

## SmartSoft User Manual for SmartScope Interrogators

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A (this document)	22 FEB 2016	New document, based on 3100-3003-A

## 1 INSTALLATION

Smart Fibres' interrogators are shipped with a CD containing installer files for the SmartSoft interface. The host PC must run a suitable Operating System, this manual covers installation on a PC running Windows XP, Vista or 7. Installers for Linux and other operating systems may be available on request.

To install the software on the host PC navigate to "setup.exe" on the CD and follow the instructions that appear during the install process. The installer will also install National Instruments' LabVIEW™ Run Time Engine (RTE). It will then place a short-cut in the Windows Start Menu (under the Smart Fibres program group) and on the Desktop.

The latest release of SmartSoft can also be downloaded from the Smart Fibres website. Contact Smart Fibres technical support for details.

## 2 PREPARING FOR USE

### 2.1 HOST PC - IP ADDRESS SETTINGS

After installing SmartSoft, connect the supplied Ethernet cross-over cable between the host PC and the interrogator. The PC's network connection must be configured to a suitable subnet; by default the interrogator's IP address is 10.0.0.150 and its Net mask is 255.255.255.0. The Net mask for the PC must also be set to 255.255.255.0, suitable ranges for the PC's IP address are 10.0.0.1 to 10.0.0.149 or to 10.0.0.151 to 10.0.0.250. (see appendix 5.1 for further details or contact your network administrator for assistance).

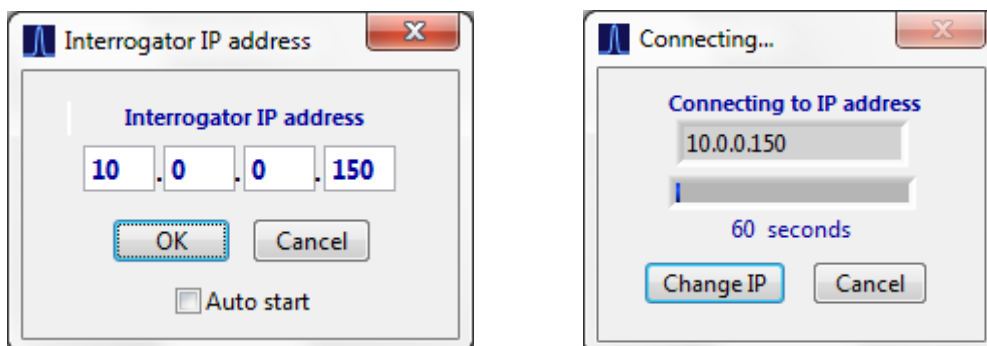
### 2.2 HOST PC - FIREWALL SETTINGS

When SmartSoft runs for the first time you may receive a warning from the Windows Firewall or other installed Firewall. You should allow the program through the firewall. If the operating System is Windows 7 you must allow SmartSoft to run on both Private and Public domains otherwise data from the interrogator will not reach SmartSoft. See also Appendix 5.2.

### 2.3 STARTING SMARTSOFT

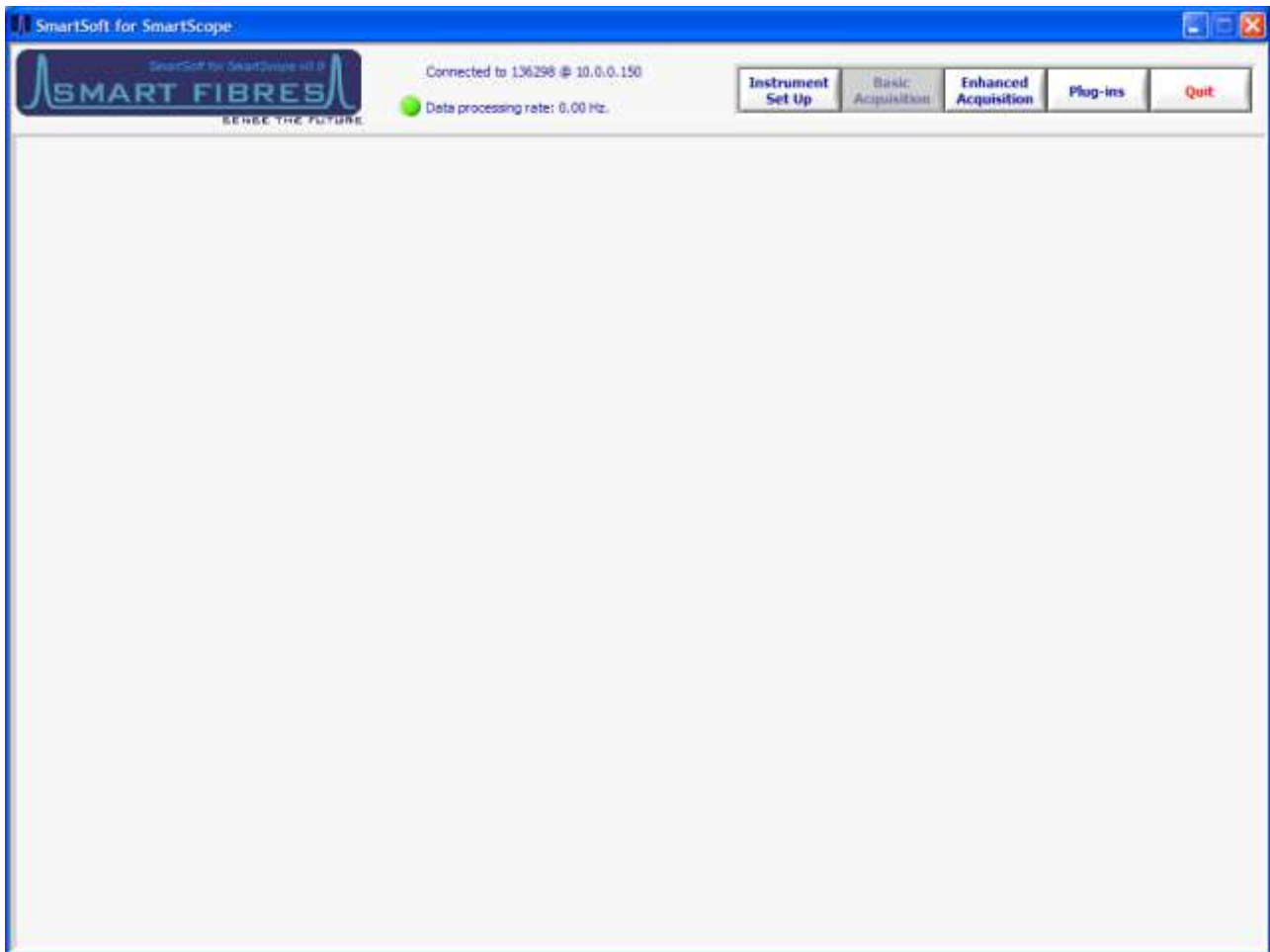
On the host PC navigate to the Smart Fibres > SmartSoft short-cut on the Windows Start Menu and start the program.

The program requests the IP address of the interrogator. As shipped from the factory this will be 10.0.0.150. An Ethernet connection is attempted and the dialogue box changes to indicate progress.



The Auto start check box can be used later so that SmartSoft starts without user input, this combined with copying a shortcut to the Windows Startup menu allows SmartSoft to start up automatically on a remote system in the event of a reboot or power interruption to the host PC.

If a connection can be made successfully the dialogue box will close after a few seconds and the SmartSoft main screen appears. If connection problems are encountered refer to the guides in the Appendices.



A number of function buttons are shown top right. Inactive functions are greyed out.

**Instrument Set-up** is used to set the interrogator's operational parameters.

**Basic Acquisition** is not implemented for SmartScope.

**Enhanced Acquisition** is the main panel in the program allowing sensor set up, visualization and logging to be configured. Attempting to use Enhanced Acquisition without first reading this manual is not recommended.

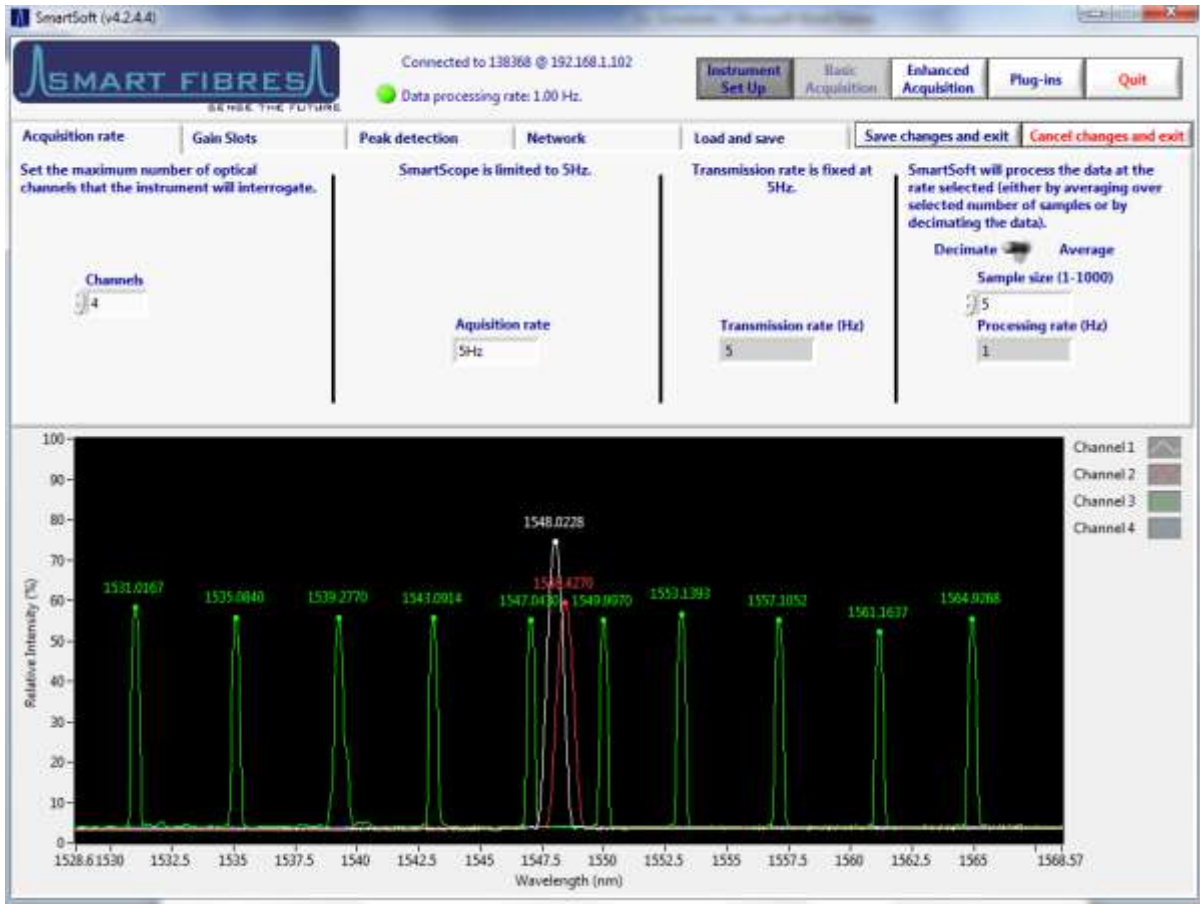
**Plug-ins** allows the user to run custom LabVIEW source code modules. Contact Smart Fibres technical support for details.

**Quit** is used to close the entire application. Always use the Quit button to exit the SmartSoft application; using other methods to close the application may cause unexpected behaviour.

### 3 INSTRUMENT SET-UP

A number of set up tabs are available, they will be described from left to right.

#### 3.1 INSTRUMENT SET-UP – ACQUISITION PANEL



Here the user can adjust various parameters which affect the acquisition rate of the instrument and the data processing rate of the SmartSoft software.

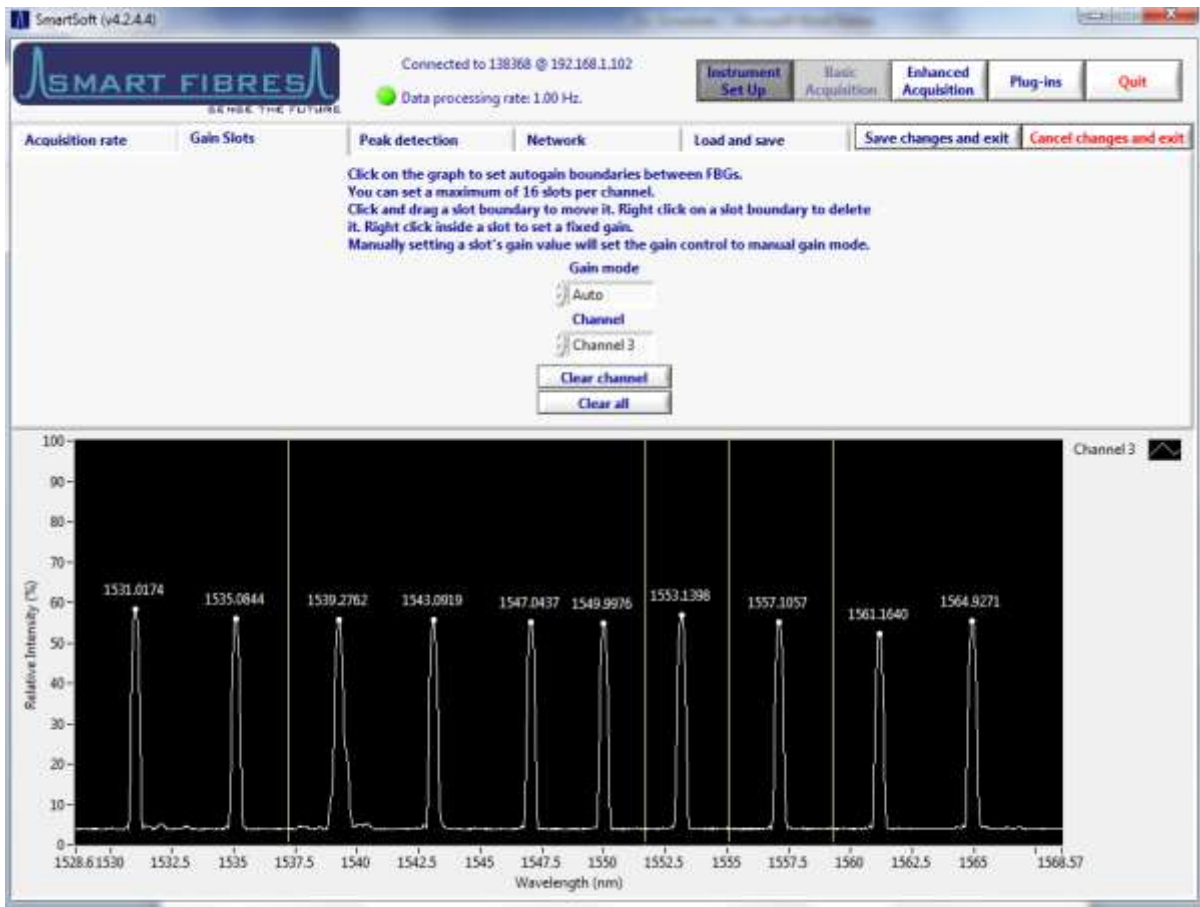
The lower half of the screen shows spectra from all operational channels, together with the current wavelengths of any detected FBG peaks. The instrument is set to use the full laser range and per-channel auto-gain.

Starting on the left the user may configure the number of active optical channels, 4 is the current limit.

The user may reduce the amount of data stored in a log file by averaging or decimating the data. This is applied by the SmartSoft application so will not reduce the Ethernet traffic but will reduce the data presented by SmartSoft and optionally saved to file. The extent of data reduction is controlled by the sample size control. Setting this to a number  $n$  will result in every  $n$ th transmitted data point being presented or stored, either by averaging  $n$  points together or by keeping every  $n$ th point and discarding the rest. Averaging  $n$  data points together will also improve the signal to noise ratio by up to a factor of  $\sqrt{n}$ .

The data processing rate is displayed at the top of the screen when acquisition is in progress.

### 3.2 INSTRUMENT SET-UP – GAIN SLOTS

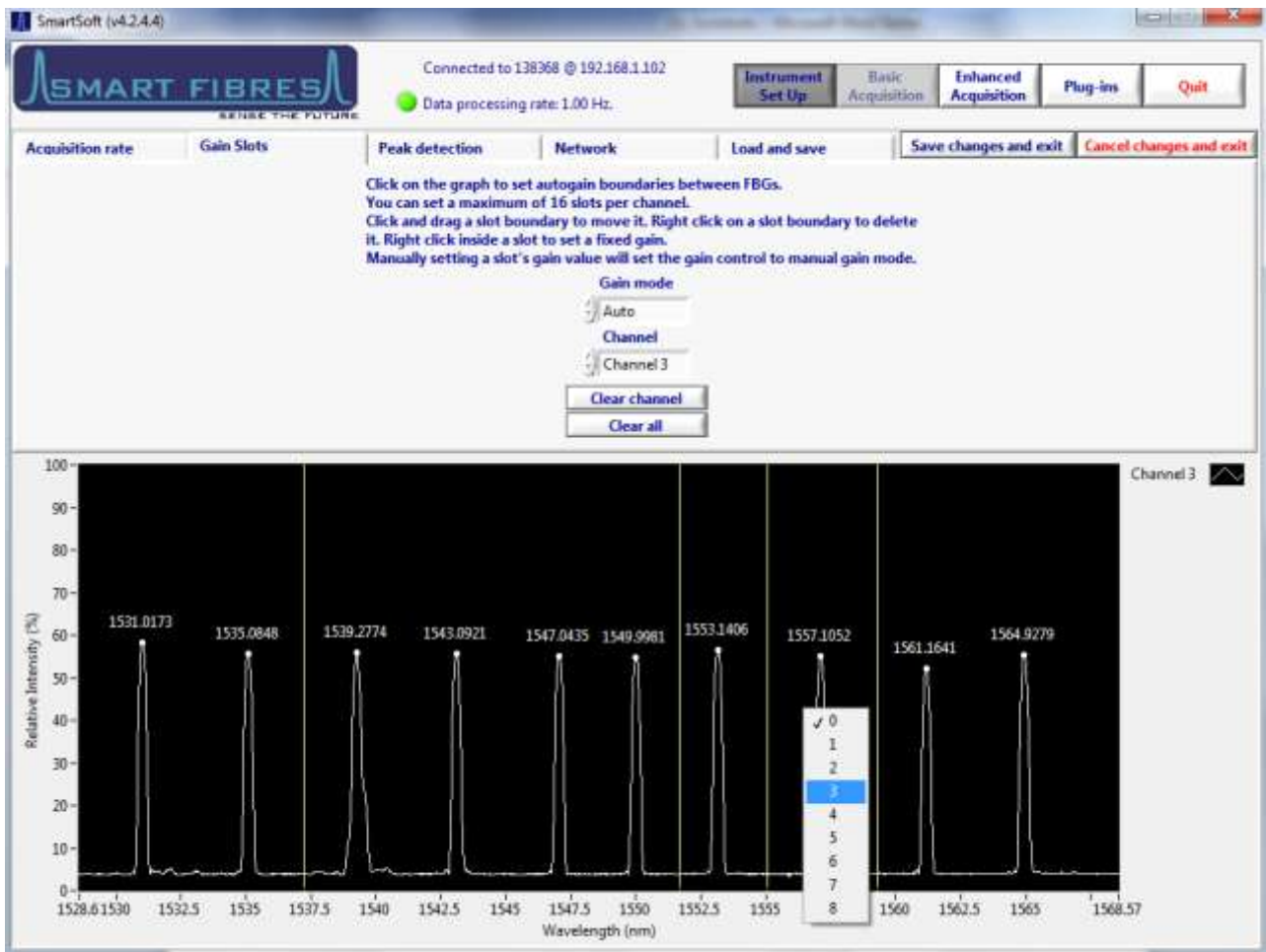


Gain Slots are used to overcome optical losses on the fibre which may cause downstream FBG peaks to be lower in amplitude than those nearest the interrogator. Each FBG peak or group of peaks can have its own gain level applied.

The Gain slots are set up on a channel-by-channel basis. The spectrum for the Channel in question is displayed. Click between the spectral peaks to add slot boundaries. The start and end points of the wavelength tuning range are slot boundaries, so be sure not to add slot boundaries before the first FBG or after the last FBG. Care should be taken that during operation the FBG peak will not cross a slot boundary and that FBG peaks remain separated by at least 2 nm from each other and 1 nm from the end of the active laser range.

Slot boundaries can be adjusted by dragging them to their desired position using the mouse. Right click on a boundary to delete it.

Once the slots are established the Gain Mode can be set. There are two modes, in auto mode the gain for each slot adjusts automatically so that the intensity of each FBG peak is maximised but does not saturate. The peak intensity will be maintained between 50 and 100 % and will only reduce below 50% on the highest gain level if the signal is still too small.



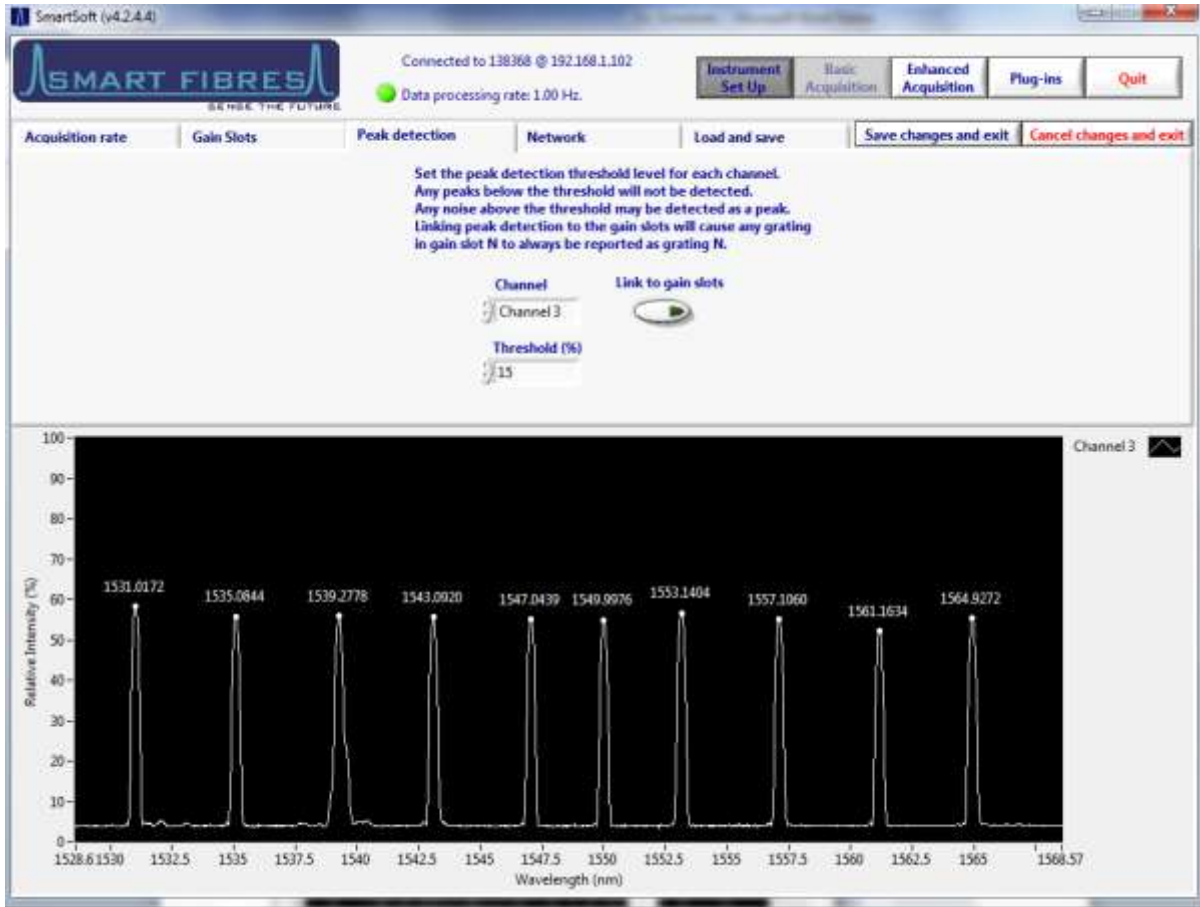
In Manual gain mode a fixed gain is applied to each slot. To set the gain, right click on the graph between the slot boundaries and set the gain level between 0 and 8, repeating this process for each slot on all channels. The optimum gain level is above 50% but without saturating; a saturated FBG peak will have a flat top at around 100% intensity. The gain applied to each slot is displayed on the graph. Selecting a manual gain for a slot will automatically change the gain setting from auto to manual.

It is recommended that in manual mode the gain be set as high as possible without risk of the FBG peak saturating. Peaks below 25% relative intensity may suffer reduced measurement performance.

In most cases it is recommended to use Auto Gain.



### 3.3 INSTRUMENT SET-UP – PEAK DETECTION



The peak detection threshold may be adjusted for each channel on this tab. Ensure the threshold level is above the background reflection level but not above any true FBG peaks. In most cases a value of around 15% is optimal. Peak detection is performed by the SmartSoft application using a polynomial fit of the spectral data returned by the instrument.

### 3.4 INSTRUMENT SET-UP – NETWORK



On the Network tab the user can change the IP settings of the interrogator. This is usually only necessary when the interrogator is to be used on a Local Area Network. Be aware that the IP settings of the host PC may need to change in order to maintain connectivity.

If you are connecting the interrogator to a network instead of a direct connection to a host PC, make sure to set the gateway address to match the network router or gateway PC's LAN address and that the interrogator's IP address is unique on the network and not in the pool of addresses assigned to any DHCP servers on the network.

If there is a firewall or NAT router between the interrogator and the host PC you may need to open UDP ports 30001 to 30003, 30070 to 30072 and 30075 to allow SmartSoft to communicate with the interrogator.

See Preparing for Use section and the Appendices for further details and if necessary consult your Network Administrator.

### 3.5 INSTRUMENT SET-UP – LOAD AND SAVE



The user can use this tab to save all the Instrument Set-up parameters to a file. The file can be recalled later using the Load button. This is particularly useful when the instrument is used to interrogate multiple sensor systems, as a configuration for each system can be saved.

### 3.6 INSTRUMENT SET-UP – SAVE AND/OR EXIT

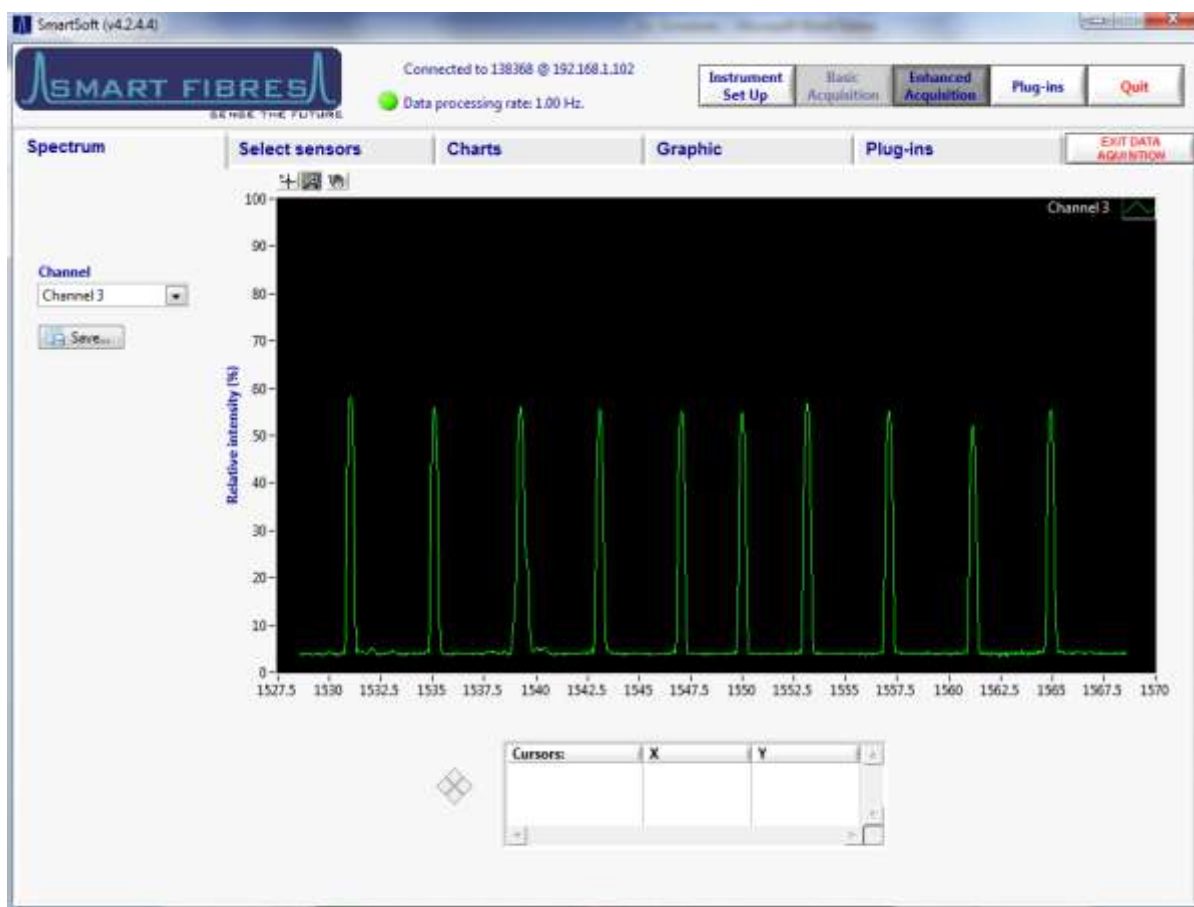
There are three options for exiting Instrument Set Up, pressing “Save changes and exit” will transfer all parameters to the interrogator and the instrument is ready to begin an Acquisition session. Alternatively, pressing “Cancel changes and Exit” will discard any changes and the interrogator will revert to its previous configuration. You can also just select a new panel from the main controls; if any settings have been changed SmartSoft will ask if you want to save them.

## 4 ENHANCED ACQUISITION

Before entering Enhanced Acquisition please go first to the Instrument Set Up section.

SmartScope delivers full spectrum data and FBG peak detection is performed in SmartSoft. This is different to other interrogators in the SmartScan range, where peak detection is performed in the interrogator and the peak wavelengths are delivered.

### 4.1 ENHANCED ACQUISITION – SPECTRUM



The spectrum tab is intended as a tool to aid setting up of sensors and/or interrogator parameters. The sensors on one channel at a time can be viewed with the reflected signal intensity displayed over the wavelength range. Each peak represents the reflected light from one FBG. The appearance of the FBG Peaks will be influenced by the Gain scheme selected during Instrument Set Up.

If desired the instantaneous spectrum can be saved to file, press the save button whilst the channel of interest is being viewed. An image of the spectrum can be exported to the clipboard or a file by right clicking in the graph area.

The graph palette in the top left corner of the graph provides options for navigating around the screen. The cross icon is the selection tool and is used for selecting and moving graph cursors, the magnifying glass icon allows the user to zoom in on the graph to examine particular spectral features in more detail and the hand icon is used to drag a magnified region around the plot.

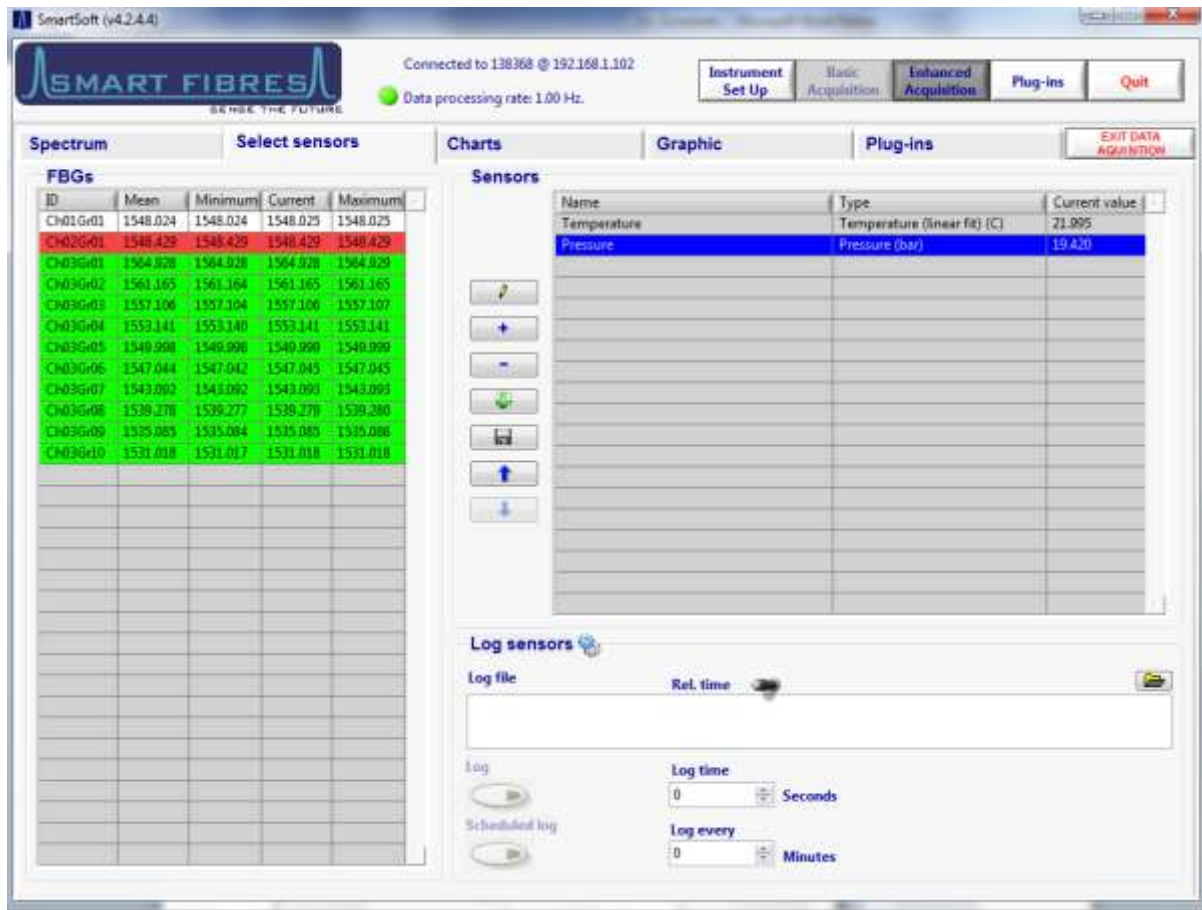
The plot legend in the top right of the graph can be used to change the plot properties, e.g. line style/colour, point style/colour, etc.

Extra functionality is made available by right clicking in the graph and selecting from the pop-up menu.



The scale legend can be used to gain quick access to the graphs auto-scale options and for changing scale indicator parameters such as numeric format, precision, etc. The cursor legend (shown above) is used for creating cursors on the graph and reading the position of those cursors. Cursors can be created by right clicking inside the cursor legend and can be dragged with the selection tool (see graph palette section). The cursor can be configured by right clicking on its name in the cursor list.

## 4.2 ENHANCED ACQUISITION – SELECT SENSORS



The Select Sensors tab has two tables. The left hand table displays all available FBGs that have been detected by SmartSoft from the spectral data received from the instrument. If there are more FBG Peaks on the Spectrum tab than available FBGs in the table then revisit the Instrument Set Up and either adjust the Gains, increase the Sensors per channel setting or adjust the peak detection thresholds.

The FBG table displays all the FBGs on channel 1 in descending wavelength order followed by those on channel 2 and so on. The channels are colour coded for ease of identification. For each FBG there are columns for its current wavelength as well as average, minimum and maximum.

The right hand table displays the selected Sensors; this table will be empty to start with. Sensors are added to the table using the “+” button or by right clicking on a grating in the FBG table. This brings up the add sensor dialogue box.





The user can select one of the FBGs from a drop down list of all available FBGs. The user may now give the sensor a meaningful name and change the Sensor type and measurement units.

For measurements other than Wavelength the user must enter a number of parameters so that SmartSoft can make the conversion. The type and quantity of conversion coefficients requested by the sensor set-up dialogue box are determined by the sensor type selected.

When all the required entries have been made, the Next button will become active allowing the user to move to the next step, at the last step the OK button becomes active completing the configuration for that sensor.

The available Sensor Types may vary. It is possible for Smart Fibres to create custom Sensor Types for specific applications, and these are created from a configuration file included with the SmartSoft Installer.

The default Sensor types are usually as listed below.

### **Wavelength**

A wavelength sensor requires no parameters, the wavelength of the FBG will be displayed in nm.

### **Strain**

A strain sensor requires a reference wavelength, that is the wavelength measured when the sensor is under no strain. The coefficient of thermal expansion (CTE) of the material the sensor is bonded to can also be entered but this is only valid if compensating for temperature and only required if the user wishes to remove the part of the strain induced by thermal expansion. A Strain Sensor can be temperature compensated by any Temperature Sensor that has been added to the Sensor table. (See example below).

### **Temperature (linear fit)**

A temperature sensor requires a reference wavelength, the temperature scaling factor in pico-metres per degree, which should be supplied by the manufacturer and the temperature offset (the temperature of the sensor at the reference wavelength) which for Smart Fibres temperature sensors is 0 °C. If the scaling factor is left as zero it will be calculated based on the reference wavelength provided. This will be a close approximation but it is recommended to use the manufacturer supplied value for maximum accuracy. Smart Fibres provides calibration certificates with all their temperature sensors, the coefficients from the certificate should be entered via the Sensor Set up dialogue.

### **Temperature (quadratic fit)**

A temperature sensor with a quadratic fit requires the three quadratic coefficients, these will be provided on a calibration certificate for Smart Fibres' temperature sensors

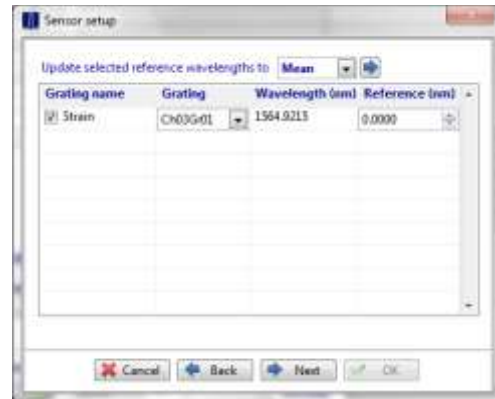
### **Pressure**

A pressure sensor requires the CTE of the pressure sensor (only required if compensating for temperature) and the micro-strain to pressure conversion factor (ustrain/bar) which should be supplied by the sensor manufacturer.

### **SmartPort**

To set up a SmartPort sensor you must first define the SmartPort temperature sensor by adding a sensor, selecting the "SmartPort T" sensor type and entering the coefficients from the data sheet. Then define a SmartPort pressure sensor by adding a sensor, selecting the "SmartPort P" sensor type, entering the coefficients from the data sheet and selecting the corresponding temperature. (See example below).

#### 4.2.1 Example – Strain Sensor

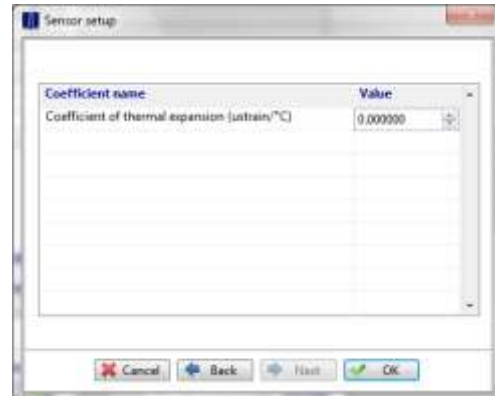
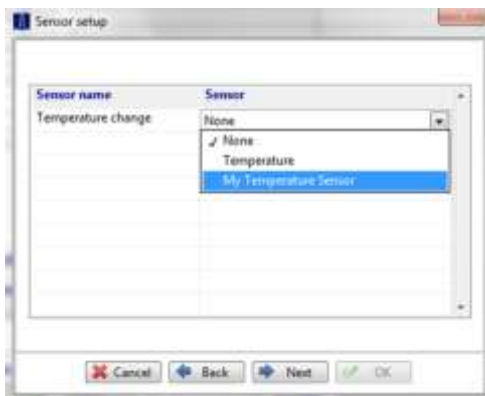


Select Strain as the Sensor Type and enter a Sensor name. Then press 'Next'.

The reference wavelength is the wavelength against which the sensor will be compared. SmartSoft needs to measure a change in the wavelength of an FBG in order to convert to engineering units such as strain, temperature and pressure. The reference wavelength may be supplied by the sensor manufacturer and can be typed in the box or it can be entered by pressing the blue arrow next to either the "set current" or "set mean" menu selection.

It may be necessary to first set the type to wavelength and log and analyse some data in order to determine the required reference wavelength. The reference wavelength should be the wavelength measured when the sensor is under its reference strain, this would usually be zero strain.

The sensor can be compensated for temperature effects by selecting a temperature sensor. Temperature sensors must be added to the Sensor table before they are available to select for compensation.



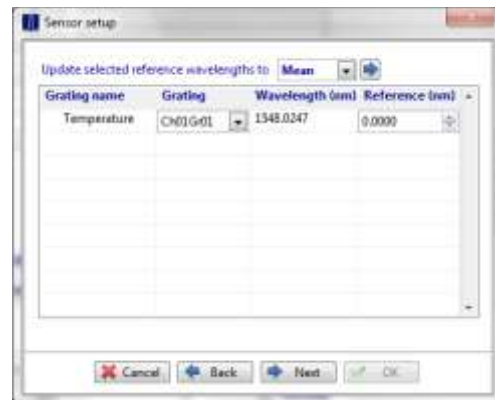
The CTE of the material to which the strain sensor is bonded to can be entered if it is important to remove the strain induced by thermal expansion leaving just the strain induced by mechanical loading. If this is not required leave CTE set to 0.



## 4.2.2 Example – SmartPort PT Sensor

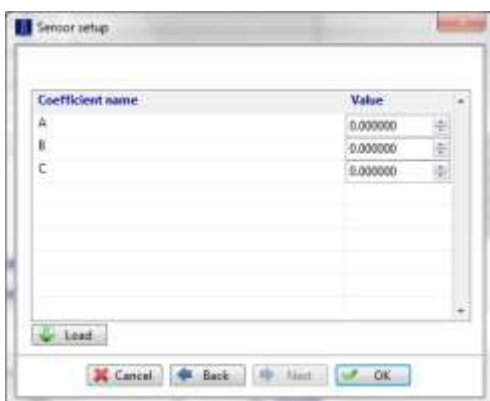
A SmartPort sensor measures both Temperature and Pressure, the Temperature needs to be measured in order to deduce the Pressure. SmartSoft treats a SmartPort as two separate sensors. To set up a SmartPort sensor you must first define the SmartPort temperature sensor by adding a sensor, selecting the “SmartPort T” sensor type and entering the coefficients from the calibration certificate. Then define a SmartPort pressure sensor by adding a sensor, selecting the “SmartPort P” sensor type, entering the coefficients from the calibration certificate and selecting the corresponding SmartPort T temperature sensor.

Have the SmartPort Calibration certificate to hand and also the coefficients csv file for the Sensor, the file will be named with the Serial Number of the Sensor, e.g. 134567 coeff.csv



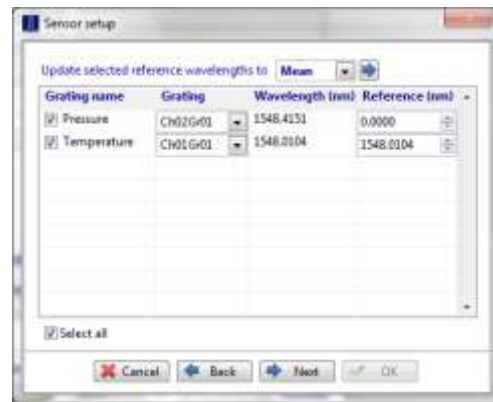
Select SmartPort T as the sensor type and give the Sensor a meaningful name, then press ‘Next’. Check the correct Grating has been selected. The Calibration certificate will indicate the approximate wavelength of the grating, so it should be possible to identify it in the FBG table.

Leave the Reference Wavelength set to 0.

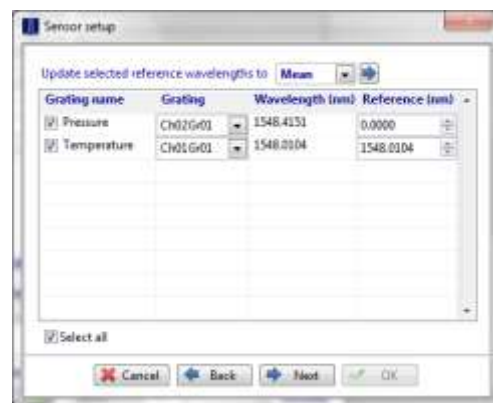
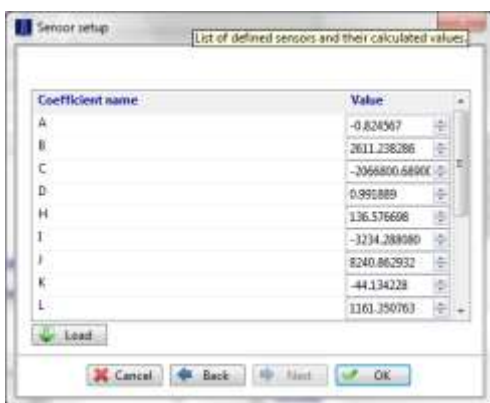


Now press the Load button and select the SNxxxx coeff.csv file, which will populate the coefficient values. Now press OK.

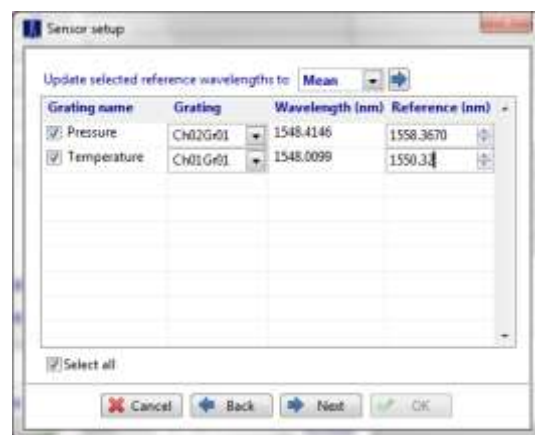
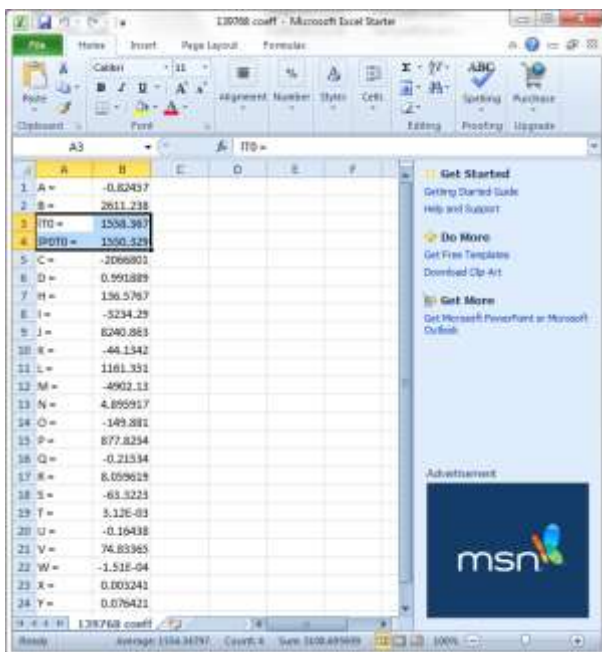
Next add another Sensor, give it a name and select SmartPort P as the Sensor Type.



Ensure the Gratings selected for the Pressure and Temperature are correct, do not worry about setting the Reference wavelengths for now this will be done later.



Press the Load button and again select the SNxxx coeff.csv file to populate the coefficient values. Now press the 'Back' button. Using Windows explorer or MS Excel open the SNxxx coeff.csv



Enter the value IT0 as the Temperature reference wavelength and IP0T0 as the Pressure reference value. Press 'Next' and then the OK button will be active. Press OK to complete the configuration.

### 4.2.3 Editing the Sensor Table

There are a number of buttons down the left side of the Sensor table.



The Edit button is used to change the parameters of the selected sensor. The Sensor Dialogue box is opened again to give the option to update any of the parameters entered when adding the sensor the first time. If the user wishes to change the sensor type then the existing sensor must be deleted, using the “-” button and a new sensor created.



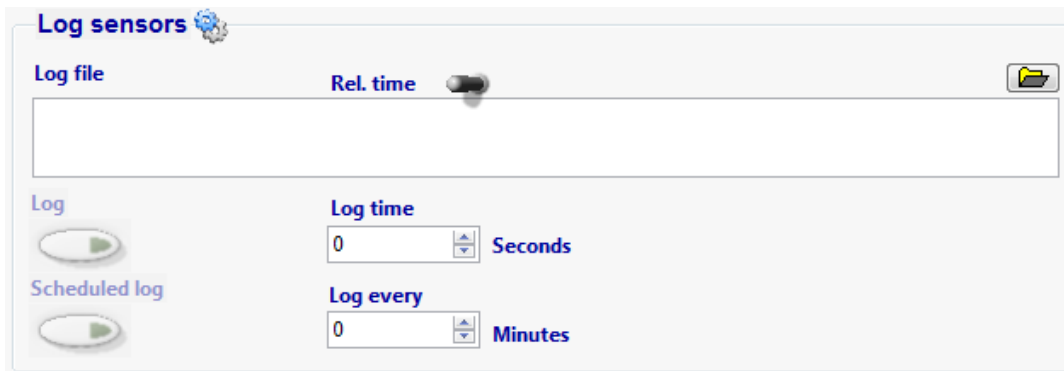
The Save button is used to save the entire Sensor List so that it may be recalled at a later time, all the sensor settings are saved to file. Note, the current sensor settings are always saved automatically whenever the user exits Enhanced Acquisition. In the case where the interrogator may be used with a variety of different sensor configurations, each can be saved to a different Sensor List file and these can be loaded as required for future use. It is good practice to Save the Sensor settings after completing or editing their set up parameters.



The Load button is used to recall Sensor settings that were previously saved. The last used settings are automatically loaded each time Enhanced Acquisition is started.

Note, if the FBG that provides the wavelength source for a sensor is removed from the system, i.e. is not present in the FBG table, then Sensors using that FBG will automatically be removed from the Sensor Table.

## 4.3 LOGGING SENSOR DATA



The logging feature on the Select Sensors tab can be used to save all the sensors present in the Sensor table. The file duration can be set in seconds or the user may use the Log button to Start and Stop logging. Sensors will be logged at the Data Processing Rate displayed at the top of the screen.

To log sensors first select a File path in the Log File box, the file path can either be typed in or selected using the folder browse button to the right of the box. Assign a name to the file e.g. "My Log File". If the file does not exist it will be created automatically.

When a path and filename have been entered the Log button should become active, when ready press the Log button to start recording data. Optionally the user may set the "Log Time" in seconds, after this has elapsed logging will stop automatically. Setting a Log Time of 0 means logging is only stopped when the user deactivates the Log Button.

Data is saved in tab separated format suitable for opening with common spreadsheet applications such as Microsoft Excel and OpenOffice Calc. The Start Time is given in UTC format, which is number of seconds since 00:00 on 1<sup>st</sup> January 1970. Each sample or line in the file then has a time relative to the start time or its own absolute UTC timestamp, depending upon whether the Switch is set to "Rel. Time" or "Abs. Time".

Time	Ch01G01	Ch01G02	Ch01G03	Ch01G04	Ch01G05	Ch01G06	Ch01G07	Ch01G08	Ch01G09	Ch01G10
	Wavelength	Wavelength	Wavelength	Wavelength	Wavelength	Wavelength	Wavelength	Wavelength	Wavelength	Wavelength
0	1564.968	1561.222	1557.172	1553.172	1550.08	1547.114	1543.125	1539.364	1536.138	1531.955
0.004	1564.967	1561.222	1557.172	1553.172	1550.079	1547.113	1543.125	1539.364	1536.138	1531.954
0.008	1564.967	1561.222	1557.173	1553.172	1550.079	1547.114	1543.126	1539.363	1536.138	1531.955
0.012	1564.968	1561.223	1557.173	1553.172	1550.08	1547.114	1543.125	1539.364	1536.138	1531.954
0.016	1564.968	1561.223	1557.174	1553.172	1550.08	1547.113	1543.125	1539.363	1536.138	1531.955
0.02	1564.967	1561.223	1557.173	1553.173	1550.079	1547.115	1543.126	1539.364	1536.138	1531.955
0.024	1564.967	1561.223	1557.173	1553.173	1550.08	1547.114	1543.125	1539.364	1536.138	1531.953
0.028	1564.968	1561.221	1557.174	1553.173	1550.079	1547.113	1543.125	1539.365	1536.138	1531.955
0.032	1564.967	1561.222	1557.173	1553.173	1550.08	1547.114	1543.125	1539.365	1536.139	1531.954
0.036	1564.967	1561.222	1557.173	1553.172	1550.08	1547.113	1543.125	1539.364	1536.138	1531.955
0.04	1564.967	1561.223	1557.173	1553.173	1550.079	1547.114	1543.124	1539.364	1536.138	1531.955
0.044	1564.967	1561.222	1557.173	1553.173	1550.079	1547.113	1543.127	1539.364	1536.138	1531.954
0.048	1564.964	1561.222	1557.173	1553.173	1550.079	1547.114	1543.125	1539.363	1536.138	1531.955
0.052	1564.968	1561.221	1557.173	1553.173	1550.08	1547.114	1543.126	1539.364	1536.138	1531.955
0.056	1564.968	1561.221	1557.173	1553.173	1550.079	1547.113	1543.126	1539.363	1536.138	1531.955
0.06	1564.967	1561.222	1557.174	1553.172	1550.079	1547.114	1543.125	1539.364	1536.138	1531.955

### 4.3.1 Scheduled Logging

A further option is to set up scheduled logging, in this mode a short burst of data is recorded at regular intervals. As before first set up the file path and filename then use the Log Time to set the length of the burst. Next set the Schedule period in minutes in the "Log Every..." box. When ready, press the Scheduled Log button instead of the Log button. The Scheduled log button should become active after the "Log Every..." has been populated.

### 4.3.2 Logging to Sequential Files

For longer logging sessions it is convenient to break the file up into a series of smaller files.

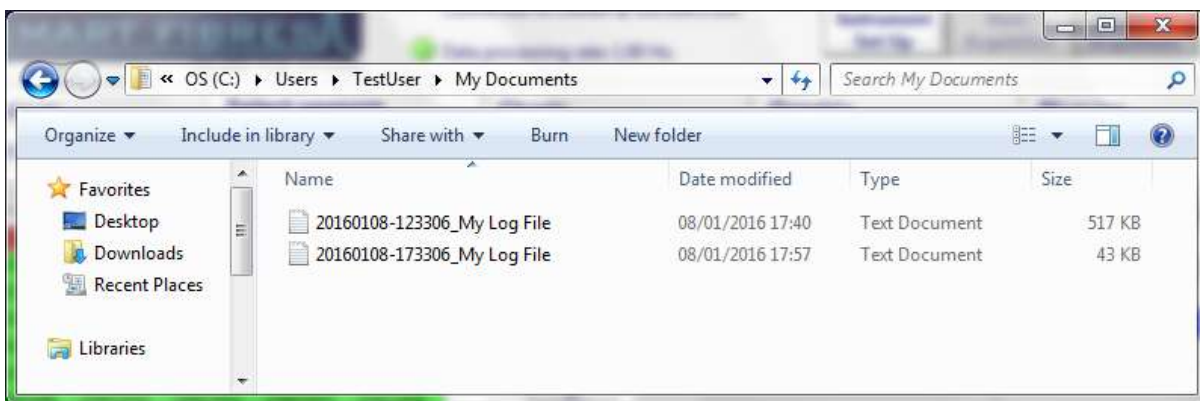
Clicking on the Gears icon  opens a Log Settings dialogue box.



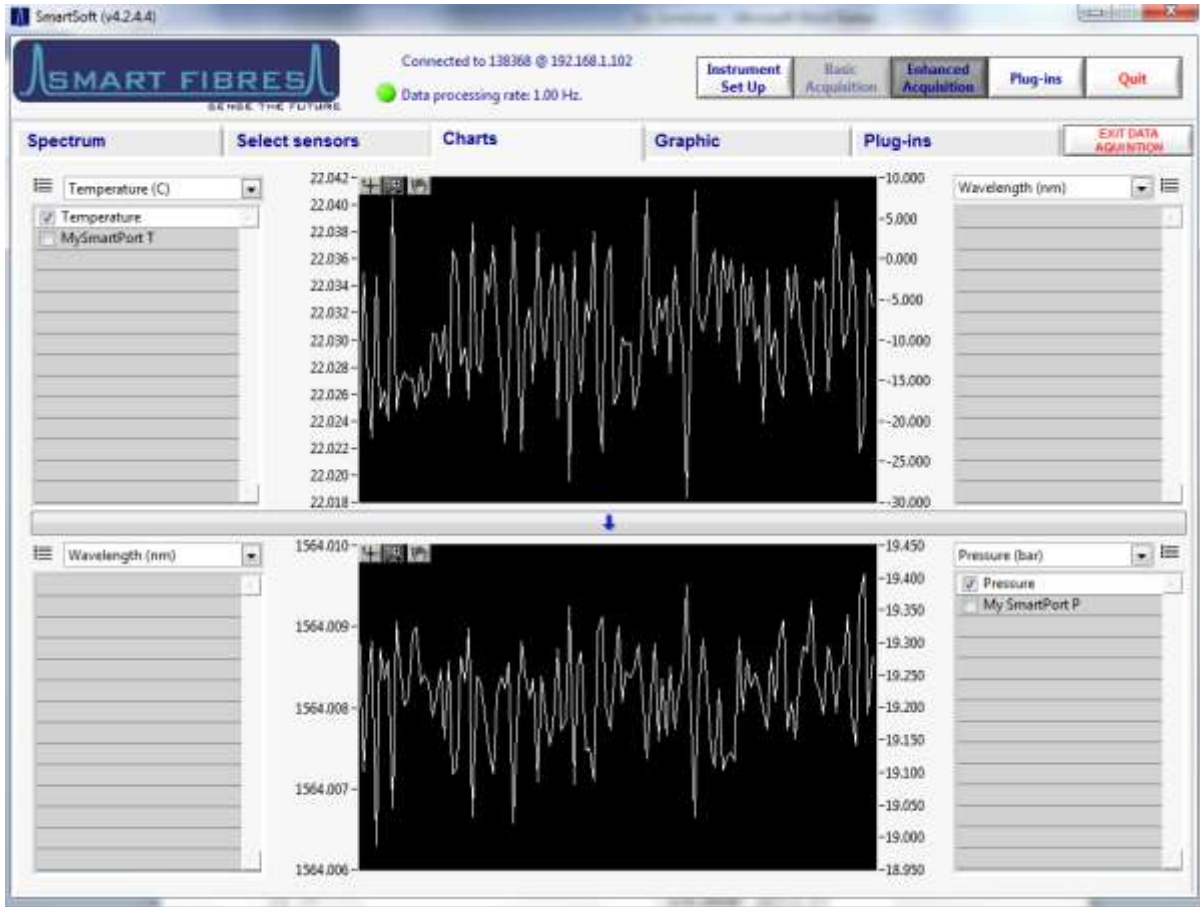
The user may set the number of Lines per file, so that each file then becomes a fixed size, when the current file is full a new file is automatically created and logging continues without interruption. The time period of each file will be set by the lines per file control and the Data processing rate, so at 5 Hz 18000 lines per file will create a new file every 3600 seconds, so every hour.

The user may customise the prefix of the file name or define a postfix. In the default case shown above each new file will be prefixed with a data and time stamp, of the form YYYYmmdd-HHMMSS, e.g. 20160108-123306. The filename specified in the Log file box defines the remainder of the file name.


Once the Log settings have been completed ensure the Log Time is set to 0 for indefinite logging and press the Log button. Files will be created sequentially as shown in the example below.



## 4.4 ENHANCED ACQUISITION – CHARTS



By default two charts are shown, each with dual y-axes. All the sensors present in the Sensor table are available for adding to the charts, this is achieved by selecting the tick box next to each sensor. The dropdown menu controls at the top of each list are used to select the sensor type (and units) for each y-axis, all the sensors in the Sensor table of that type then appear in the list below the Sensor Type menu control. It is not possible to add mixed sensor types to the same y-axis so make use of both graphs and left and right y-axes if multiple sensor types are to be displayed simultaneously. If more than one sensor is selected on a graph then each trace takes a different colour.

The chart can be expanded by hiding one of the y-axes using the hide axis button  next to the Sensor Type selector. The entire lower chart can also be hidden by pressing the down arrow button between the upper and lower charts, whereby the upper chart expands to fill the whole tab.

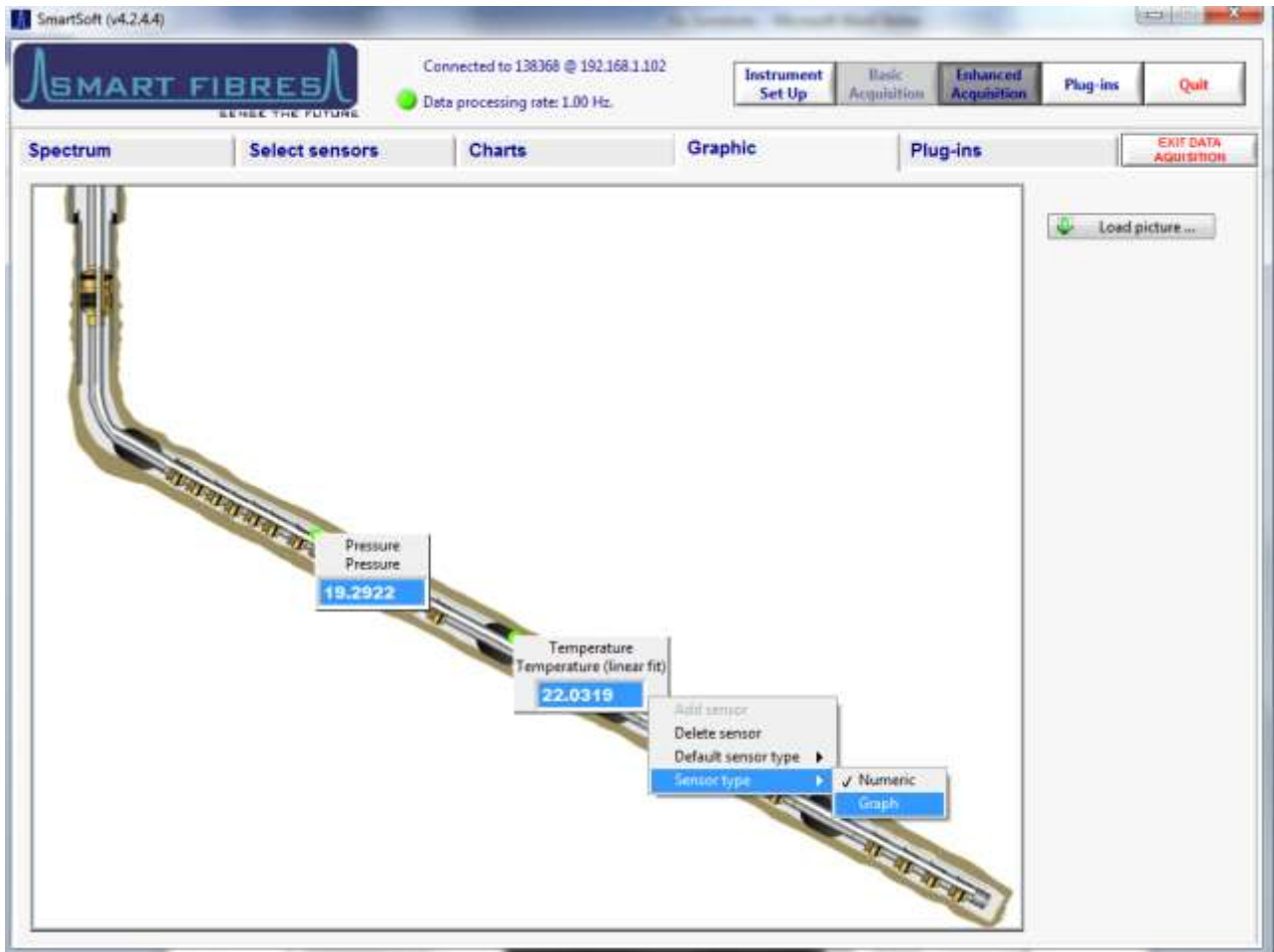
The y-axes of the charts auto-scaled by default but by right clicking on the charts the user may disable auto-scaling and may then edit the maximum and minimum y-axis limits to display the desired amplitude range.

The x-axis represents time. The chart will display the latest 512 samples, so the time span of the graph data depends upon the Data processing rate, at 5 Hz the graph displays just over 100 seconds of data.

An image of the chart can be exported to the clipboard or saved to a file by right clicking on the graph and selecting “Export simplified image...”.



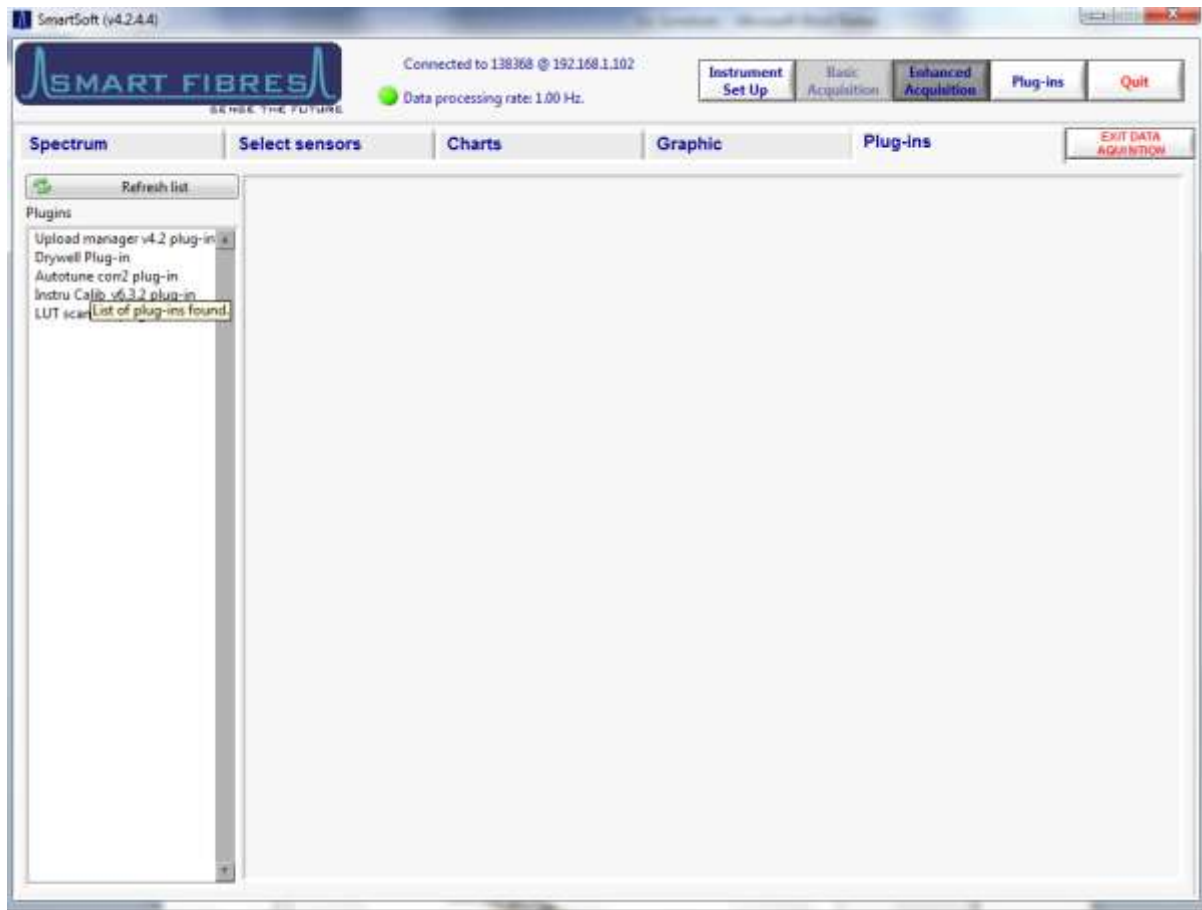
## 4.5 ENHANCED ACQUISITION – GRAPHIC



On the graphic tab the user may load a photograph or diagram of the structure being monitored. The file must be in JPG format and 800 x 600 pixels in size. Some example pictures are installed with the application and are located in the common application data directory e.g. “C:\ProgramData\Smart Fibres\SmartSoftv4.2I\Graphics”. The location of the common application data folder is dependent on your version of Windows, the file path above is for Windows 7.

By right clicking on the graphic the user may add sensors from the sensor table and display their current values in numeric or mini-graph form. By right clicking on an existing sensor it may be deleted or the type can be changed between Numeric and Graph.

## 4.6 ENHANCED ACQUISITION – PLUG-INS



The plug-ins tab is used for running additional functions from LabVIEW source code, these can be written by the end user to increase and customise the functionality of the SmartSoft user interface. Details on how to write plug-ins can be obtained on request from Smart Fibres.

The list of available Plug-ins is shown in the left hand column, select the desired Plug-in and its front panel will open in the panel space to the right of the Plug-in list.

## 4.7 ENHANCED ACQUISITION – EXIT DATA ACQUISITION

Press “Exit Data Acquisition” to leave this area of the application.

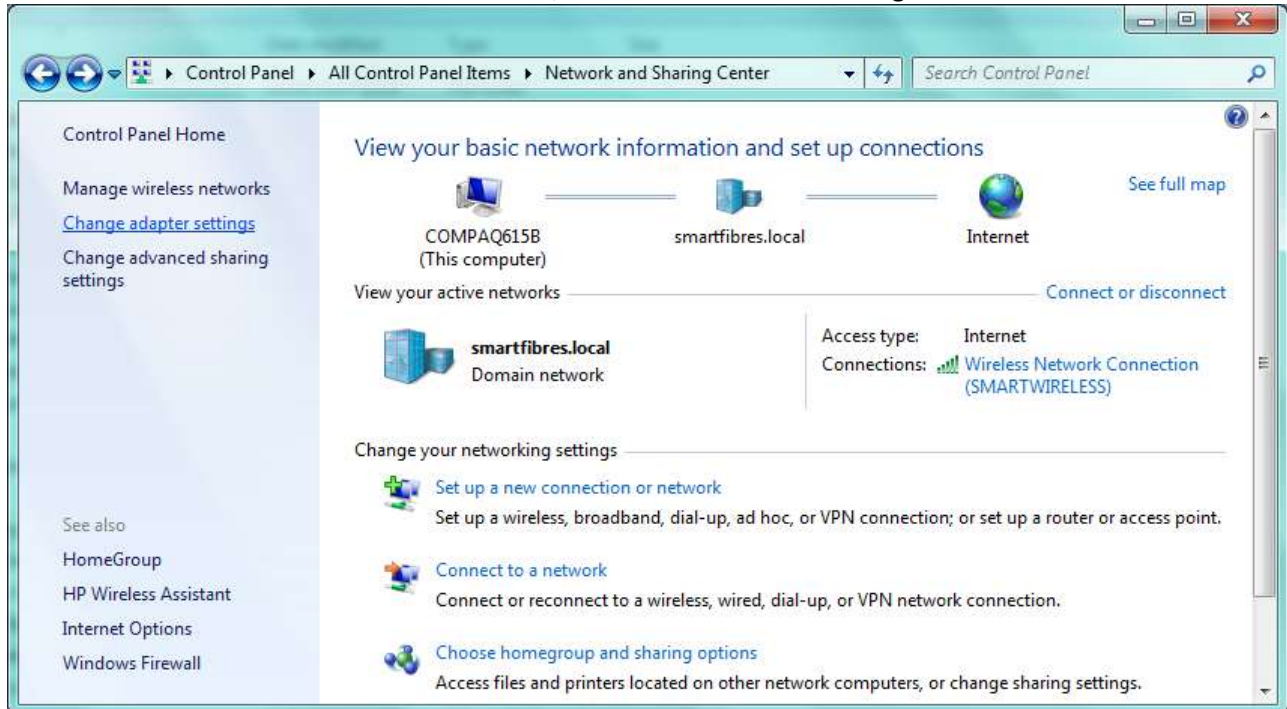


## 5 APPENDICES

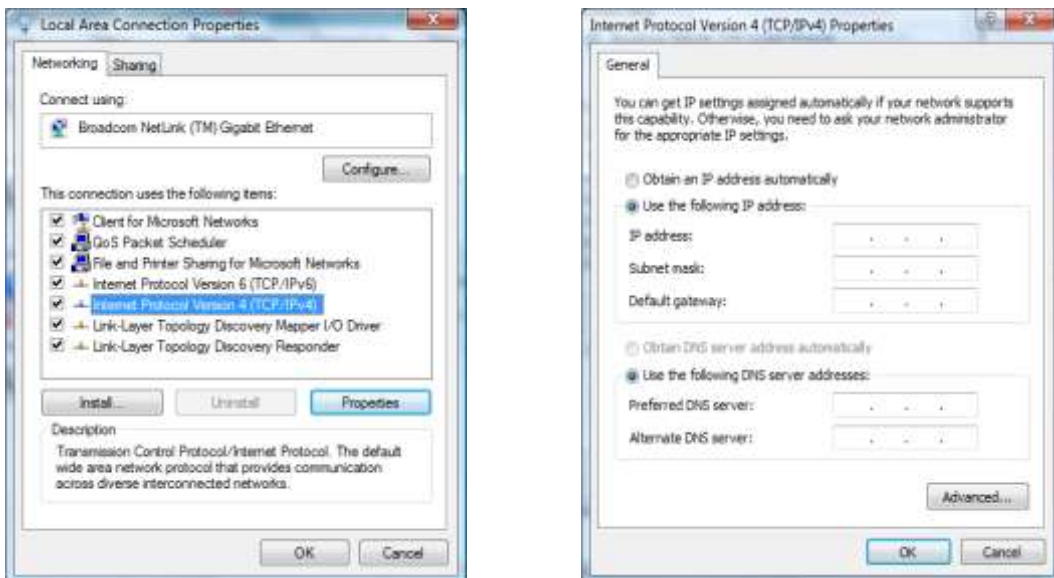
### 5.1 SETTING IP ADDRESS OF HOST PC

#### 5.1.1 Windows 7

Click on the Start Bar and select Control Panel, select “Network and Sharing Centre”.



Select “Change adapter settings”, Right Click on the Local Area Connection and select “Properties”

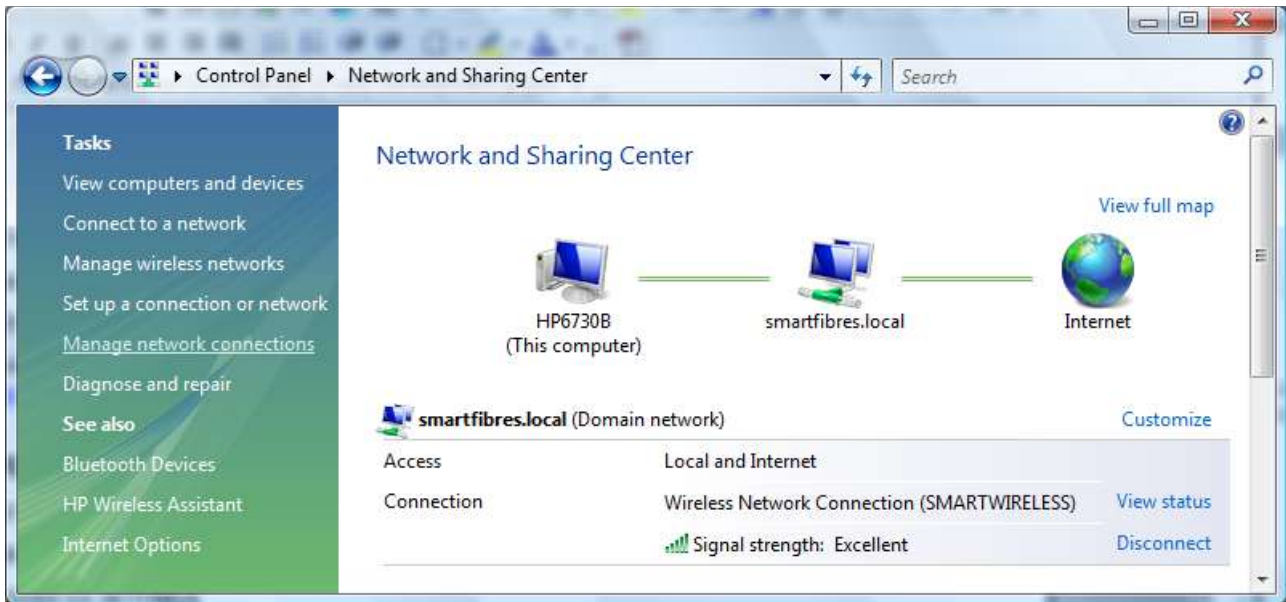


Select “Internet Protocol Version 4” and click the “Properties” button. Select “Use the following IP address” and enter the desired IP address and Subnet Mask to suit the interrogator. Click OK to save settings.

After using SmartSoft, to reconnect to a Local Area Network select “Obtain an IP address automatically”.

## 5.1.2 Windows Vista

Click on the Start Bar and select Control Panel, select “Network and Sharing Centre”.



Select “Manage Network connections”, Right Click on the Local Area Connection and select “Properties”



Select “Internet Protocol Version 4” and click the “Properties” button. Select “Use the following IP address” and enter the desired IP address and Subnet Mask to suit the interrogator. Click OK to save settings.

After using SmartSoft, to reconnect to a Local Area Network select “Obtain an IP address automatically”.

### 5.1.3 Windows XP

On a Windows XP machine, click on the Start Bar and select “Control Panel.” Click on the icon entitled “Network Connections” to open. When open, highlight the “Local Area Network” selection, right click, and choose “Properties”.



Highlight the “Internet Protocol (TCP/IP)” entry and click “Properties”. You will then have access to change the IP address and Subnet mask to suit the interrogator. Click “OK” to save settings.

After using SmartSoft, to reconnect to a Local Area Network select “Obtain an IP address automatically”.

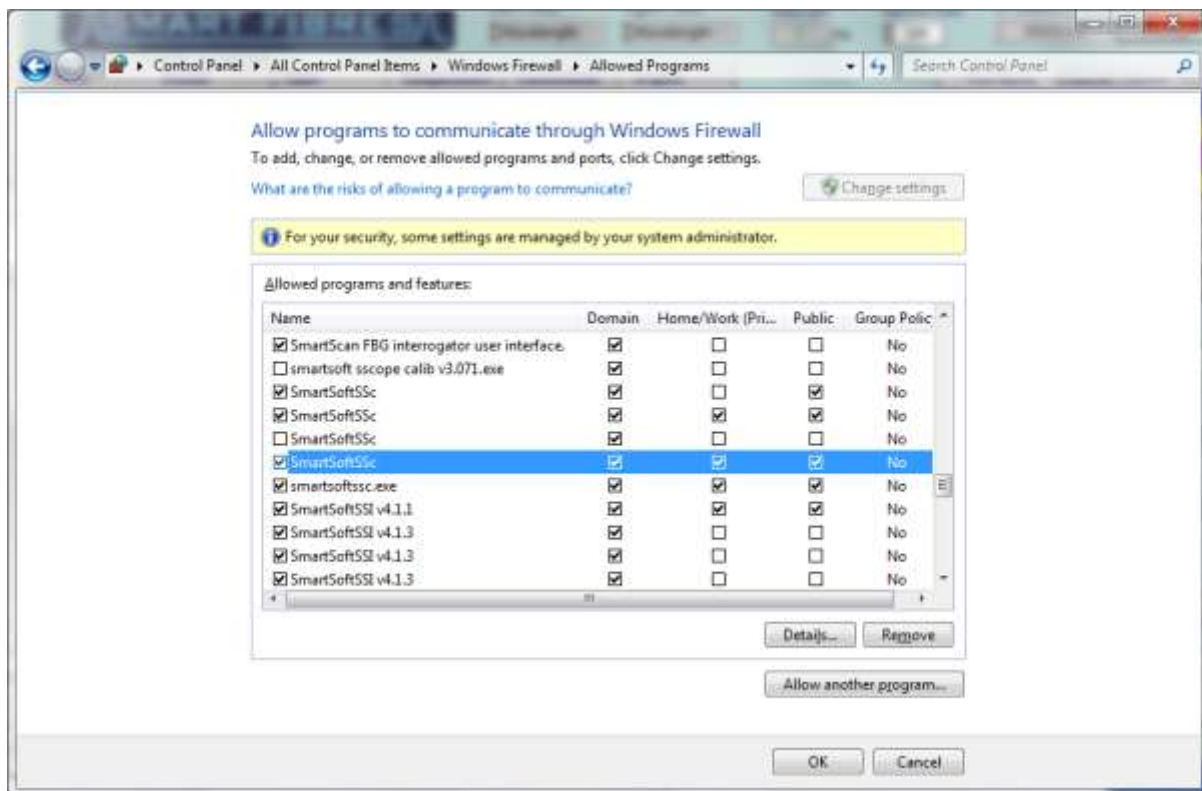
## 5.2 SETTING WINDOWS 7 FIREWALL

When SmartSoft is run for the first time the Windows Firewall requests the user's permission to allow the program to through the firewall. On the pop up Window there are three domains to choose, each with a check box. By default only one of these is checked but you must allow SmartSoft to run on both Private and Public domains otherwise data from the interrogator will not reach SmartSoft.

If the firewall has not been set correctly SmartSoft may not receive any Spectra data, so graphs where spectral traces should appear will be blank.

If you missed the opportunity to configure the Firewall when SmartSoft was ran for the first time then you will need to open the Windows Firewall to change the settings.

- Navigate to the Firewall's list of allowed programs as shown below.
- Click the "Change settings" button (you will need local administrator rights to do this).
- Find the entry for SmartSoft, if you have installed multiple versions of SmartSoft there will be one entry per version.
- For the version of SmartSoft that you wish to use check the boxes for Home/Work (Private) and Public. Then press OK and close the Firewall.



For reference SmartSoft uses UDP ports 30001 to 30003, 30070 to 30072 and 30075.

### 5.3 USING SMARTSOFT ON A .LOCAL DOMAIN

SmartSoft is written in the LabVIEW programming language developed by National Instruments.

Installing SmartSoft requires a National Instruments utility program call the Run-time Engine to be installed. We are aware of an issue which can affect the performance of the host PC after installation of the Run-time Engine if it is connected to a Windows domain with a .local suffix.

The issue causes the host PC to take much longer to start Windows after login credentials have been entered.

National Instruments have written a patch to resolve the issue, which can be found here: <http://digital.ni.com/public.nsf/allkb/814FEF952915137686257B6B006C5F4F?OpenDocument> along with more details of the issue.

If you think you may be affected by the issue please download the patch, this creates a file called `disable_nsp.bat`, to run the file right click and select “Run as Administrator”.

Note, you may need to run the file again if you update any National Instruments software installed on the host PC.