

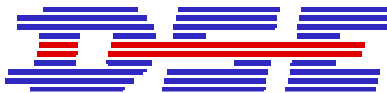
# **ODS-Explorer.exe** Reference Manual

**ODS *NEW* Black-Line Select -2 & -10**

**ODS Red-Line Select-1, -2, & -10**

**ODS Grey-Line Select-2 & -10**

**(1, 2, 5 and 10 kHz sensors)**



**Danish Sensor Engineering**  
**Columbusvej 3 • Søborg • Denmark**

## ODS Explorer.exe software Reference Manual

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5<sup>TH</sup> Edition, March 2017.

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### NOTE:

In the **Operator's Manual** read chapters **CAUTION about Laser Safety & INTALLATION about Correct Grounding** and make all connections to the sensor before applying power.

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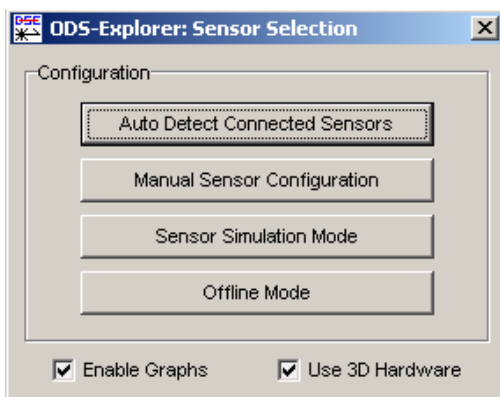
### GENERAL INFORMATION ABOUT ODS-Explorer

#### Main Application Window

The main application window consists of three tabs, selectable by the corresponding buttons, located just below the window title, but an ODS Explorer measuring or analysis session starts with Sensor-Selection.

#### Sensor-Selection

This window is shown automatically at program start and can be shown manually by clicking the "Configurations" button in the "Online Data Capture & Display" tab. Initially the "Configuration" page will be shown, with a number of buttons for the various program-modes, as described below:



#### Auto Detect Connected Sensors

Clicking this button will initiate a search for connected sensors on all available COM ports, which may take anywhere from a few seconds to half a minute, depending on the number of ports and connected sensors. After finishing the search, the "Detected Sensors" page is shown, with a list of all the sensors found, if any. Otherwise, if no sensors are found, an information-box is shown and the "Configuration" buttons are redisplayed.

To aid with the correct identification of the (possibly multiple) connected sensors, the COM port, Baud rate and telegram size is shown for each detected sensor.

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Double-clicking any sensor in the list, or selecting a sensor and then clicking "OK", will close the "Sensor-Selection" window, and return to the "Online Data Capture & Display" tab in the main program window. Clicking the "Back" button redisplay the "Configuration" buttons.

The program will now have opened the COM port for the selected sensor, and have started receiving measurement-data from the connected sensor.

NOTE: There is a slight chance that an, otherwise correctly connected and powered-up, sensor is not detected. If this happens, doing another search (i.e. by pressing "Auto Detect Connected Sensors" once more) will usually cause the sensor to be detected correctly and displayed in the list.

### Manual Sensor Configuration

Clicking this button will show the "Manual Configuration" page, where settings for COM port, Baud rate, and measurement telegram size can be chosen from the available options.

After selecting the relevant settings, clicking "OK" will close the "Sensor-Selection" window, and return to the "Online Data Capture & Display" tab in the main program window.

The program will now have opened the selected COM port, and have started receiving measurement-data from the connected sensor (assuming one is present and powered up on the selected port, and that the Baud rate and telegram size settings were otherwise correctly chosen for the particular sensor model).

NOTE: The list of COM ports will only show "available" ports (which is to say that any ports currently in use, such as by a mouse or other, currently active, serial-devices, will NOT occur in this list.

### Sensor Simulation Mode

Clicking this button will show the "Sensor Simulation" page, where a "Data Source" (simulation-file) and the "Data Rate" (measurements per second) can be chosen.

After selecting the relevant settings, clicking "OK" will close the "Sensor-Selection" window, and return to the "Online Data Capture & Display" tab in the main program window. The program will now have opened the selected simulation-file, and have started displaying the measurement-data it contains.

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NOTE: The contents of the "Data Source" list is built from the files found in the "simulations" folder, which must be a sub-folder of the "current folder" (the folder in which DSE-Explorer.exe is located). If this folder is either not present, or contains no files with the extension ".SIM", the list will be empty and it will NOT be possible to use the program in "Simulation Mode". Simulation files are made by SAVING measurement data from an ODS sensor using the ODS-Explorer program. Alternatively a suitable file can be made manually using a text editor/program capable of producing ASCII files (such as Excel). The file-extension must be renamed to .SIM, and placed in a folder called "simulations" situated in the folder that contains the ODS-Explorer.exe program.

### Offline Mode

Clicking this button will close the "Sensor-Selection" window, and return immediately to the "Offline Analysis & Display" tab in the main program window.

The program will now be working in "Offline Mode", without opening a COM port or simulation-file. Only offline functionality will be available, and the "Online Data Capture & Display" tab will contain no useful information. The features in the "Offline Analysis & Display" and "Offline Graphical Display" tabs will still be accessible, and can be used to display and modify previously saved measurement-files.

### Enable Graphs & Use 3D Hardware checkboxes

These are found at the very bottom of the "Sensor-Selection" window, and should not have to be changed under normal circumstances. Only in case of problems with the OpenGL graphics, should these be used as a means of resolving such issues. However, before resorting to using these checkboxes, please ensure that the most current display- and OpenGL-drivers have been installed on the PC. If possible, verify their correct functionality by running some other OpenGL application, preferably some kind of test-application capable of indicating if the 3D hardware is indeed being used to render the OpenGL graphics and of exposing possible "issues" with the currently installed drivers and OpenGL configuration in general. In addition, some minor problems, such as graphical artifacts, or poor visual quality in the graphs, can be solved by ensuring correct OpenGL settings (typically accessed through the "Display" settings, available through the Control-Panel). In order to achieve best performance and visual quality with most OpenGL implementations, "OpenGL Anti-Aliasing" should be disabled, while "V.Sync." and "Triple-Buffering" should be enabled, although the available settings and their impact on the graphs in DSE-Explorer may vary between different display adaptors and their 3D hardware implementations.

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### Enable Graphs

Uncheck to completely disable the use of OpenGL graphics, in which case both the "On-Line Graph" in the "Online Data Capture & Display" tab and the "Offline-Graph" in the "Offline Graphical Display" tab will be disabled.

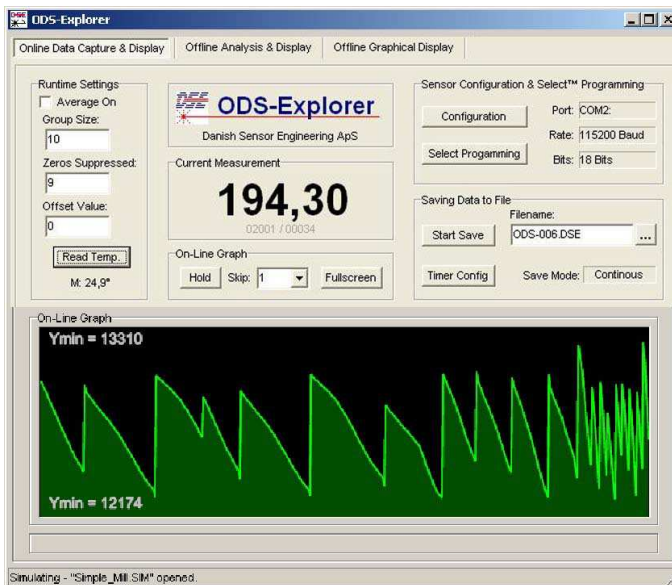
### Use 3D Hardware

Uncheck to resolve issues with faulty OpenGL drivers, which might cause the graphs to display incorrectly or not at all. When unchecked, the graphs will try to use the software implementation of OpenGL instead, there is no guarantee that this will actually improve quality or performance.

NOTE: These checkboxes can only be changed when the "Sensor-Selection" window is displayed for the first time (i.e. during program start), after which they will appear greyed. To re-enable the checkboxes, restart the program.

### Online Data Capture & Display

This tab contains settings, graphs and readouts relating to the real-time functionality of the application and connected sensor.



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### Runtime Settings

This panel offers various runtime modifications that can be applied to the incoming measurement data by this program (as opposed to by the sensor).

A decimal point can be edited in the "Current Measurement" field by clicking the left mouse button, in order to change the integer output from the sensor to a correct decimal distance.

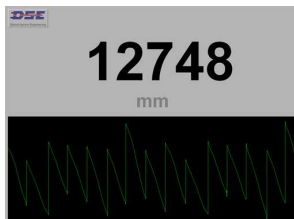
By checking "Average On", an average similar to the "Group Mode Averaging" implemented in Select-X capable sensors will be applied to all incoming measurements (before these are displayed, graphed or saved to file) by the application. The "Group Size" and "Zero Supp." parameters correspond to their Select-X counterparts (number of measurements to include in the average calculations respectively the maximum number of zero-measurements that will be suppressed from the calculation).

The "Offset Value" parameter, when differing from zero, will apply a simple offset to the incoming measurements. Both positive and negative values are allowed. Note: Take care to avoid large negative offsets that will cause the effective measurement range to reach low, single-digit (or even negative) numbers, as this may affect the proper function of various aspects of the application, involving the detection of zero-measurements and light-intensity codes.

Sensors that provide Reading of internal Temperatures will result in a "Read Temp." button. Pressing this button will show the temperature inside the sensor in 1/10 of a degree Celsius. This is done by replacing a single standard displacement reading.

### Fullscreen

Clicking this button will activate the full-screen mode, intended for demonstration purposes, or where a large numerical and/or graphical readout is needed.



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While full-screen mode is active, clicking the mouse button or pressing the "ESC" key will exit full-screen mode and return to the main application window. The following (case-insensitive) configuration keys are also recognized (refer to the "On-Line Graph" section for further explanation of these configuration options):

G: "Graph Size" - Changes the graph-size (none -> small -> half -> full -> none).

A: "Antialias" - Enables/disables anti-aliasing.

I: "Inverted" - Inverts the Y-axis.

B: "Labels" - Toggles the display of labels (Y-axis range).

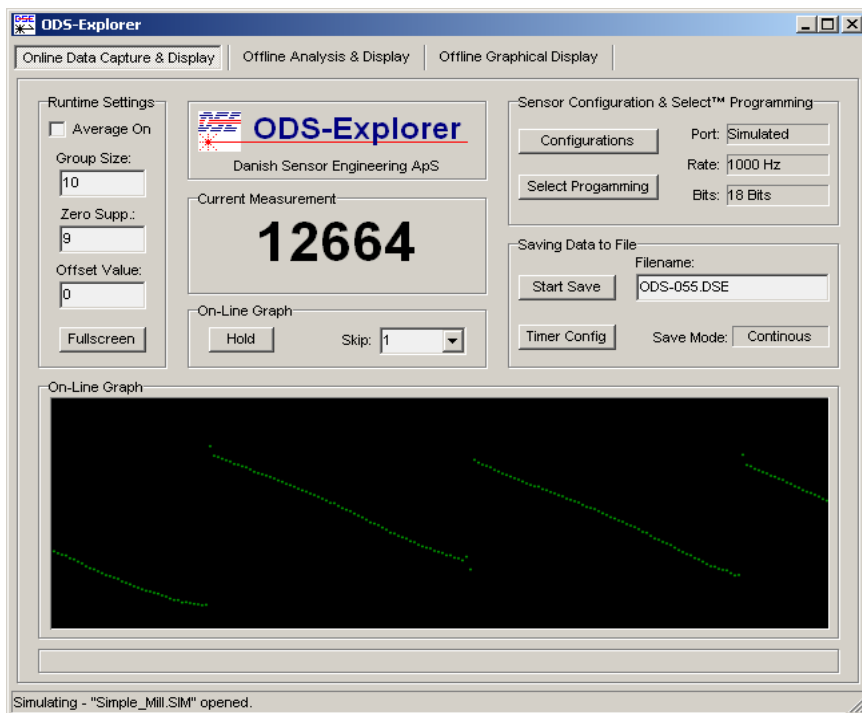
F: "Filled" - Toggles filling of the area below the measurements.

L: "Lines" - Toggles between separate dots and connected lines.

W: "Wide" - Toggles between wide and narrow lines / small and big dots.

C: "Clear" - Clears the graph and resets the Y-axis range.

+/-: Increases/decreases the graph "speed" (corresponds to the "Skip" setting discussed in the "On-Line Graph" section).



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NOTE: "Graph Size" is not discussed further in the "On-Line Graph" section, since this setting is only relevant for the full-screen mode graph. The functionality of the +/- keys will decrease/increase the "Skip" setting, as discussed in the "On-Line Graph" section, however, notice the inverse relationship between these keys and the changes to the "Skip" setting: Pressing + will decrease "Skip", causing the graph to speed up, and conversely for the - key. The skip setting and all the toggles are shared between the full-screen graph and the "On-Line Graph", and are thus retained when switching between full-screen mode and normal operation, however the "Graph Size" setting is reset each time full-screen mode is activated (i.e. the full-screen graph will always be hidden upon entering this mode).

### On-Line Graph panel

The "Stop" button allow the graph to be stopped temporarily, the button will then change to "Run", another click will make the graph resume operation. This will not affect other parts of the application, including the numerical measurement readout.

The skip dropdown can be used to slow down the graph, by only displaying every n'th measurement. Thus if skip is set to "2", only every other measurement will be shown in the graph, effectively halving the scroll-speed of the graph. Aside from the predefined choices in the dropdown, any number between 1 and 1000 can be entered manually. This setting is also affected by the +/- keys when in full-screen mode.

### On-Line Graph

Clicking the graph will reset the Y-axis auto-ranging feature, causing the graph to be "zoom in", until the measurements makes the auto-ranging zoom out again, as necessary to ensure all measurements are visible

NOTE: The auto-ranging feature never zooms in (automatically) once it has zoomed out to a given range. This to prevent the Y-axis range from changing too often, once a reasonable range has been established by the auto-ranging algorithm.

### On-Line Graph context-menu

If the "On-Line Graph" is right-clicked, a small menu is shown, providing a number of display options, as follows:

- "Inverted" swaps the Y-axis of the graph, effectively turning the graph upside-down.

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- "Antialias" enables anti-aliasing of lines and dots (Note: the textual labels are always anti-aliased to ensure readability).
- "Labels" show the Y-axis range labels.
- "Filled" cause the area below (above, if inverted) the measurements to be filled.
- "Lines" show connected line-segments instead of separate dots.
- "Wide" will make the dots or lines larger.

### Sensor Configuration & Select™ Programming panel

Clicking the "Configurations" button will show the "Sensor Selection" window, used to choose the operational mode of the ODS-Explorer application. Please refer to the section about the "Sensor Selection" window above for further information.

Clicking the "Select Programming" button will cause the application to read the current Select settings from the connected sensor and, if successful, show the "Select Configuration" dialog. If no Select capable sensor is connected, or another problem occurred when reading the settings, an error-dialog is shown.

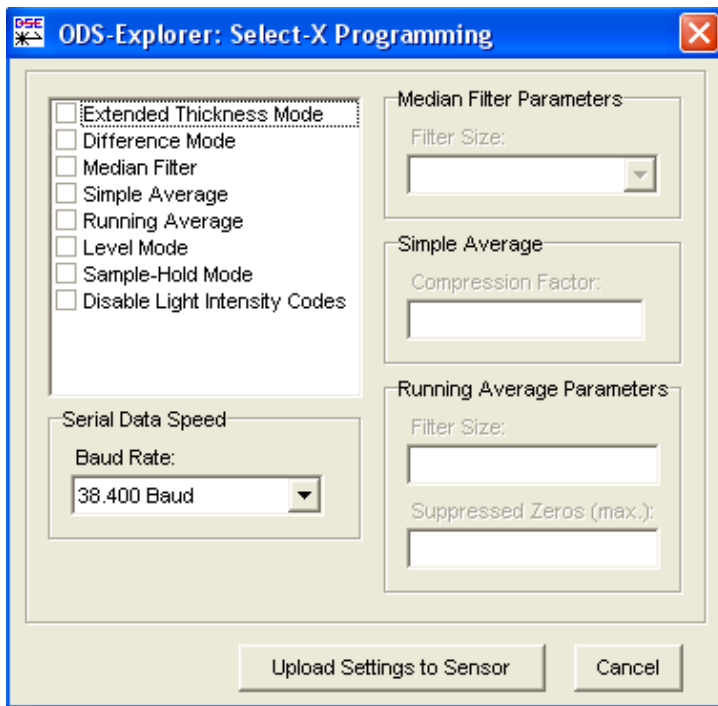
The "Port", "Rate" and "Bits" boxes show the configuration for the currently active sensor, consisting of the COM port opened, the Baud rate (measurement rate if in "Simulation Mode") and the telegram size (bits per measurement).

### Select Programming

In this dialog, several settings, pertaining to the operational mode of the connected sensor, are shown. When the dialog is shown, these settings will reflect the current Select settings in the sensor. After changing the settings as wanted, click the "Upload Settings to Sensor" button to store and verify the settings in the sensor, after which a dialog indicating success of failure is shown. Clicking "Cancel" will exit the dialog without storing the changes made in the sensor.

(Note: Please refer to the hardware manual for further information about the Select Filters and Settings available for your sensor model.)

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### Saving Data to File panel

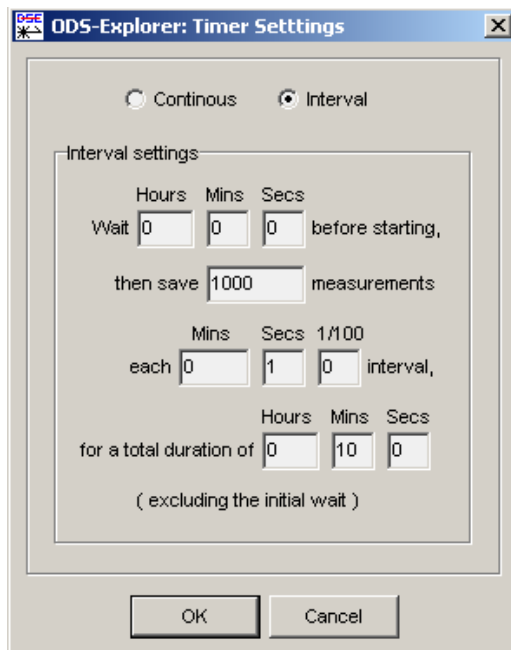
This panel is used to save measurement data to a file. The files produced are simple ASCII (plain-text) files with a single measurement (an integer reflecting the nominal resolution of the sensor), written as a numerical string, per line.

Any valid Windows filename can be entered in the "Filename" box. If an integer number occurs in the filename, the auto-increment logic will attempt to parse the filename and automatically increment the number for each file saved. Files are saved to the "files" sub-folder, if present, otherwise to the current folder (i.e. the folder where ODS-Explorer.exe resides).

- Clicking "Start" will start saving files, the button will change to "Stop" and the status-line will show the number of measurements saved so far. Clicking "Stop" will stop saving data and close the file; the filename will be "incremented" by one (assuming a number is present in the filename).
- Clicking "Timer Config" will show the "Timer Settings" dialog, where the save mode can be configured.

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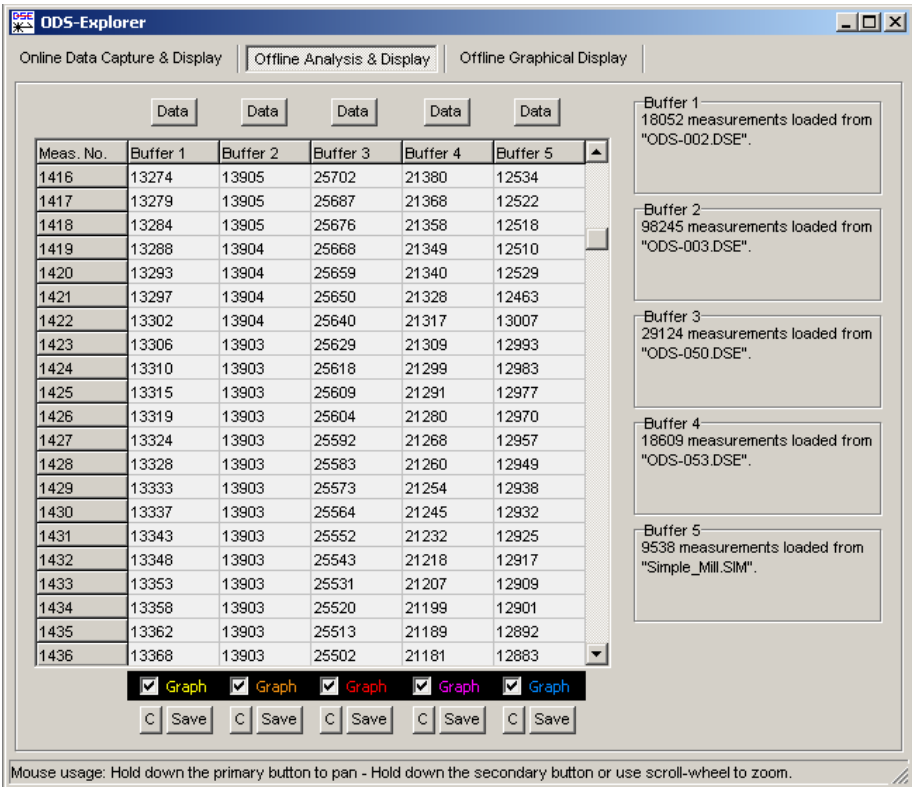
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- Either "Continuous" or "Interval" mode can be chosen. In "Continuous" mode, all measurements are saved continuously until the "Stop" button is clicked manually. No further parameters are available for this mode. In "Interval" mode, measurements are saved in groups of a specified length and with a predefined interval. The settings for "Interval" mode are as follows:
- The first Hours/Mins/Secs setting defines how much time should elapse before the first measurement group is saved.
- Then the number of measurements in each group is entered.
- The second Hours/Mins/Secs setting defines the interval between the groups (including the time taken to save the measurements of each group).
- The third Hours/Mins/Secs setting defines the total duration of the Interval save operation, excluding the initial wait.
- Clicking "OK" will store the new settings. Clicking "Cancel" will discard any changes.
- The "Save Mode" box will show which mode is currently chosen. The text will blink green when saving and red when waiting (interval mode only).

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### Offline Analysis & Display



In this tab previously saved data can be analysed and modified, either to be saved to file again or in preparation for viewing and inspection in the "Offline Graphical Display" tab.

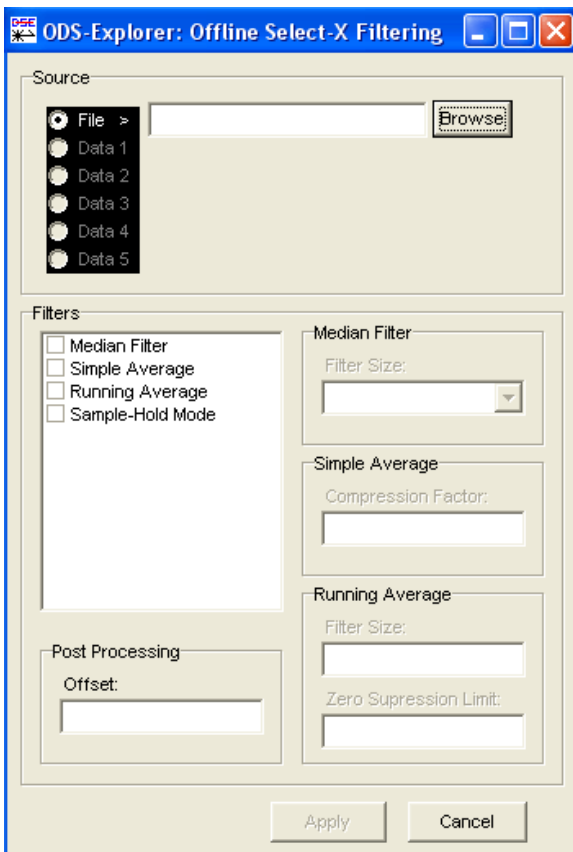
The data from the last save to file operation, if any, will be automatically displayed in the first column, titled "Buffer 1", assuming this buffer was previously empty. Note: The data-grid columns will show the first 10,000 measurements in the buffer. This limit applies ONLY to the data-grid. Data operations and manipulations will involve ALL the measurements present in the buffer. Likewise all the data will be present in the offline graph. New data can be loaded into any of the five available analysis buffers (titled "Buffer 1" through "Buffer 5"), by clicking the corresponding "Data" button. This will overwrite any existing data in the buffer. When clicking this button, the "Data Manipulation Wizard" will be shown, with which a number of data manipulations can be performed.

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### Offline Select-X Filtering

On the "Source" page, the data source for the measurements to be loaded is chosen, this can either be one of the five analysis buffers (assuming at least one of these have previously been loaded with data) Data 1 to Data 5, or a previously saved data file.



- Click "Browse" to show a Load dialog, allowing easy selection of data files, or enter a filename manually in the box.
- Click "Load" to load the selected data source into the analysis buffer and return to the main application window.
- Click one of the Data buffers to copy data from this buffer instead.
- Click "Copy" to load the selected data source into the analysis buffer and return to the main application window.

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- Clicking "Cancel" anytime during the process, will exit without modifying the analysis buffer contents.
- Further mathematical filters can be applied to the data by clicking one or more of the corresponding checkmarks.
- Some of the filters require one or two parameters to be entered as well:
  - "Median Filter" requires a "Group Size", between 3 and 15.
  - "Simple Average" requires a "Compression Factor", between 2 and 200.
  - "Running Average" requires a "Filter Size", between 2 and 1000, and a "Zero Suppression Limit", between 0 and "Filter Size" minus one. "Filter Size" minus one is always recommended.
  - "Sample Hold Mode" does not require any parameters.
- A fixed "Offset" value can be added to all measurements, by entering a positive or negative integer in the "Offset Value" box..
- Any combination of filters and/or an offset can be chosen and applied to the data in a single operation. The filters are applied in the order shown. The offset, if any, will be applied BEFORE the other filters.
- Once filters and suitable parameters have been selected, clicking "Apply" will perform the selected operations on the data and save it to the analysis buffer, before returning to the main application window. The "Apply" button is only enabled if valid parameters have been entered for all selected filters.

The measurements in the analysis buffer columns can be selected and copied to the clipboard, for later insertion into other applications, such as Microsoft Excel or similar.

Note: In case of data sets containing more than 10.000 measurements, please open the data file in a text-editor and copy from there, or import the (plain text) file directly into the application in question.

The "Buffer 1" through "Buffer 5" boxes (to the right of the data-grid) will show the "operation history" (i.e. the source and latest operation(s) performed) for the data in the various buffers. (Note: It may be necessary to expand or maximize the application window, to read the full history texts.)

- Use the coloured "Graph" checkboxes to select which buffers should be shown in the "Offline Graphical Display" tab.
- The "C" button will clear the corresponding analysis buffer.
- The "Save" button will show a save dialog, allowing the data in corresponding buffer to be saved to a file.

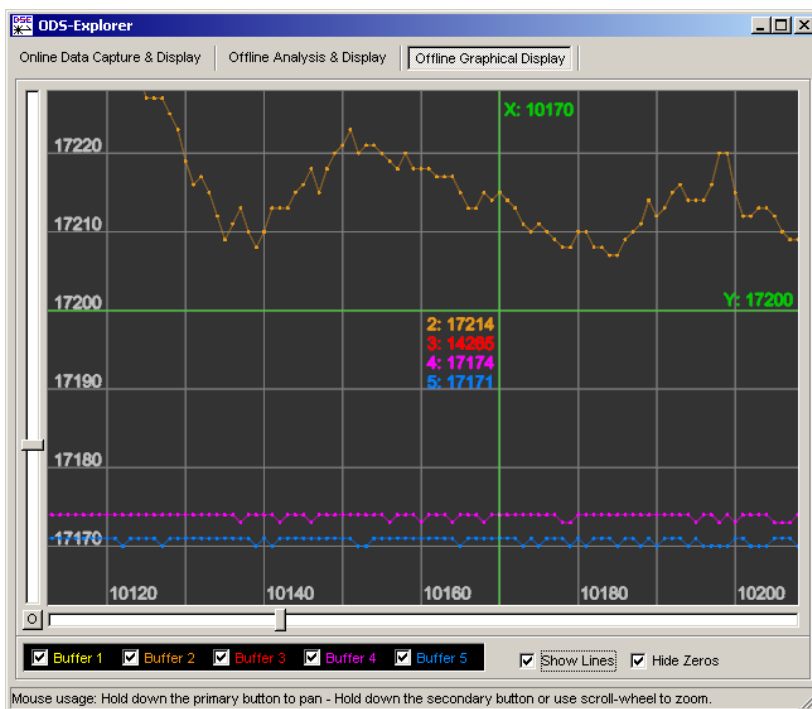
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### Offline Graphical Display

Under this tab a large graph is shown, allowing the different data sets loaded into the five available analysis buffers to be visually inspected and compared.

The graph will show up to five of the analysis buffers, depending on which of these have been selected for display in the graph. The measurement points are shown as individual "dots", with or without interconnecting lines. The grid and axis-legends will follow the graph as it is zoomed and panned with the mouse, while the cross hair will indicate the current coordinate, as well as the values of any (vertically) intersected measurement tracks.

(Note: To obtain an image of the graph, such as for printing, make a Windows screenshot by optionally maximizing the application window and then pressing the [Print Scr] key. This will copy an image of the entire screen on the clipboard, (which can then be pasted into any image-manipulation application, where it can be further cropped or adjusted as necessary, before being sent to a printer or file.)



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The graph can be manipulated as follows:

- The coloured "Buffer 1" through "Buffer 5" checkboxes reflect the similar checkboxes in the "Offline Data Analysis & Display" tab, selecting which of the five buffers are shown in the graph.
- The "Show Lines" checkbox, if enabled, cause the measurement points to be connected with lines.
- The "Hide Zeros" (requires "Show Lines" to be enabled) will hide any lines going to or from any zero (i.e. out-of-range / invalid) measurements.

### Sliders

- The "O" button at the graph origin, resets the zoom level.
- The two sliders along the X and Y axis of the graph, allow these axis to be zoomed individually.

### Mouse

The graph can furthermore be manipulated in a number of ways, using the mouse as follows:

- Hold down the left button while moving the mouse inside the graph, to pan the graph in the X and Y directions. A "Pan" icon will be shown instead of the cross hair.
- Hold down the right button while moving the mouse up and down (Y-axis) inside the graph, to zoom the graph in and out smoothly. A "Zoom" icon will be shown instead of the cross hair.
- Roll the mouse wheel to zoom the graph in and out in small steps.