rows
   - The first column must not contain valid numeric values or the '$' character.
3) The first valid numeric value, '$', or date/time in the first column marks the start of data.
   - Date can be entered in following formats (Y/M/D), (D/M/Y) or (M/D/Y). Time is always HH:mm:ss and can either follow the data or be in it's own column
   - e.g. 11/21/08 21:29:03
4) The file can not contain a footer.
   - No non data entries can be placed after the last data entry. Any information will be taken as valid data.
5) Information can be placed to the right of the last data entry.
6) Channels names and units can be directly imported in Geoviewer
   - Place the units string a row directly above the first data entry for the channel.
   - Place the Channel name string a row directly above the unit's entry for the channel.
   - From within Geoviewer these values can be read in and saved
7) The following is sample manual data file:

Header Information
….
No., Date, Time, Temp., Temp., Chan1, Chan2, Chan3, Chan4, Chan5, Chan6, Chan7, Chan8
,,,° F,° C,[mm],[mm],[mm],[mm],[mm],[mm],[mm],[mm]
1,7/4/2008,15:30,108.7,42.6,15.376,65.376,0,12.148,62.148,0,7.893,57.893
2,8/4/2008,12:42,108.5,42.5,15.416,65.416,0.04,12.205,62.205,0.057,7.984,57.984
3,9/4/2008,9:35,89.4,31.9,15.446,65.446,0.07,12.276,62.276,0.128,8.134,58.134
4,14/04/08,10:20,97.3,36.3,15.53,65.53,0.154,12.574,62.574,0.426,8.639,58.639
5,18/04/08,10:28,102.7,39.3,15.533,65.533,0.157,12.662,62.662,0.514,8.798,58.798

Please note: A Loggernet *.dat file saved in Excel it will no longer work with Loggernet. Excel removes the quotes around the date time string "2007-02-17 18:00:00" to 2007-02-17 18:00:00 which causes an error in Loggernet when writing to file. Loggernet *.dat file date/time format – Note the required quotes.

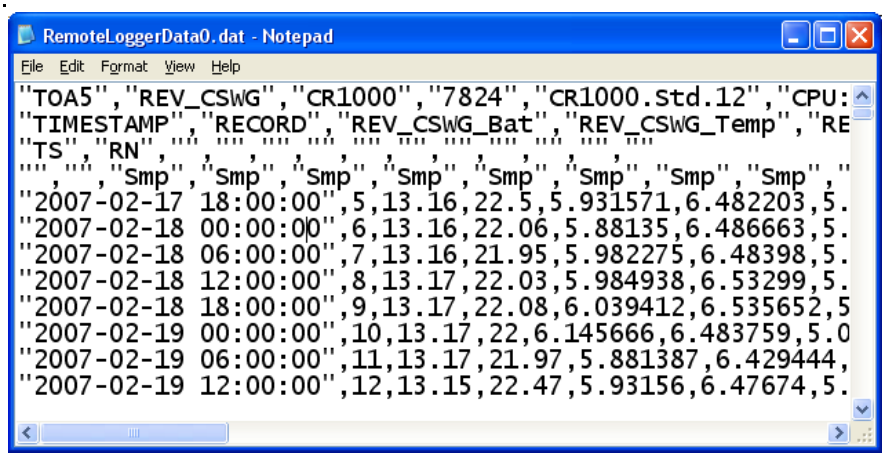
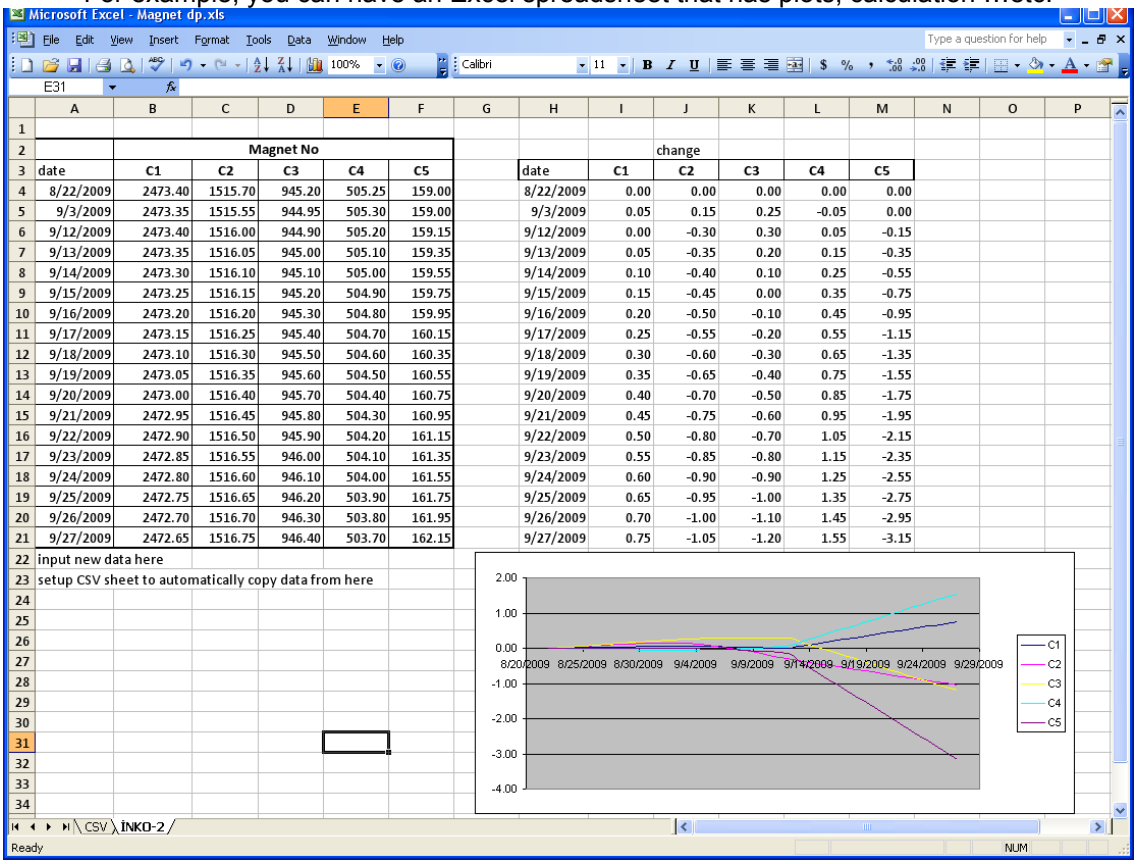


Figure 136: Sample Data File

For example, you can have an Excel spreadsheet that has plots, calculation …etc.



	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2		Magnet No								change			
3	date	C1	C2	C3	C4	C5		date	C1	C2	C3	C4	C5
4	8/22/2009	2473.40	1515.70	945.20	505.25	159.00		8/22/2009	0.00	0.00	0.00	0.00	0.00
5	9/3/2009	2473.35	1515.55	944.95	505.30	159.00		9/3/2009	0.05	0.15	0.25	-0.05	0.00
6	9/12/2009	2473.40	1516.00	944.90	505.20	159.15		9/12/2009	0.00	-0.30	0.30	0.05	-0.15
7	9/13/2009	2473.35	1516.05	945.00	505.10	159.35		9/13/2009	0.05	-0.35	0.20	0.15	-0.35
8	9/14/2009	2473.30	1516.10	945.10	505.00	159.55		9/14/2009	0.10	-0.40	0.10	0.25	-0.55
9	9/15/2009	2473.25	1516.15	945.20	504.90	159.75		9/15/2009	0.15	-0.45	0.00	0.35	-0.75
10	9/16/2009	2473.20	1516.20	945.30	504.80	159.95		9/16/2009	0.20	-0.50	-0.10	0.45	-0.95
11	9/17/2009	2473.15	1516.25	945.40	504.70	160.15		9/17/2009	0.25	-0.55	-0.20	0.55	-1.15
12	9/18/2009	2473.10	1516.30	945.50	504.60	160.35		9/18/2009	0.30	-0.60	-0.30	0.65	-1.35
13	9/19/2009	2473.05	1516.35	945.60	504.50	160.55		9/19/2009	0.35	-0.65	-0.40	0.75	-1.55
14	9/20/2009	2473.00	1516.40	945.70	504.40	160.75		9/20/2009	0.40	-0.70	-0.50	0.85	-1.75
15	9/21/2009	2472.95	1516.45	945.80	504.30	160.95		9/21/2009	0.45	-0.75	-0.60	0.95	-1.95
16	9/22/2009	2472.90	1516.50	945.90	504.20	161.15		9/22/2009	0.50	-0.80	-0.70	1.05	-2.15
17	9/23/2009	2472.85	1516.55	946.00	504.10	161.35		9/23/2009	0.55	-0.85	-0.80	1.15	-2.35
18	9/24/2009	2472.80	1516.60	946.10	504.00	161.55		9/24/2009	0.60	-0.90	-0.90	1.25	-2.55
19	9/25/2009	2472.75	1516.65	946.20	503.90	161.75		9/25/2009	0.65	-0.95	-1.00	1.35	-2.75
20	9/26/2009	2472.70	1516.70	946.30	503.80	161.95		9/26/2009	0.70	-1.00	-1.10	1.45	-2.95
21	9/27/2009	2472.65	1516.75	946.40	503.70	162.15		9/27/2009	0.75	-1.05	-1.20	1.55	-3.15
22	input new data here												
23	setup CSV sheet to automatically copy data from here												

Figure 137: Data To Be Exported in Excel Format

And another sheet that has the required data for Geoviewer in CSV format

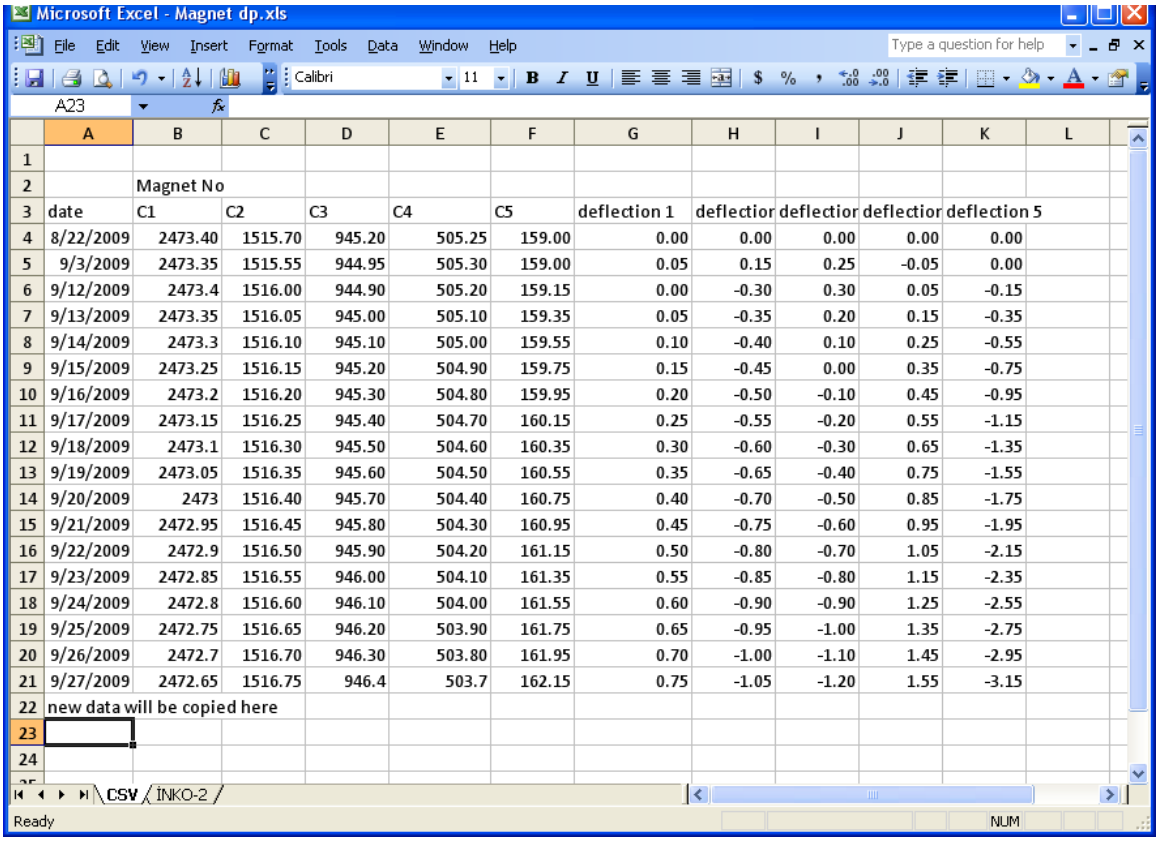


Figure 138: Excel Data to Be Exported

When have finished imputing new data, save your file as and an excel spread sheet to preserve your plots and data analysis and then as a CSV file while you are on the CSV page. Geoviewer will automatically update all plots and calculations.

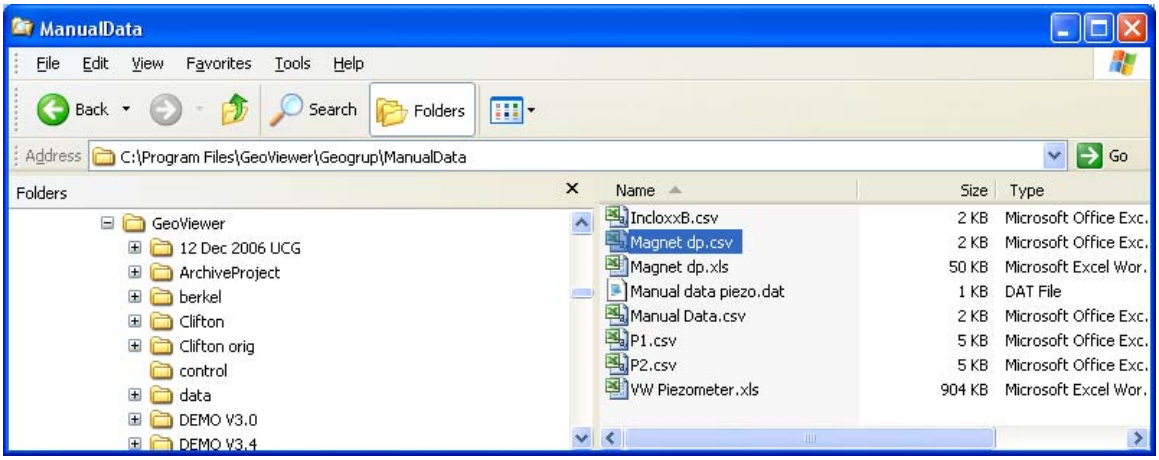


Figure 139: File in Windows Explorer

You can also enter new data directly into the file in Geoviewer.

7.2 IMPORTING A FILE INTO GEOVIEWER

1) Open "Logger" window.

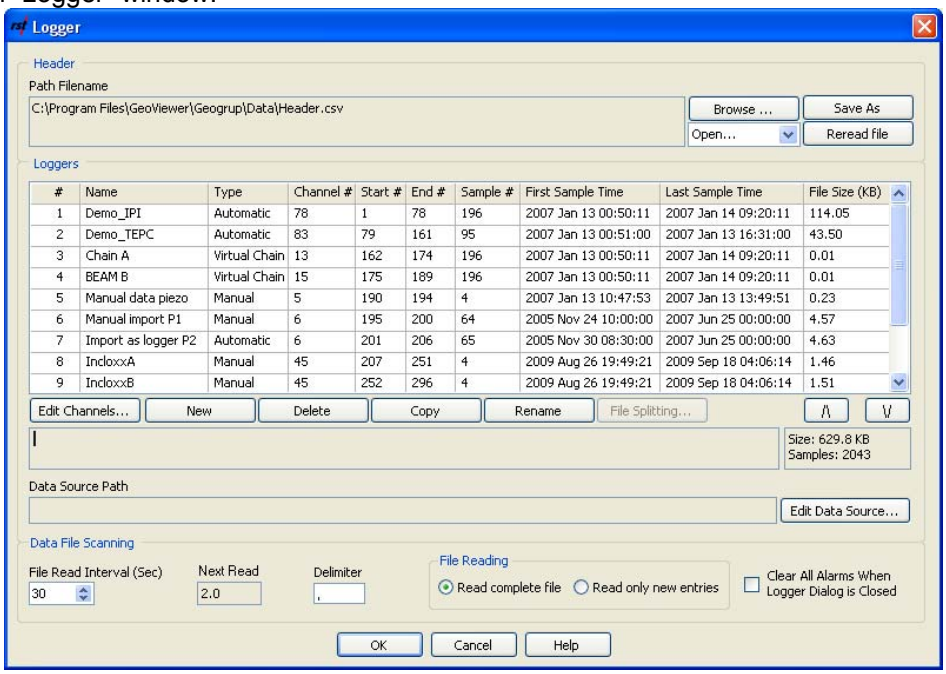


Figure 140: Edit Logger Window

2) New – give logger a name and select data file location – OK

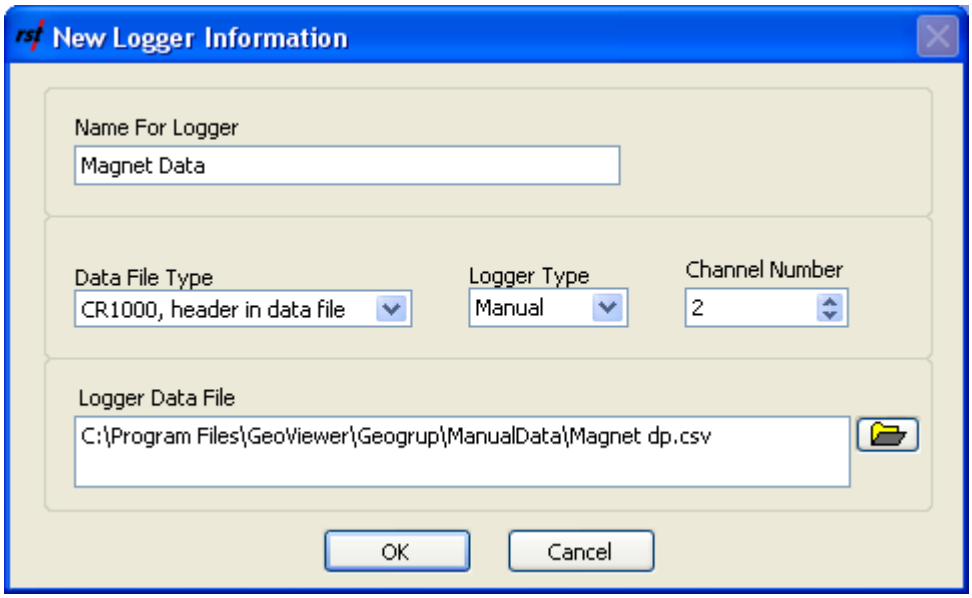


Figure 141: New Logger Window

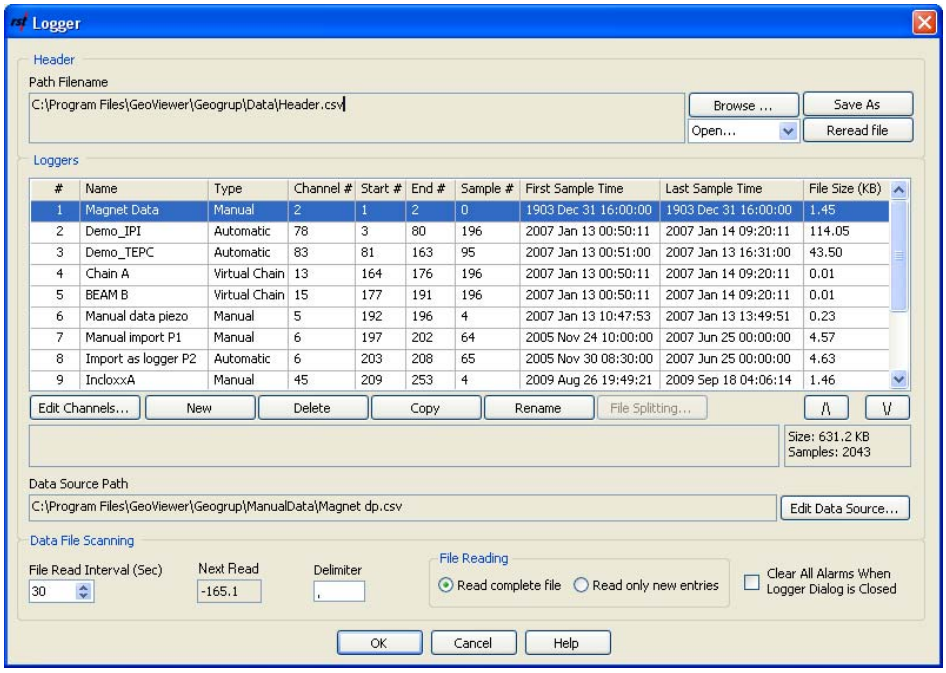


Figure 142: New Logger in Edit Logger Window

3) Edit Channels.

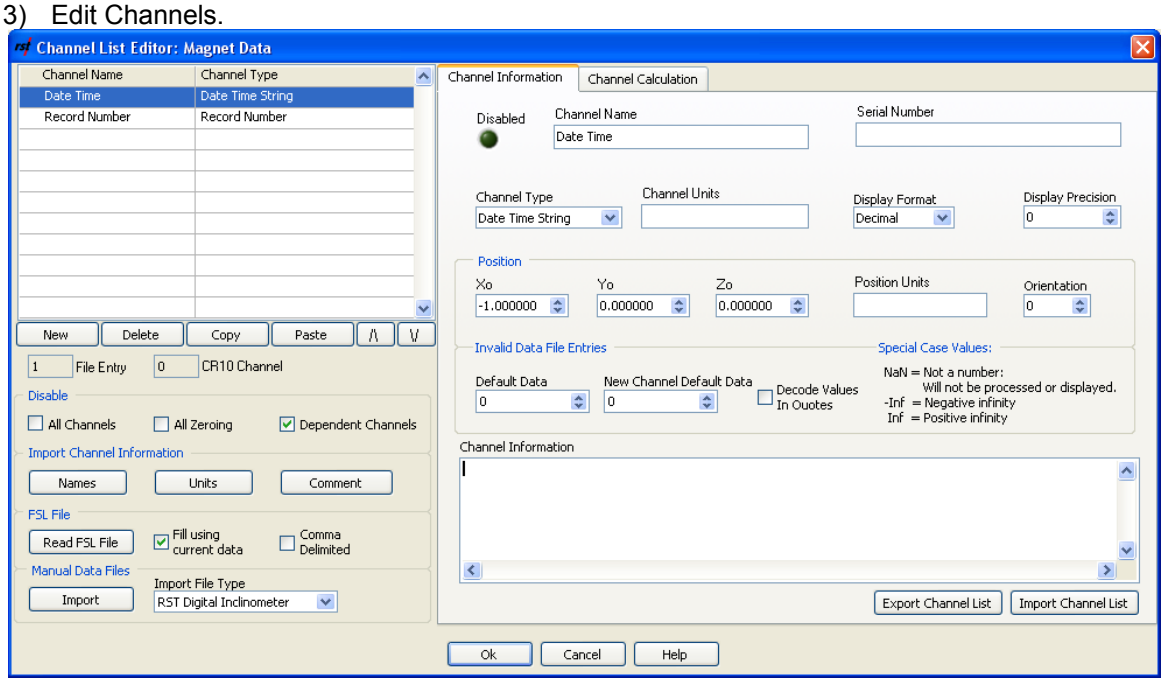


Figure 143: Edit New Logger Channels List

4) Names – OK (units if applicable)

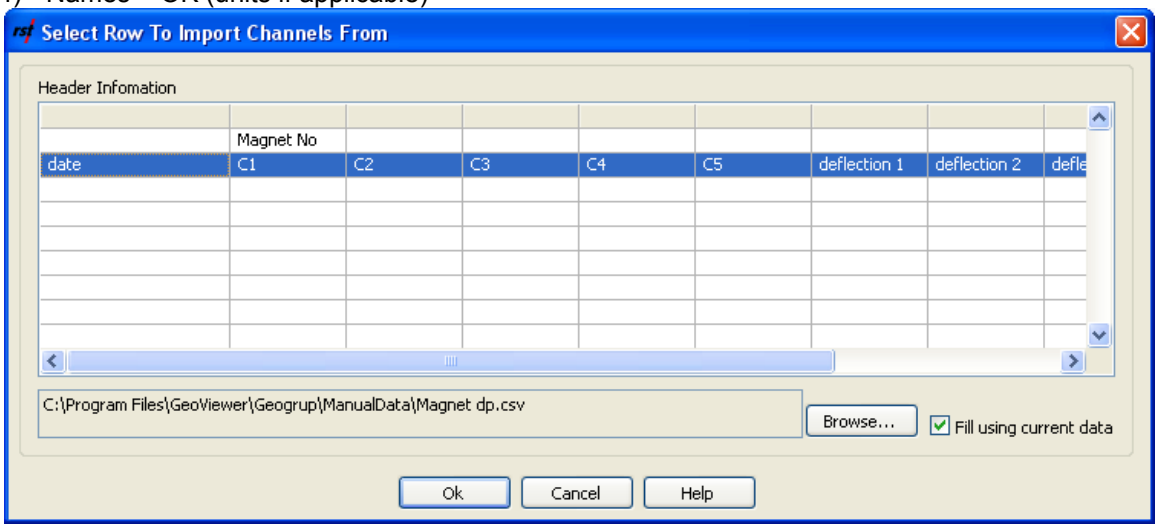


Figure 144: Selecting Channel Names

5) Select the correct time date format under Channel Type i.e Date Time (M/D/Y)

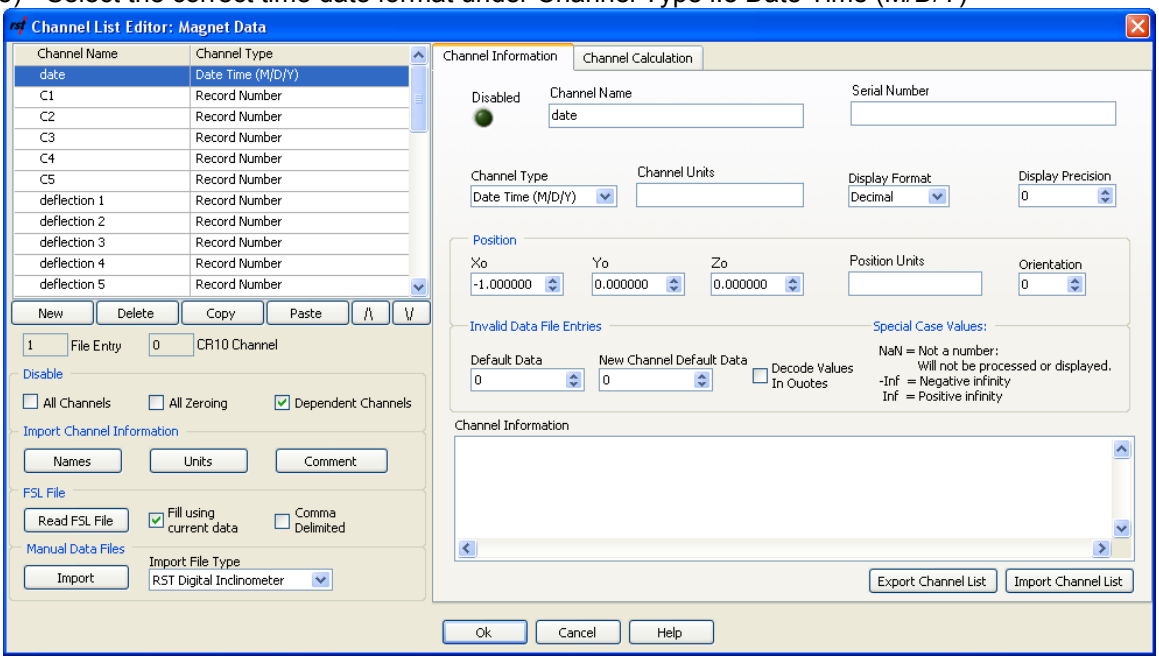


Figure 145: Selecting Date Time Channels

Manual data can now be treated like a standard logger – calcs, zeroing …

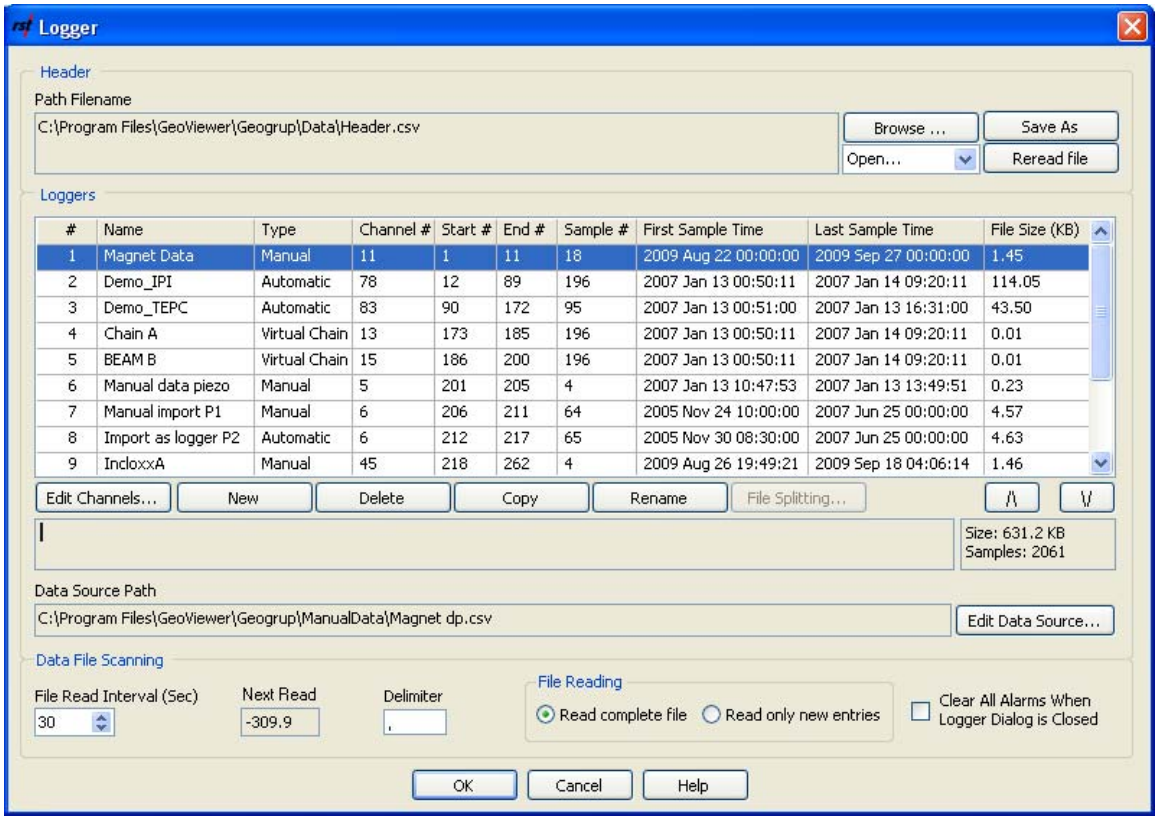


Figure 146: New Logger Updated in Edit Logger Window

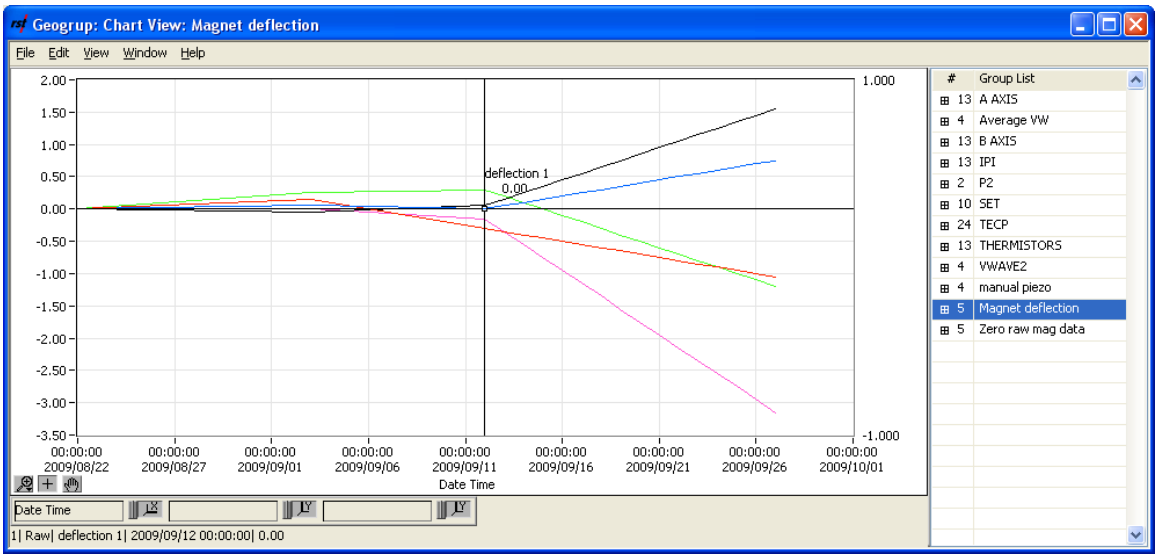


Figure 147: Chart of New Logger Data

8 USB SECURITY KEY DRIVER INSTALLATION

The following instructions describe typical driver installation on Microsoft™ WindowsXP and Microsoft™ Windows Vista platforms. The actual screenshots may differ but the steps will be very similar.

8.1 RUNNING INSTALLATION SOFTWARE

8.1.1 FROM WITH GEOVIEWER

From the main menu select Help/Install Dongle Software

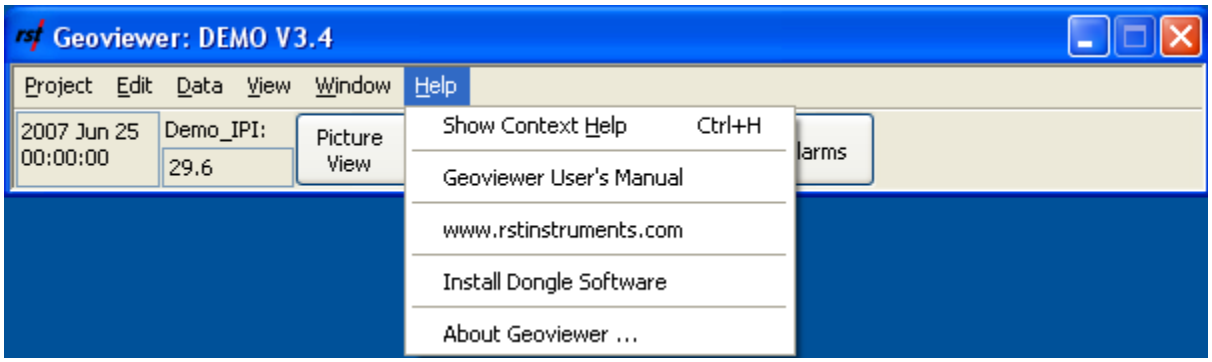


Figure 148: Running Dongle Software

8.1.2 FROM WINDOWS START MENU

Navigate to "Start/Programs/Geoviewer/Install Dongle Software".

8.2 MICROSOFT™ WINDOWSXP INSTALLATION PROCEDURE

For Microsoft™ Windows Vista platform installations please refer to Section 8.3.

After successful installation of USB Security Key device drivers, the following dialog box is displayed.

Figure 149: USB Security Key drivers installed notification

At this point, the USB key should be inserted into the USB port.

The MS Windows system should detect the new device and display New Hardware Wizard, as shown on Figure 150. The MS Windows system might display a warning stating that the drivers being installed are not certified by Windows Logo Certification. These warnings can be safely ignored during the USB Security Key Driver Installation. Please click Continue Anyway and proceed with installation.

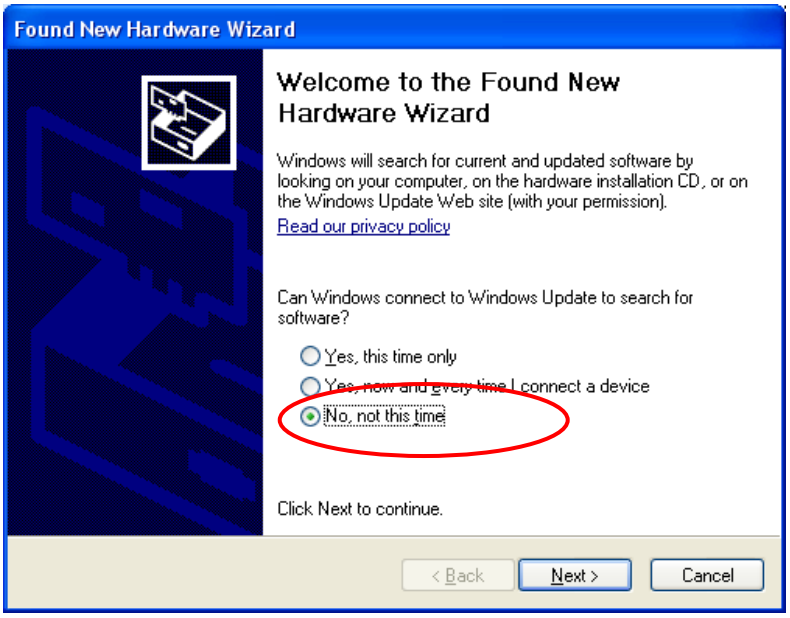


Figure 150: New Hardware Wizard for USB Key

Choose ***No, not this time*** if asked whether or not connect to Windows Update. Click ***Next***.

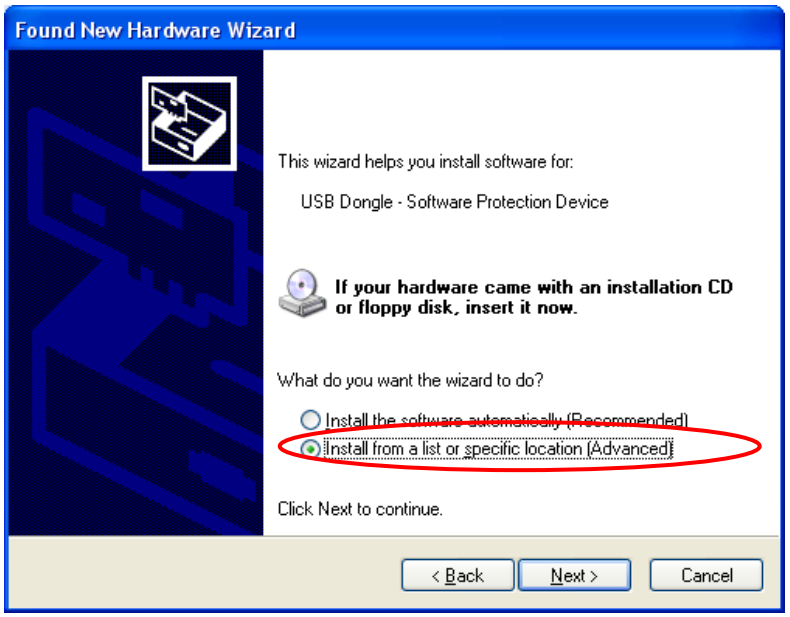


Figure 151: New Hardware Wizard installation

Choose ***Install from a list or specific location*** and click ***Next***.

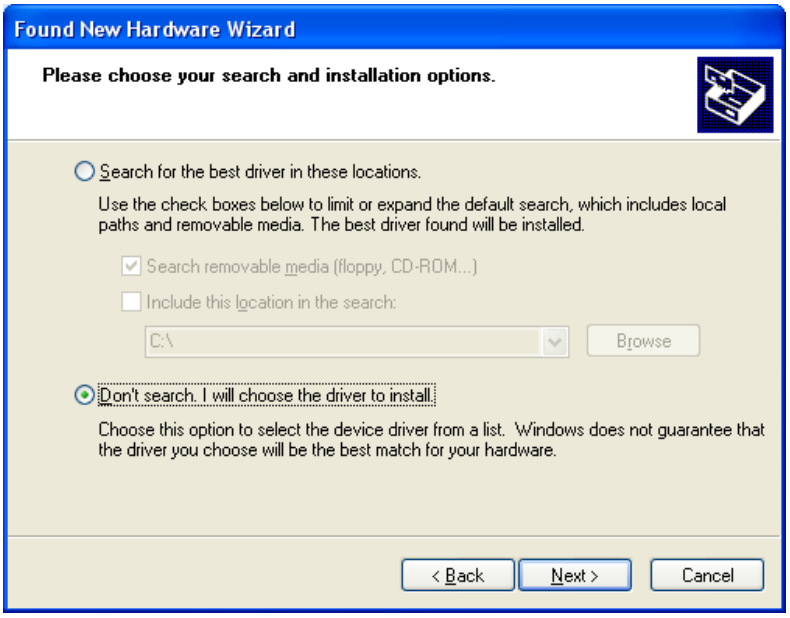


Figure 152: New Hardware Wizard – choose driver

Select ***Don't search*** and click ***Next***. Click ***Next*** on window that follows.

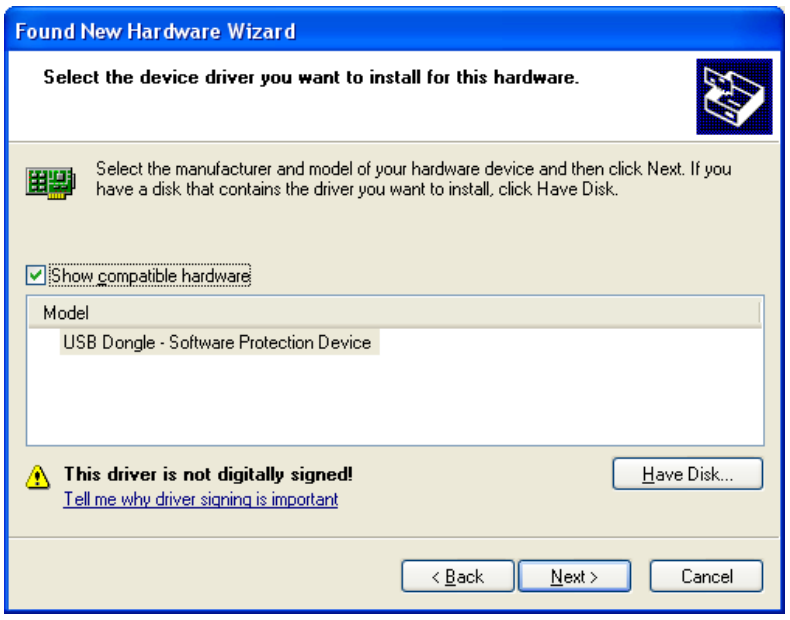


Figure 153: New Hardware Wizard – continue

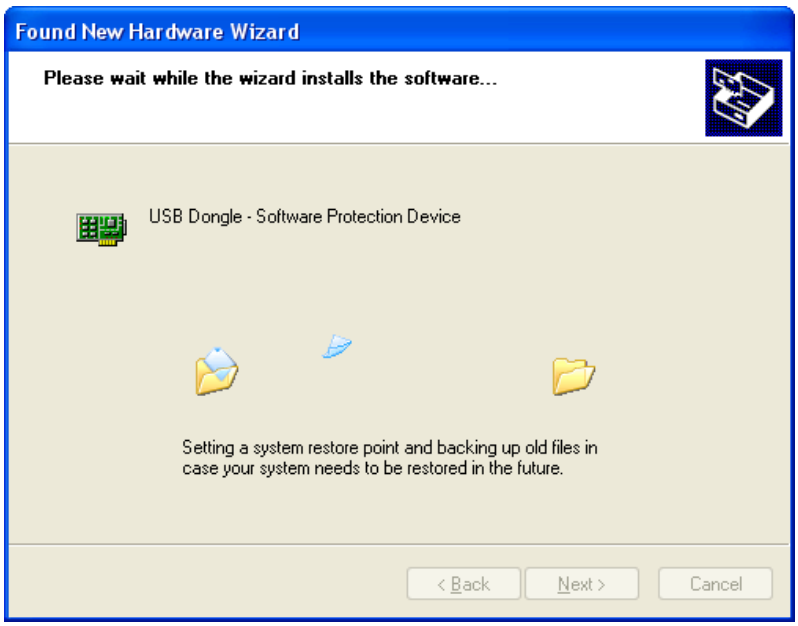


Figure 154: New Hardware Wizard – file transfer

The Wizard will install device drivers and display the following screen. Click ***Finish*** to complete the device drivers installation.

Figure 155: New Hardware Wizard for USB key – install complete

After successful installation, the yellow message balloon (Figure 156) should be shown in the lower right hand corner stating that all device drivers are installed and ready to use.

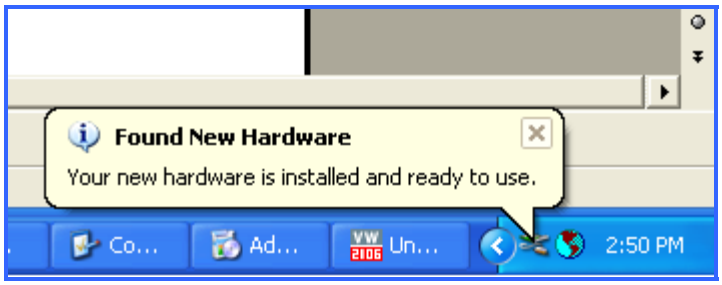


Figure 156: New Hardware installed confirmation

Alternatively, correct installation of the device drivers can be verified by navigating to the *Windows Control Panel*, choosing *System* and then selecting the *Hardware* tab. Clicking on *Device Manager* will bring up the following screen:

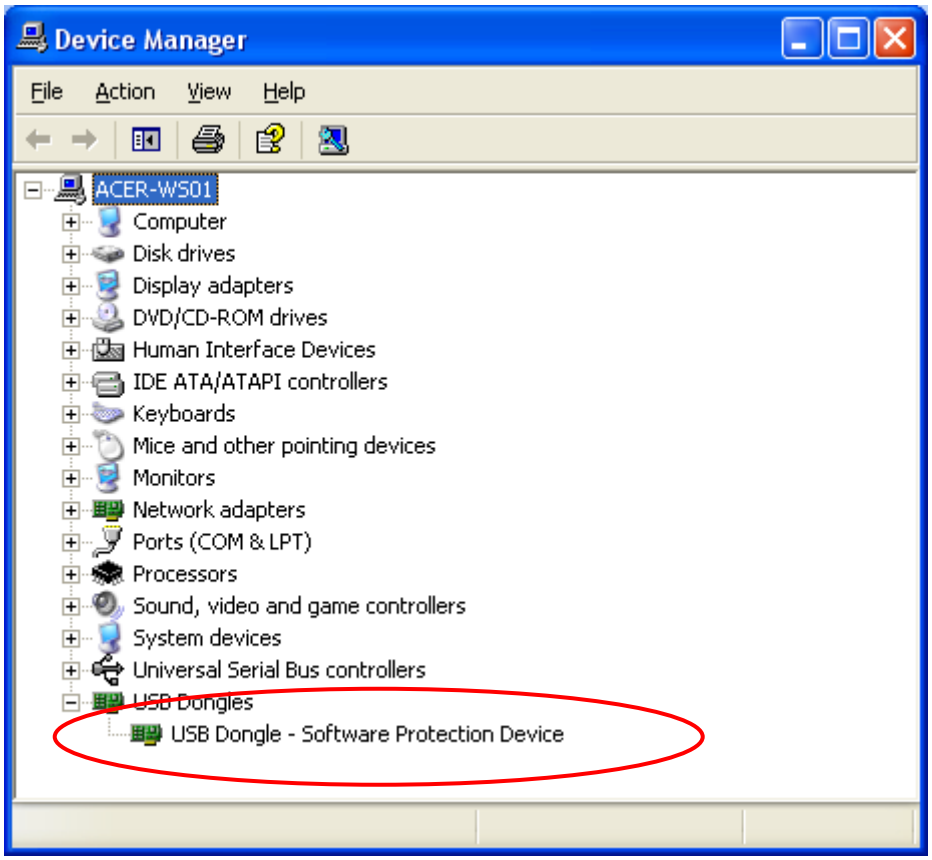


Figure 157: Windows Device Manager

If the driver was installed correctly, the USB Dongle – Software Protection Device will appear as in Figure 157 above. If the driver has not been installed correctly, yellow exclamation mark will appear next to the device.

8.3 MICROSOFT™ WINDOWS VISTA INSTALLATION PROCEDURE

After successful installation of USB Security Key device drivers, the following dialog box is displayed.

Figure 158: USB Security Key drivers installed notification

At this point, the USB key should be inserted into the USB port.

The MS Windows system should detect the new device and display KEYLOK Security Key Installer, as shown on Figure 159. The MS Windows system might display a warning stating that the drivers being installed are not certified by Windows Logo Certification (Figure 160). These warnings can be safely ignored during the USB Security Key Driver Installation. Please click "Install this driver anyway" and proceed with installation.

Figure 159: KEYLOK Security Key Installer

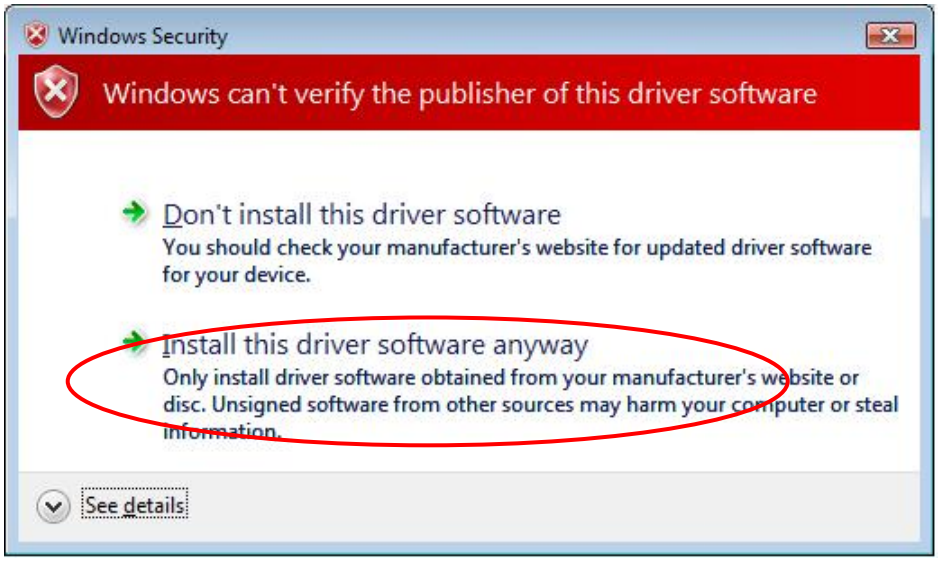


Figure 160: Windows Security warning

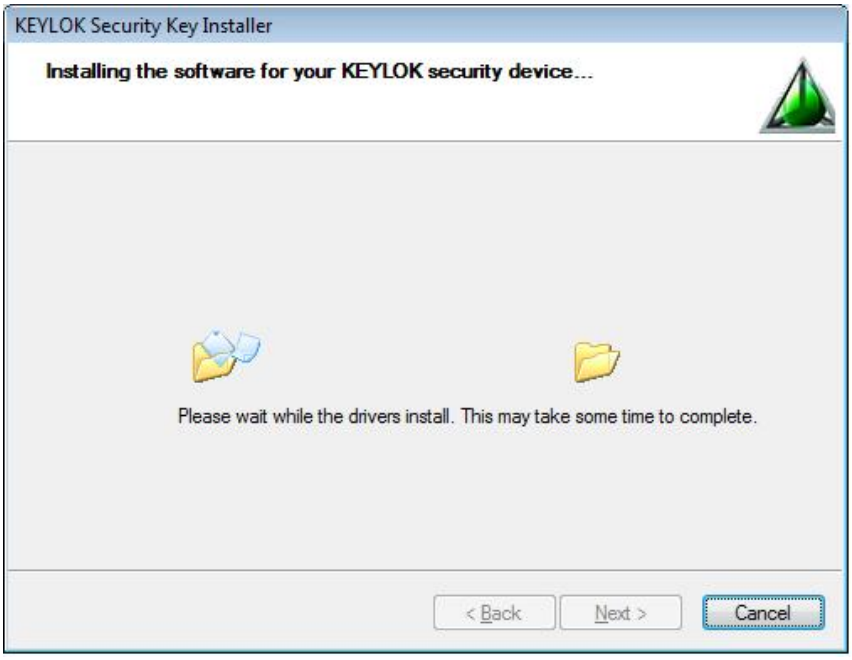


Figure 161: KEYLOK Security Key Installer – choose driver

The Wizard will install device drivers and display the following screen. Click ***Finish*** to complete the device drivers installation.

Figure 162: KEYLOK Security Key Installer – install complete

After successful installation, the yellow message balloon (Figure 163) should be shown in the lower right hand corner stating that all device drivers are installed and ready to use.

Figure 163: New Hardware installed confirmation

Alternatively, correct installation of the device drivers can be verified by navigating to the *Windows Control Panel*, choosing *System* and then selecting the *Hardware* tab. Clicking on *Device Manager* will bring up the following screen:

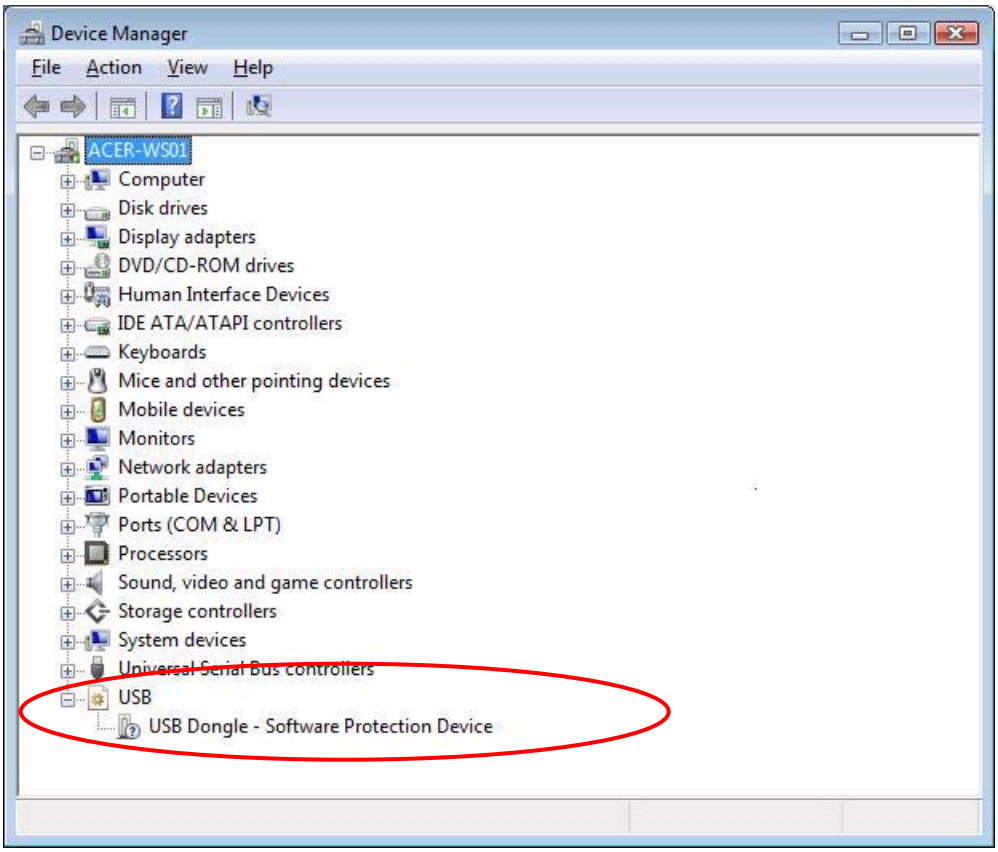


Figure 164: Windows Device Manager

If the driver was installed correctly, the USB Dongle – Software Protection Device will appear as in Figure 164: Windows Device Manager above. If the driver has not been installed correctly, yellow exclamation mark will appear next to the device

9 TROUBLESHOOTING

Problem: The program fails to recognize USB Security Key

Solution:

1. Ensure that USB Key driver files are installed.
   - Remove USB key.
   - Navigate to "Start/Programs/Geoviewer/Install Dongle Software".
2. Assuming that USB Key drivers are on the system
   - Insert USB key.
   - If the "Welcome to the Found New Hardware Wizard" box shows up, do as follows. Otherwise, skip to step 3.
   - Choose third option "No, not at this time" and click next when asked for connecting to windows update.
   - Choose "Don't search. I will choose the driver to install". Click next.
   - Select "USB Dongle - Software Protection Device" if not already selected. Click next.
   - Click Finish.
   - There should be yellow info balloon in the lower right corner saying that new hardware is installed and ready for use.
3. Hardware drivers can be updated from Control Panel, if driver files are already on the system.
   - Insert USB key.
   - Go to Control Panel, then to System->Device Manager in "Hardware" tab.
   - Right-click the "USB Dongle" and choose "Update driver...".
   - When "Welcome to the hardware update Wizard" box appears, follow the same steps as for New Hardware Wizard in 2 above.

10 CONTACT US

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