New Features in ibaPDA v6.32.0

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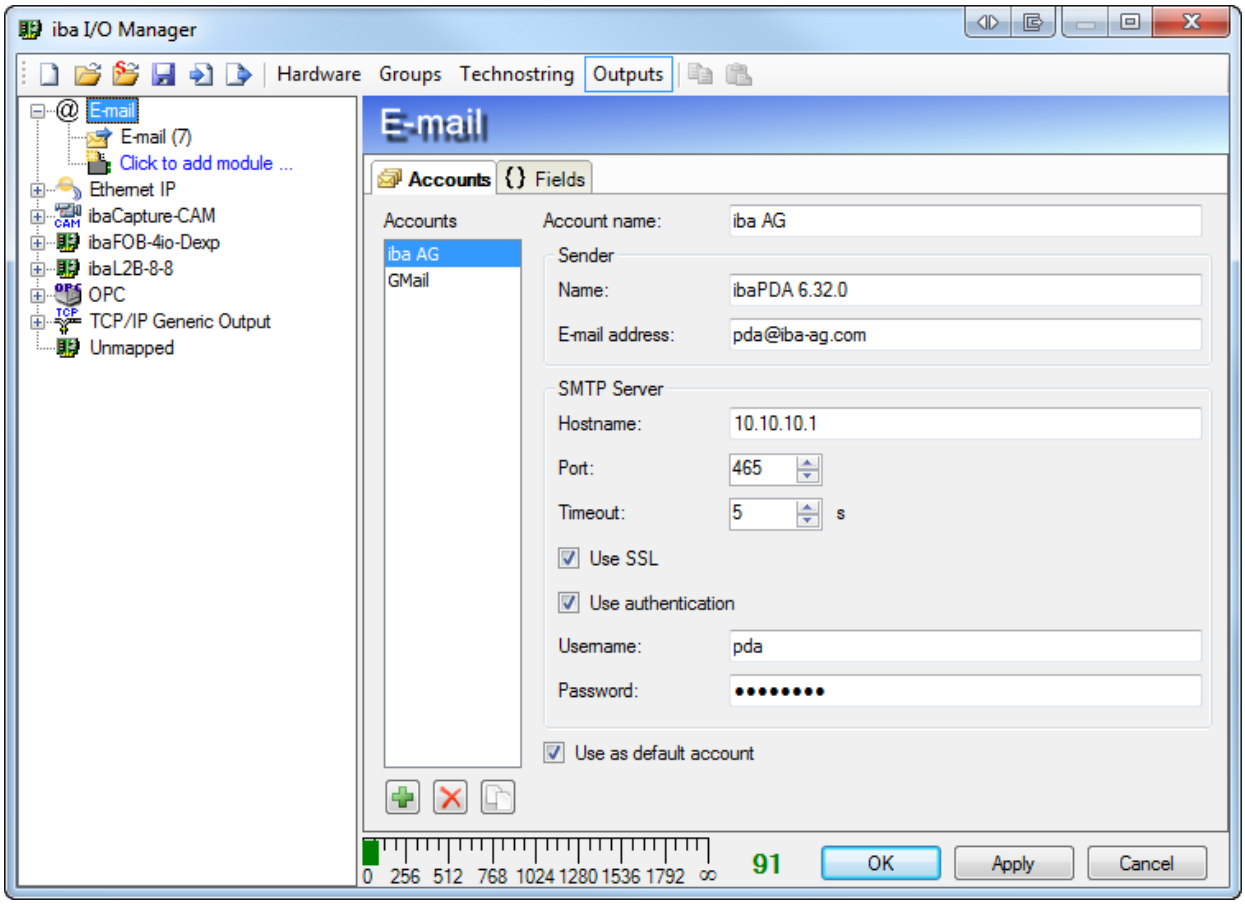
Table of contents

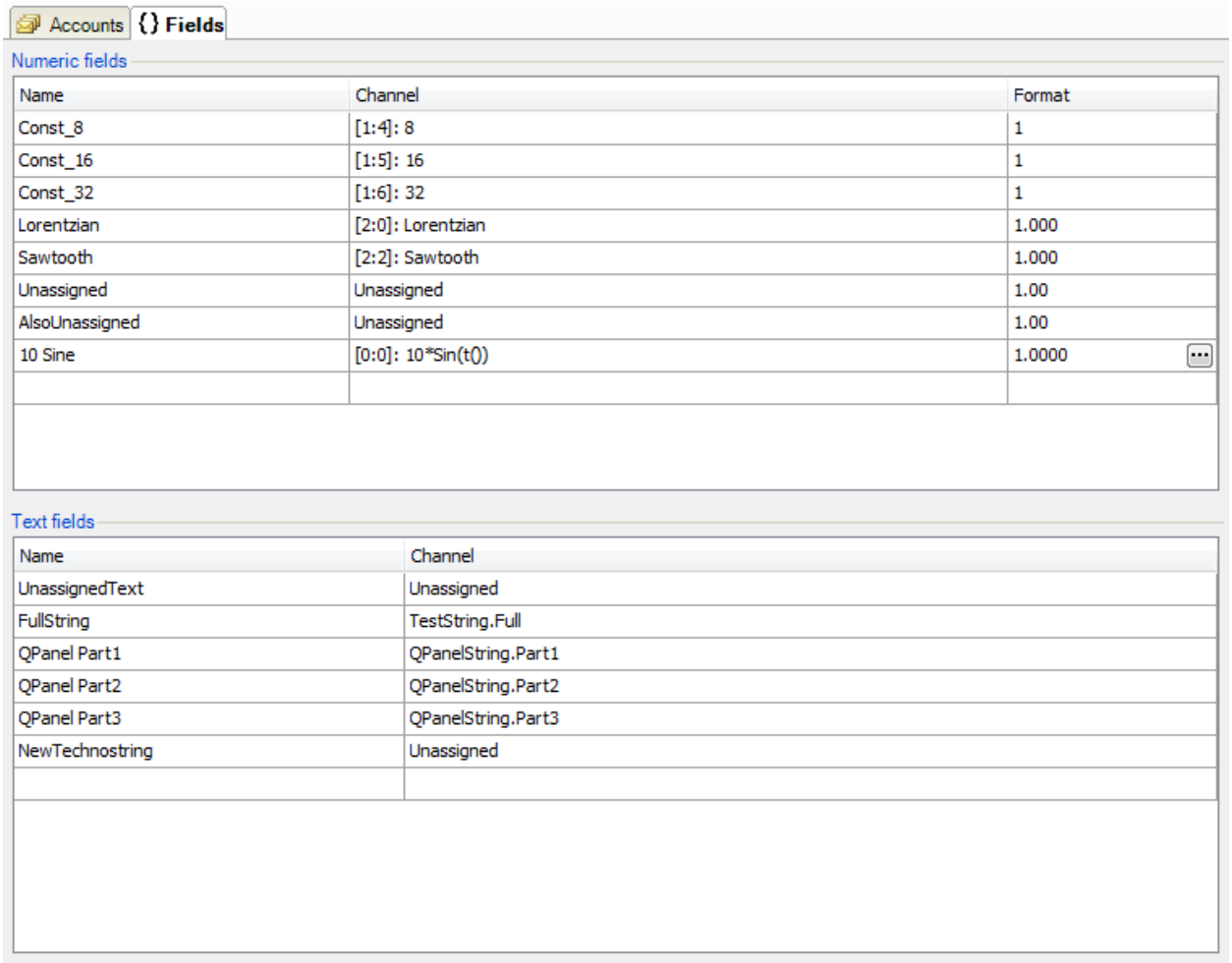
1 E-mail output interface

Using the new e-mail output interface, e-mail messages can be sent when a trigger fires. This allows operators to be automatically notified in case of e.g. an alarm. The e-mail interface requires no additional license and is therefore available for all ibaPDA users.
The e-mail interface can be found in the Outputs tab of the I/O Manager.



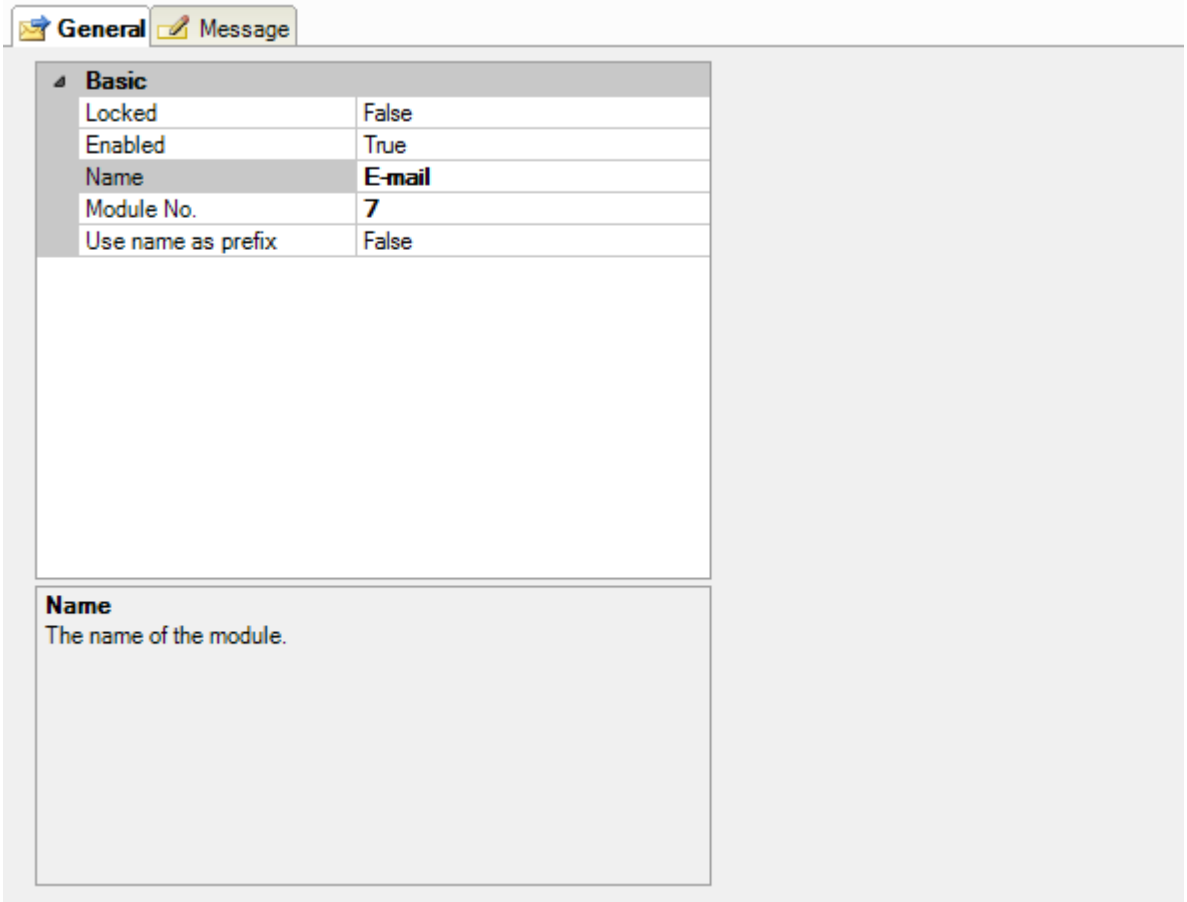
In the interface node, the user has to configure the e-mail accounts that will be used to dispatch e-mails and a number of numeric and text fields that can be used to incorporate signal values in the e-mail message. Each e-mail module corresponds to one e-mail message.

The Accounts tab of the interface node lists all configured e-mail accounts. Using the controls on the right, all standard parameters of an e-mail account can be set. The buttons below the listbox allow the user to add, remove or duplicate e-mail account settings.

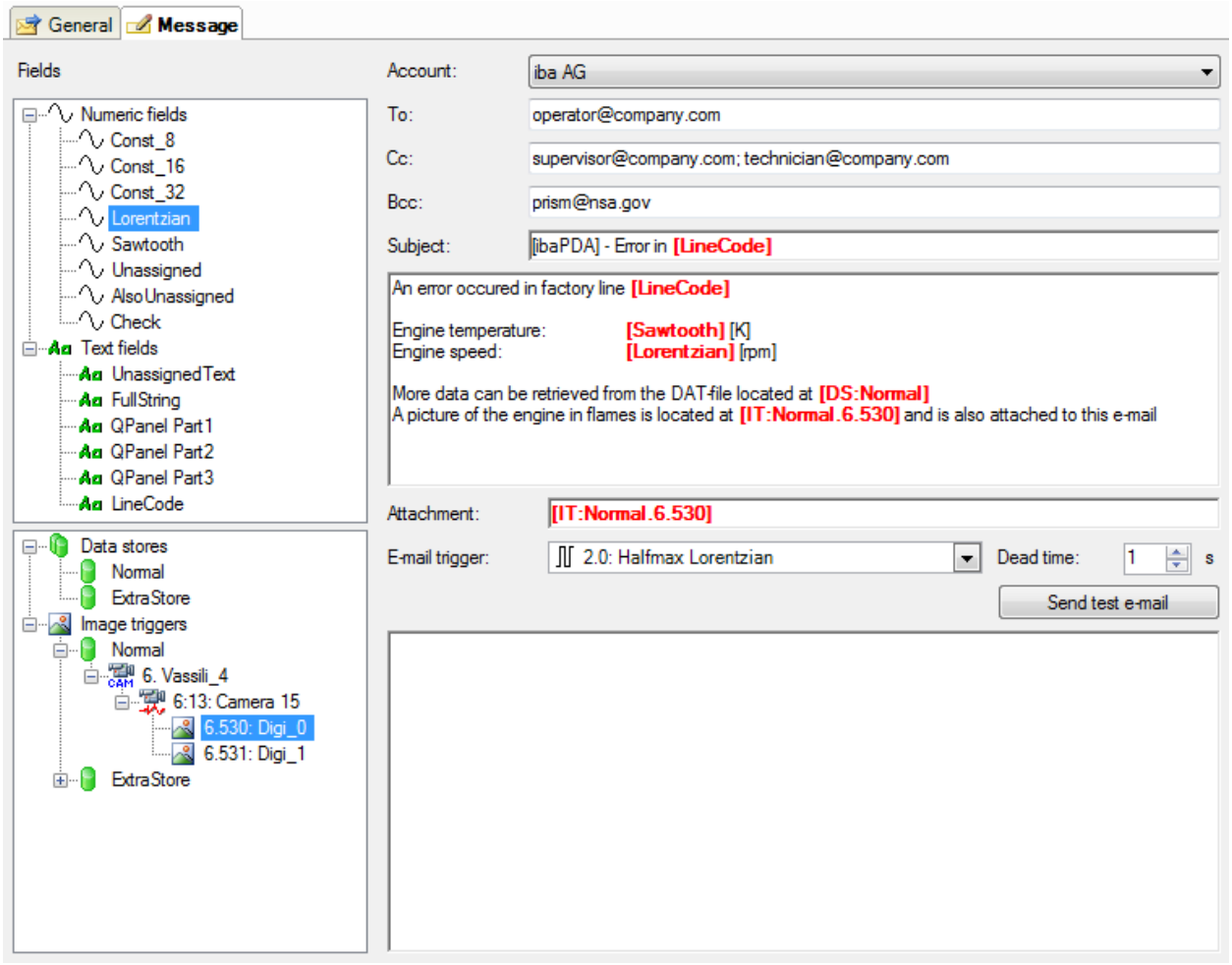


In the Fields tab, placeholders can be defined that can be used in the e-mail messages, similar to how HD events can be configured. Numeric fields can represent the value of standard analog and digital signals while text fields correspond to Technostrings. Field names cannot

- contain square brackets **[** or **]**
- start with **IT:** (these are reserved for image triggers; see later)
- start with **DS:** (these are reserved for data stores; see later)
- carry the same name as an already existing text or numeric field



The General tab of an e-mail module only contains the standard parameters that are common to any module so no specific options can be configured here.



The actual e-mail message can be configured in the Message tab. On the left, the numeric and text fields can be found as defined in the interface node. Below that is a tree structure displaying all data stores and image triggers. These data store and image trigger fields correspond respectively to the path of the most recent DAT-file and image of these triggers.

Apart from the standard fields of an e-mail message, the trigger signal at which an e-mail is sent has to be set as well as a dead time (i.e. the time after a trigger fires during which subsequent triggers are ignored).

The numeric, text and image trigger fields can be incorporated in the subject, body or attachment field of the e-mail message. This can be done either by manually typing the field name in between square brackets, by double clicking a field in the tree (after which it will be inserted at the current cursor's position) or by dragging and dropping a field into one of the text fields. In any case, a valid field will be displayed in bold and in red to indicate that this portion of the text will be replaced by a value.

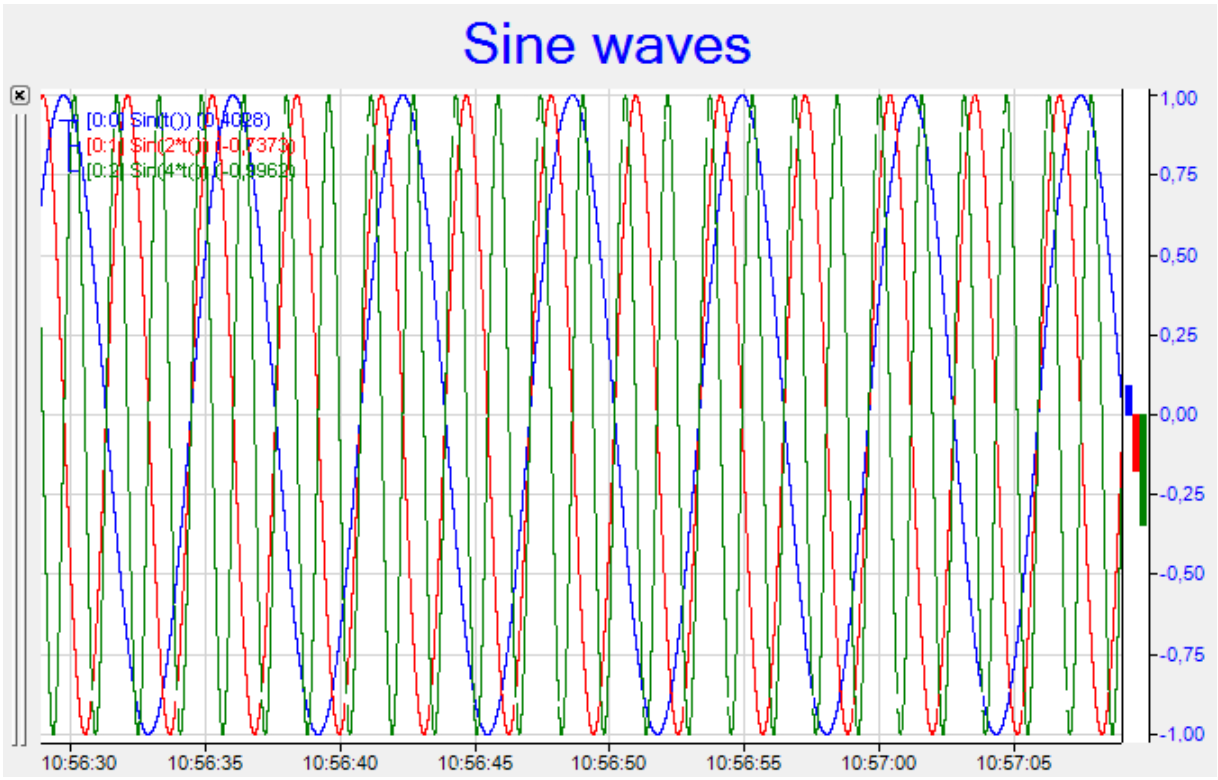
In the attachment field, multiple attachments (separated using a semicolon) can be defined using a valid path. Since an image trigger field, for example, contains a full path, it is straightforward to attach images to e-mail messages. Data store fields are not allowed in the attachment field since these files tend to be relatively large and are often still not closed by ibaPDA when the e-mail is sent.

When a trigger is fired, the fields will be replaced with the signal values at the time the trigger fired and the message will be sent.

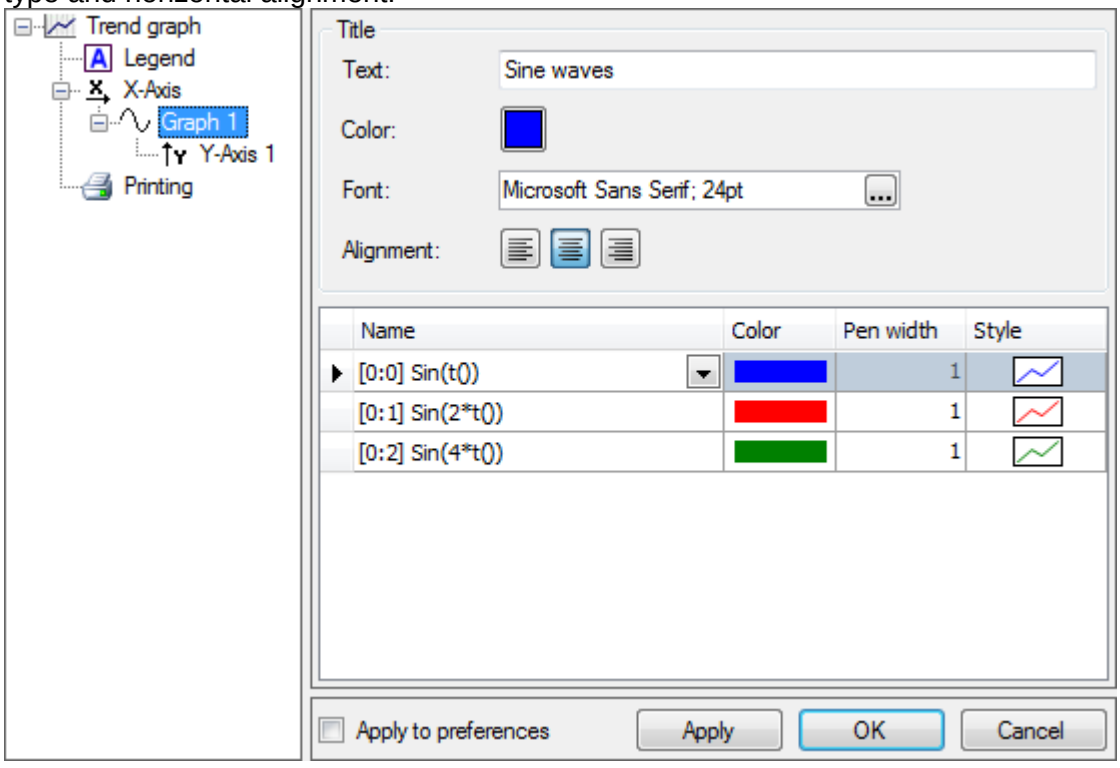
Note that the configuration of an e-mail message can be checked by using the Send test e-mail which will force ibaPDA to send an e-mail, regardless of the trigger status. However, fields will not be replaced by their corresponding signal values and will be sent as plain text. It is therefore also possible to send a test e-mail when acquisition is not running.

2 Trend graph title

There is a possibility to define a title above each (HD) trend graph.



To configure this title, new controls have been added to the Graph node of the properties dialog of a trend graph. Apart from the actual text, it is also possible to configure the font color, font type and horizontal alignment.

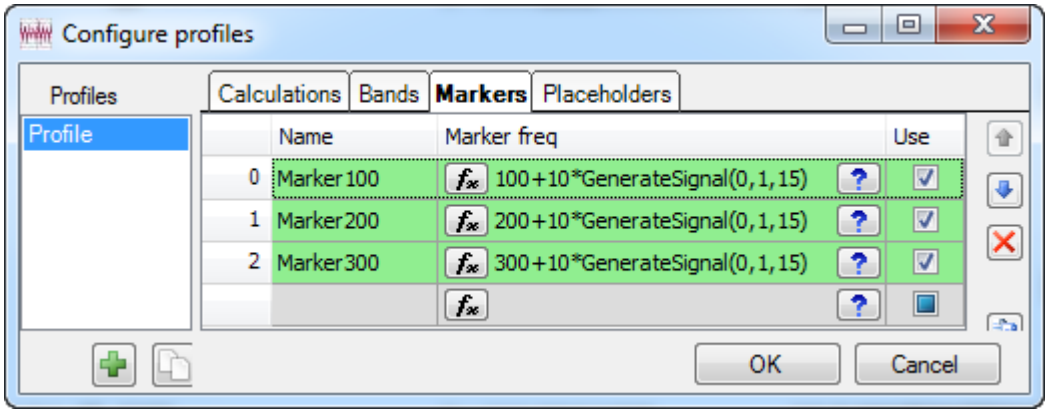


3 InSpectra Expert

3.1 Markers

An InSpectra Expert profile now also supports for markers. Markers denote a specific frequency point in the spectrum. Unlike bands, they do not have a width.

The markers defined in the InSpectra Expert profile can be visualized in the FFT view when analyzing an InSpectra Expert module using that profile.



It is possible to use a placeholder of a band in the definition of a marker. This way, the center frequency of a marker can refer to the center of a band.

The system supports the following placeholders:

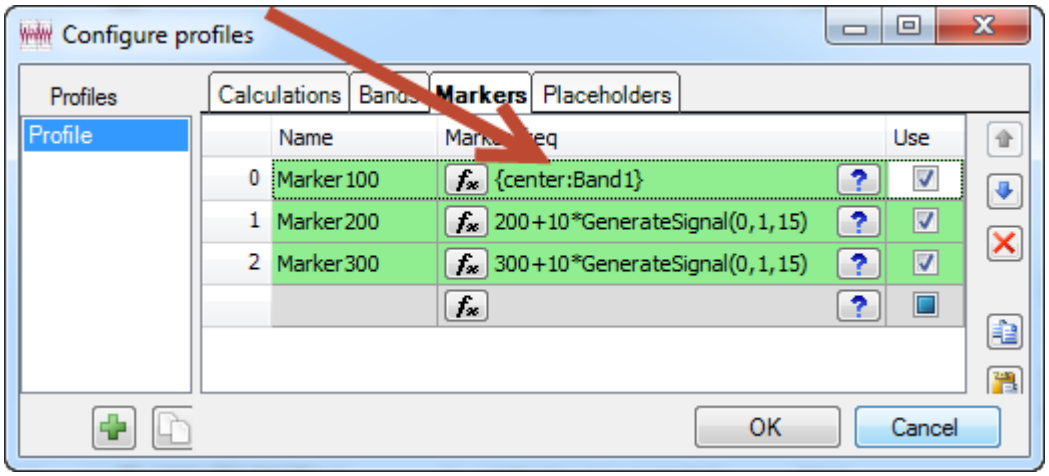
Bands:

- center:<band name>
- delta:<band name>

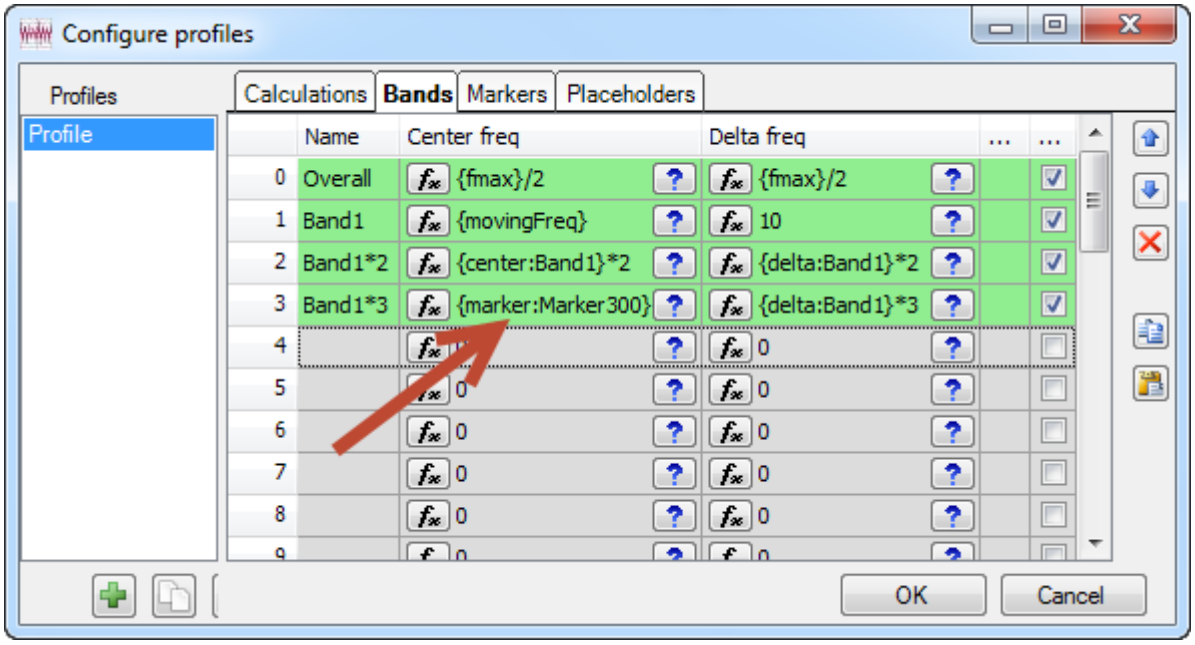
Markers

- marker:<marker name>

In case the marker or band name is not provided one can use the band or marker number instead.

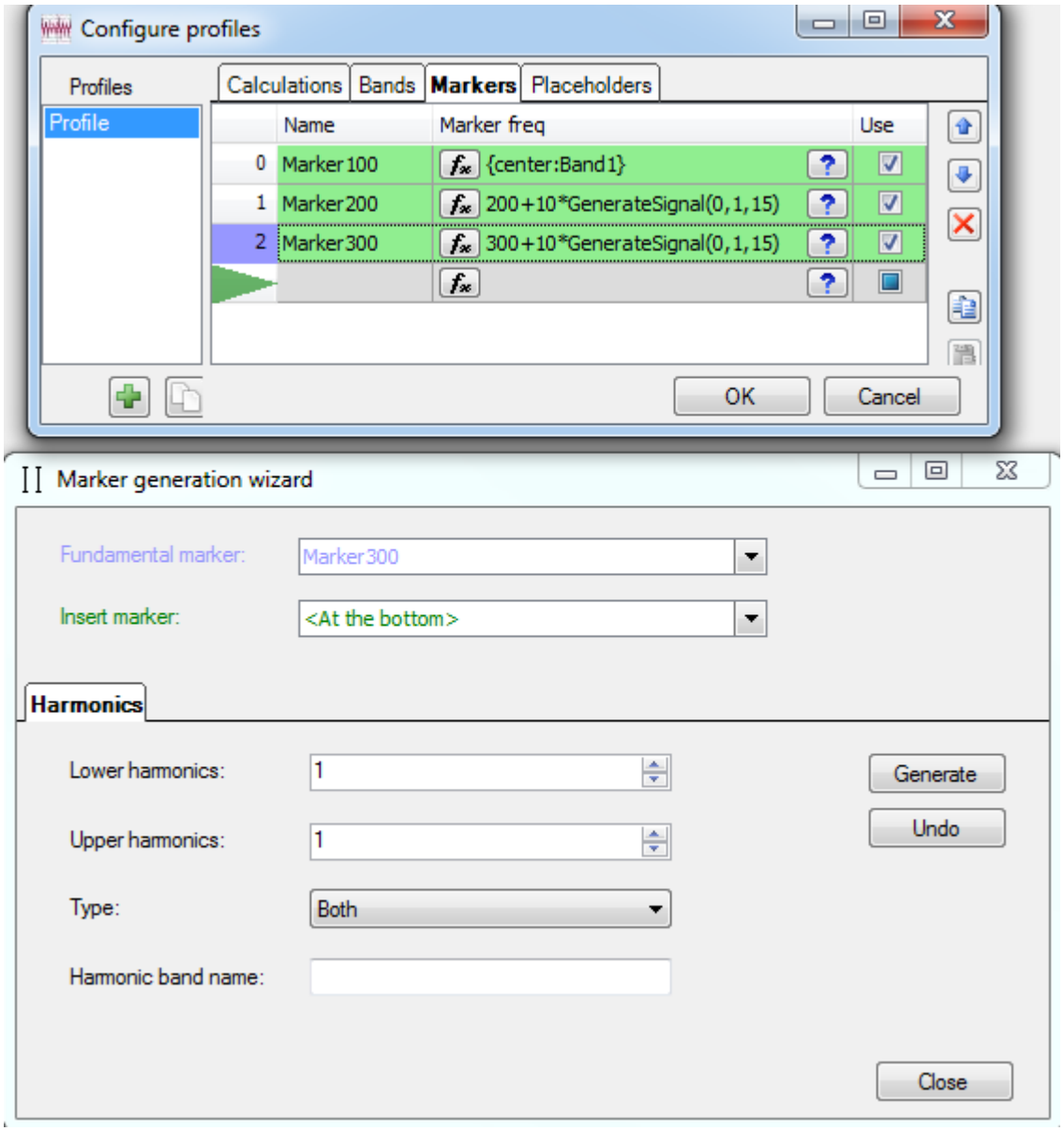


Vice-versa, one can use the center frequency of a marker in the definition of a band.

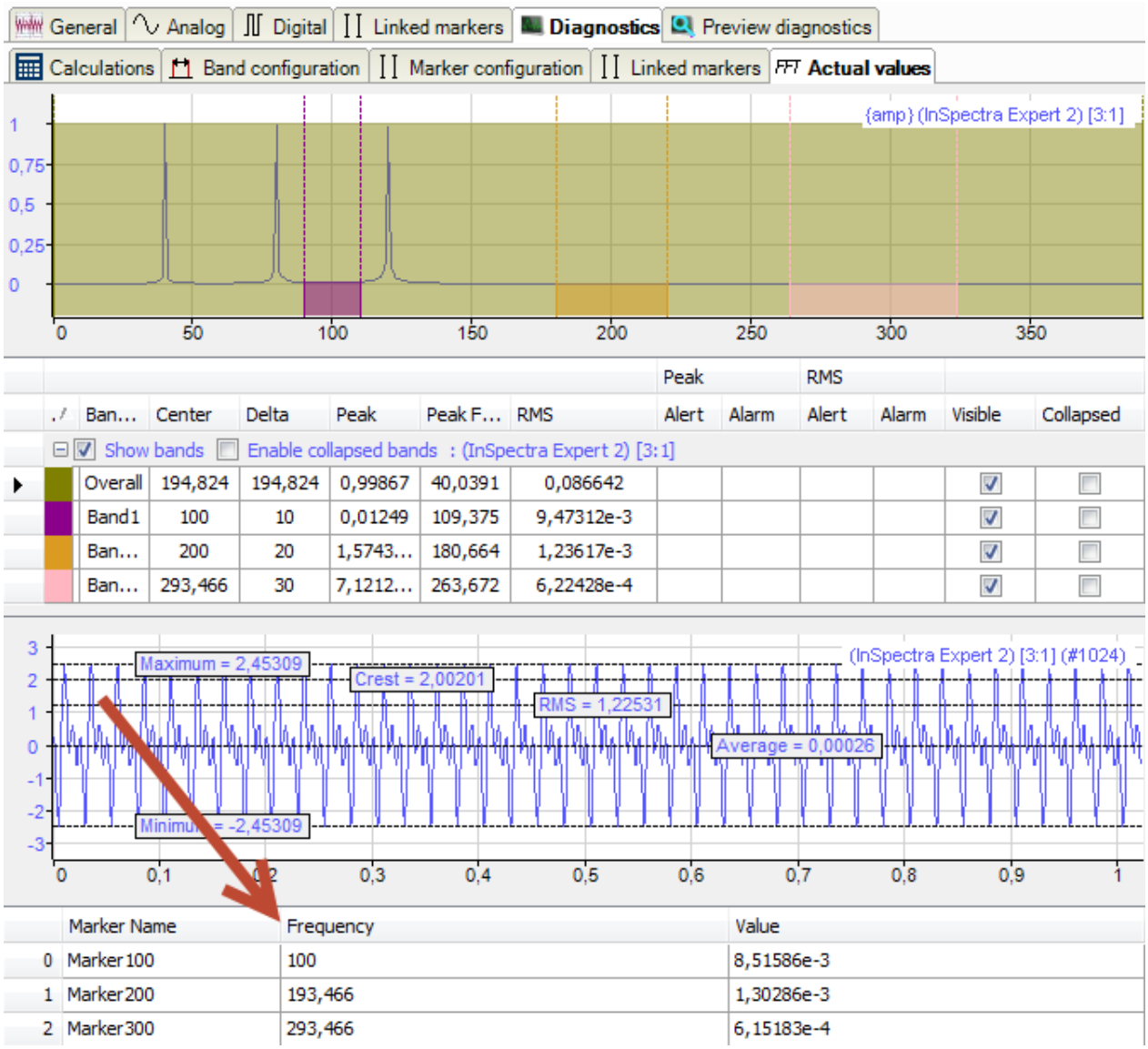


One can also use the marker or band placeholders in the definition of the limit, time or deadband of a band event. Note that markers do not support events.

The marker grid has a marker generation wizard providing the same functionality as the band generation wizard. It can be opened through the context menu of the marker‘s grid.



The values of the markers markers can be monitored in the diagnostics and the preview diagnostics TAB. You can read a marker's current frequency and the corresponding value of the spectrum in the table at the bottom.



The visualization settings of the bands and markers are loaded from the registry. However, in the spectrum chart of the I/O manager all labels are disabled. You can only access the labels by pressing and holding CTRL.

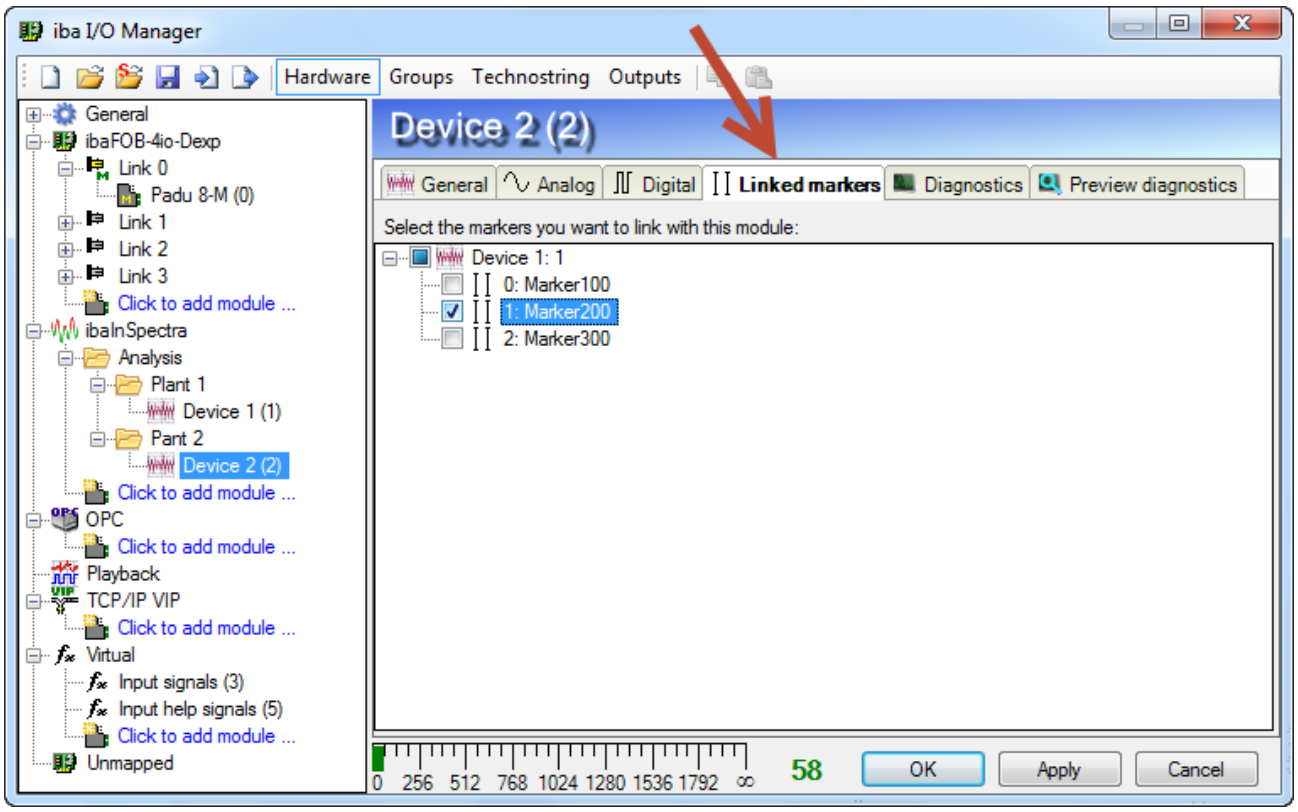
3.2 Linked markers

In case multiple InSpectra Expert modules with markers are defined, it is possible to link markers.

This means you can indicate that the markers of a module A are important when analyzing the spectrum of module B. This is especially interesting when multiple machine parts are interconnected, for example when the machine part monitored by module A could pass vibrations to the machine part monitored by module B.

When analyzing an InSpectra Expert module A in the FFT view, it is possible to visualize all linked markers too in an easy way.

When an InSpectra Expert module is selected, you can set up the linked markers in the corresponding TAB.



In this TAB there is a tree containing an overview of all other InSpectra Expert modules and their markers. Checkboxes are used to indicate which markers are linked with the selected module.

The values of the linked markers markers cannot be monitored in the diagnostics and the preview diagnostics TAB.

3.3 Copy and pasting bands and markers

It is possible to copy and paste bands and markers in the profiles dialog. You can

- Copy one or more bands or markers
- Paste them in an external program such as Excel and edit them
- Paste them back to the grids in the profiles dialog

The copy/pasting works in the same way as the copy/pasting of signals in the signals grids of the I/O manager.

When pasting, you have to be sure that the correct column is selected. The pasting starts at the selected column.

When copying bands, you must take into account that all event settings are copied as well. Every band contains 24 columns in the following order

- Band name
- Center frequency

- Delta frequency
- Events: 4 x (name / limit / time / deadband / used)
- Used

To change the used setting of the band itself, you have to change the value of the 24th column.

The copy/paste strategy can be used to disable a large number of events at the same time. You can paste all bands in Excel. By changing all values of one specific column to FALSE you can disable all events of a specific type (e.g. all peak alerts).

Every marker has only 3 columns:

- Marker name
- Marker frequency
- Used

To copy or paste you can either use

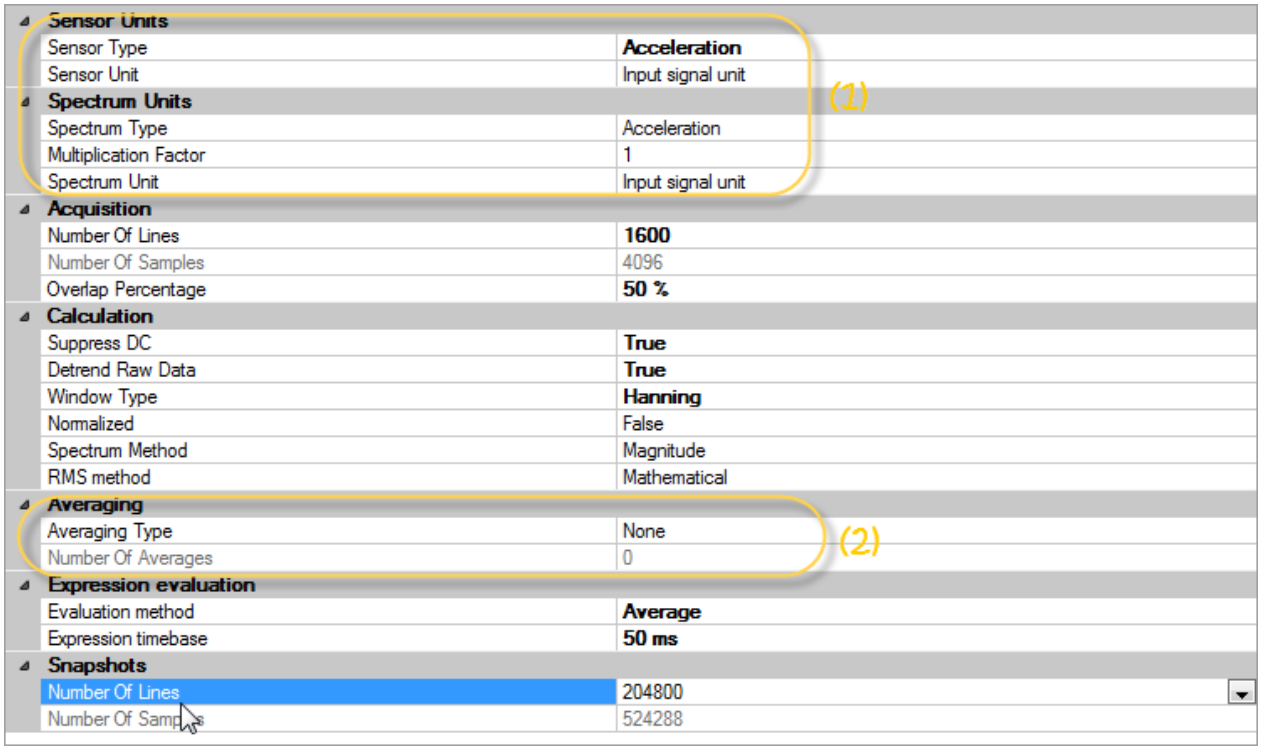
- The context menu
- The buttons to the right of the grid
- Shortcuts: CTRL + C and CTRL + V

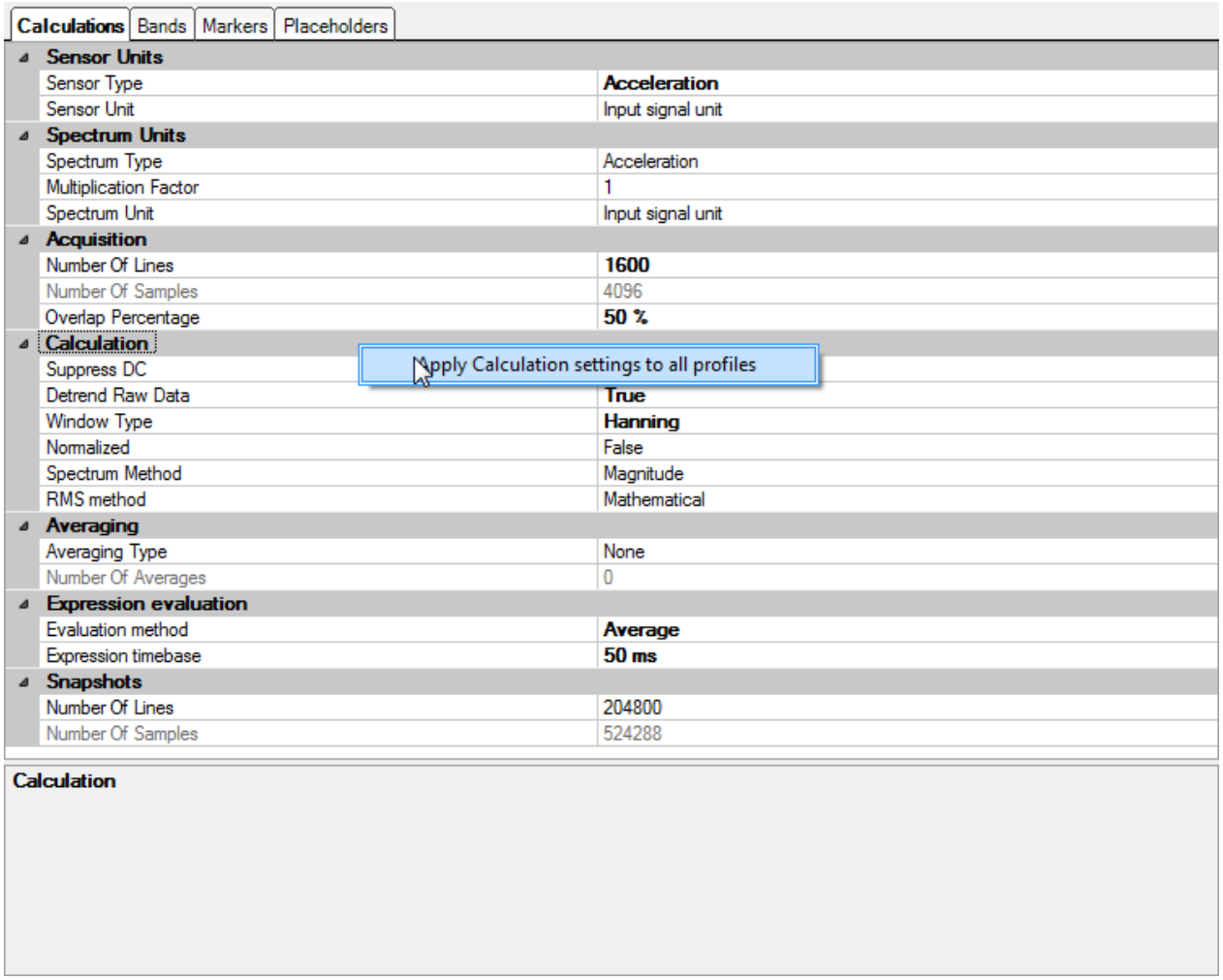
3.4 Copying profile calculation properties

It is easy to copy/paste specific calculation properties from one profile **to all profiles**. This can be done through a context menu.

As some settings are interconnected, **you can not copy/paste all settings individually**, more specifically:

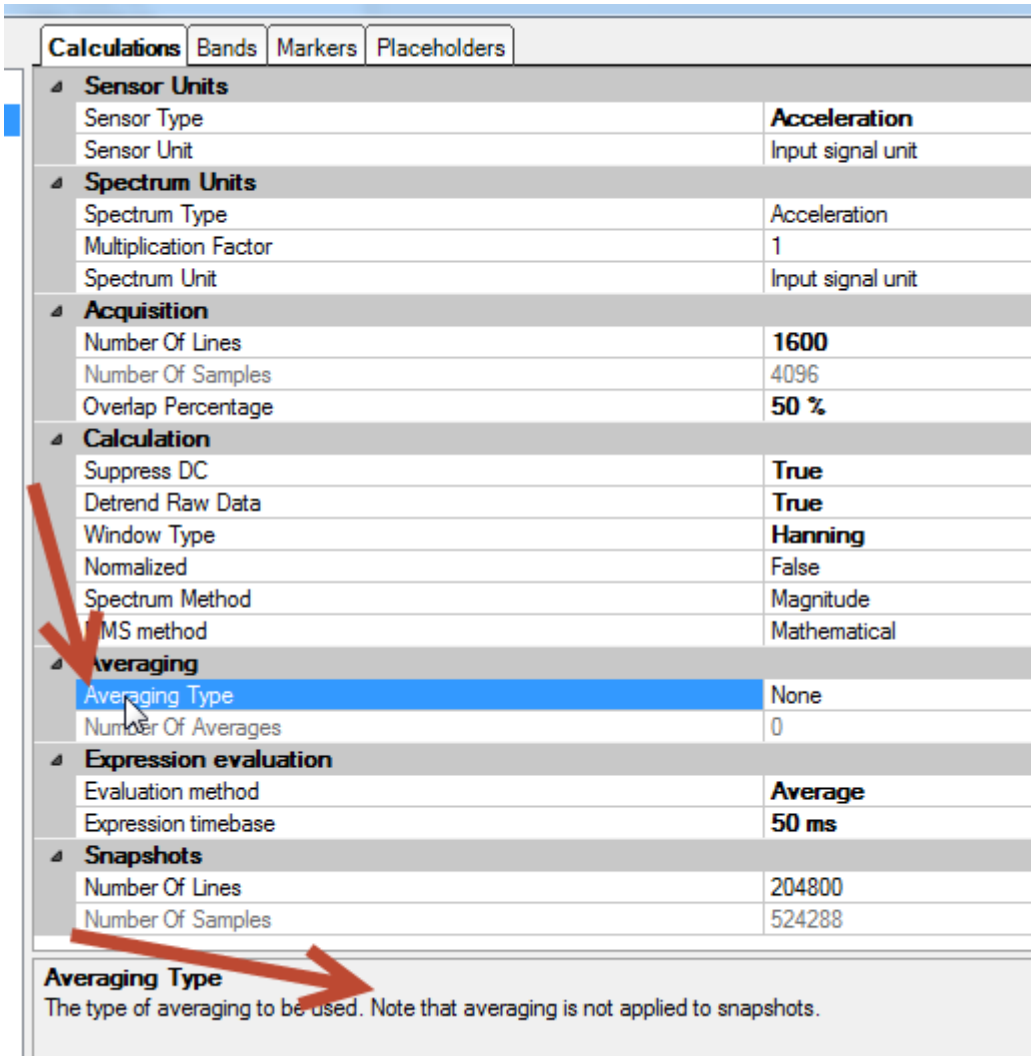
1) You can copy/paste the **unit settings (sensor + spectrum)** all together by right clicking on the Sensors units or the Spectrum Units category (1)
2) You can copy/paste the **two averaging settings** all together by right clicking on the Averaging category (2)
3) Settings not mentioned in 1) and 2):
    a. You can copy/paste these settings individually by right clicking on them
    b. You can copy/paste all settings of one category by right clicking on that category


Sensor Units
Sensor Type
Acceleration
Sensor Unit
Input signal unit
Spectrum Units
(1)
Spectrum Type
Acceleration
Multiplication Factor
1
Spectrum Unit
Input signal unit
Acquisition
Number Of Lines
1600
Number Of Samples
4096
Overlap Percentage
50 %
Calculation
Suppress DC
True
Detrend Raw Data
True
Window Type
Hanning
Normalized
False
Spectrum Method
Magnitude
RMS method
Mathematical
Averaging
Averaging Type
None
(2)
Number Of Averages
0
Expression evaluation
Evaluation method
Average
Expression timebase
50 ms
Snapshots
Number Of Lines
204800
Number Of Samples
524288


Calculations
Bands
Markers
Placeholders
Sensor Units
Sensor Type
Acceleration
Sensor Unit
Input signal unit
Spectrum Units
Spectrum Type
Acceleration
Multiplication Factor
1
Spectrum Unit
Input signal unit
Acquisition
Number Of Lines
1600
Number Of Samples
4096
Overlap Percentage
50 %
Calculation
Apply Calculation settings to all profiles
Suppress DC
Detrend Raw Data
True
Window Type
Hanning
Normalized
False
Spectrum Method
Magnitude
RMS method
Mathematical
Averaging
Averaging Type
None
Number Of Averages
0
Expression evaluation
Evaluation method
Average
Expression timebase
50 ms
Snapshots
Number Of Lines
204800
Number Of Samples
524288
Calculation

3.5 Snapshots and averaging

In 6.31 the averaging setting in the InSpectra Expert profile is also applied to the snapshots. This has changed in 6.32. Averaging does not apply anymore to snapshots.



4 FFT view

4.1 Markers

The FFT view supports several types of markers:

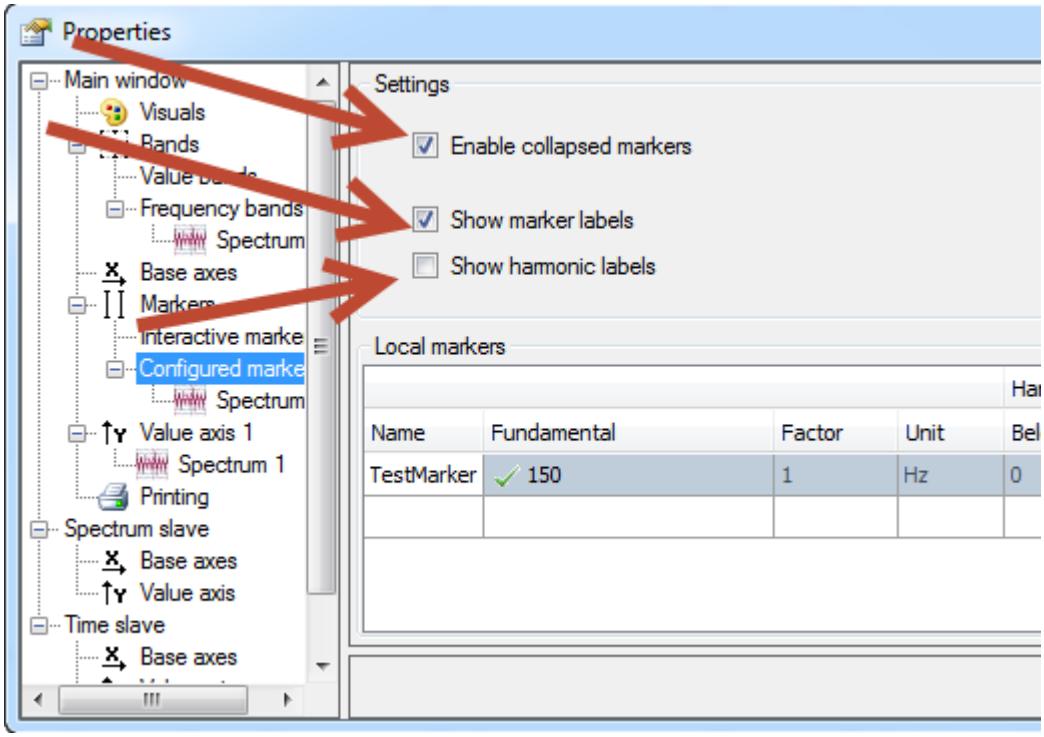
- The interactive marker
- Configured markers
  - Local markers
  - InSpectra Expert markers (*)

- Linked InSpectra Expert markers (*)

The marker types marked with an asterix are only available in case an InSpectra module is monitored. All markers can be switched on or off individually and you can assign a custom color to each of them.

4.1.1 Configured markers

Configured markers are markers that cannot be moved interactively. Their position is deterministic.



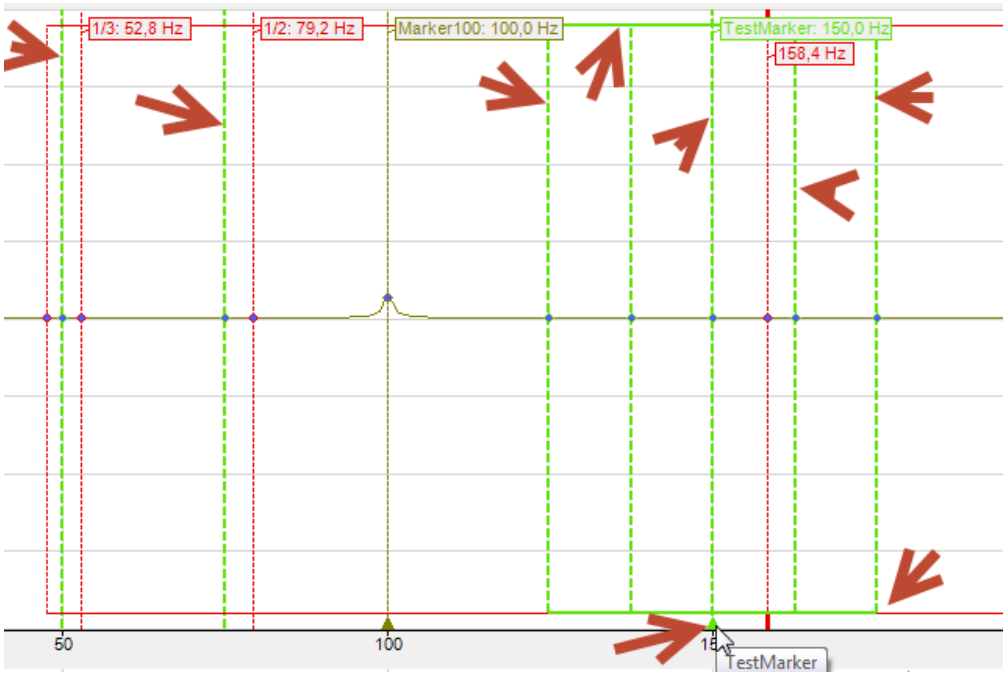
There are three settings that apply to all configured markers:

- They can be put in a collapsed state in case the “Enable collapsed markers” setting is switched on.
- The second checkbox allows determining whether the labels of configured markers are shown or not.
- The “Show harmonic labels” checkbox determines whether harmonic markers of a configured marker will have a label.

In case “Enable collapsed markers” is switched on, each marker has a small triangle near the tick axis.

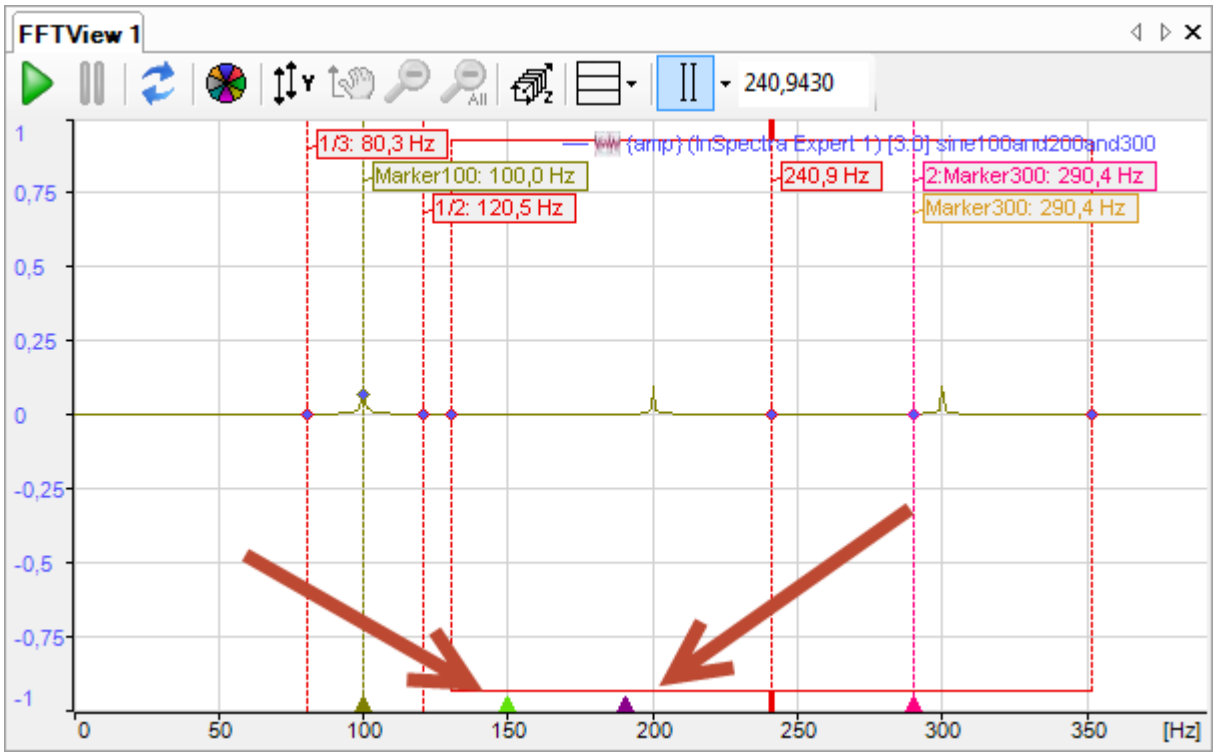
If you hover over such triangle, a tooltip containing the marker's name will appear. In case the marker is a linked InSpectra Expert marker, also its module name and number will appear in the tooltip.

If you hover over the marker's triangle, the marker is highlighted as well (it is painted ticker). In the picture below, the green marker (and its harmonics and sidebands) is painted thicker than the other markers.



If you press the DEL button while a marker is hovered, it will become invisible. You can reenable this marker by changing its visibility state in the properties dialog of the FFT view.

If you click on the triangle, the marker is collapsed, i.e., you only see a triangle:

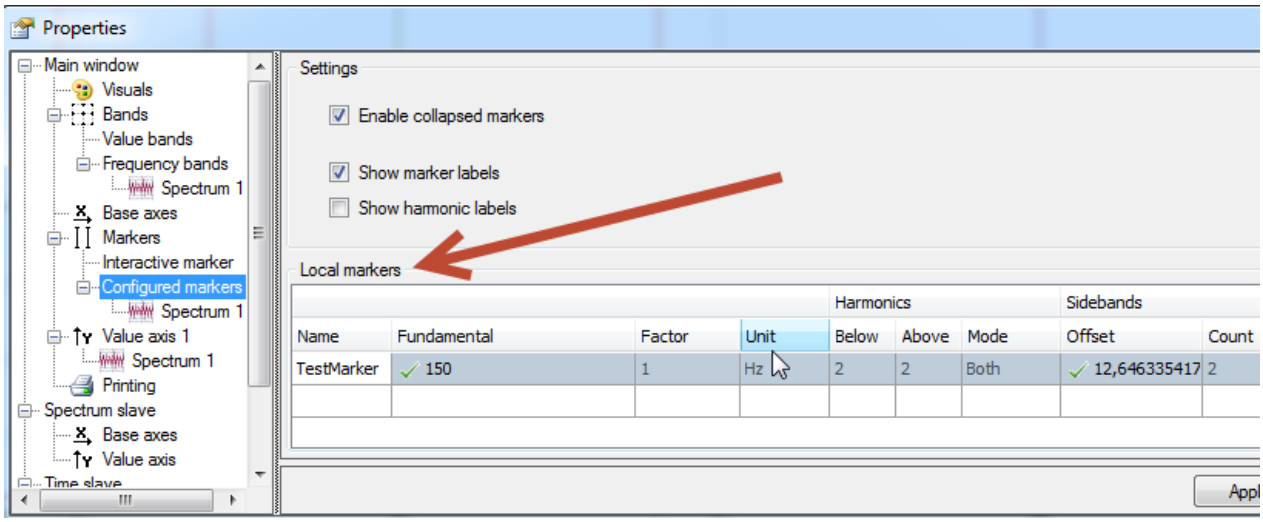


If you click on it again, the marker will reappear in its full state.

Note that a marker having harmonics or sidebands has only one triangle. It is not possible to collapse harmonics or sidebands individually.

4.1.1.1 Local markers

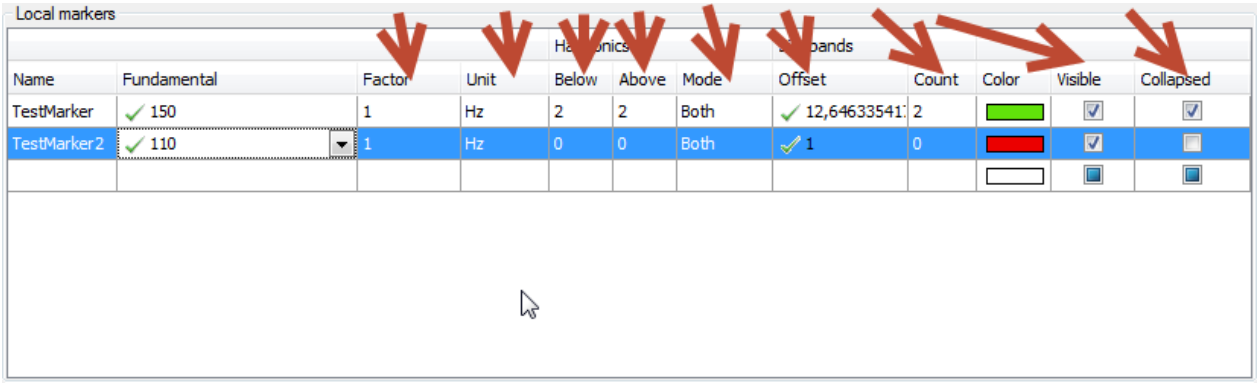
Local markers can be added in the local markers table:



The state of each marker can be set individually:

- Visibility
- Collapsed state or normal state

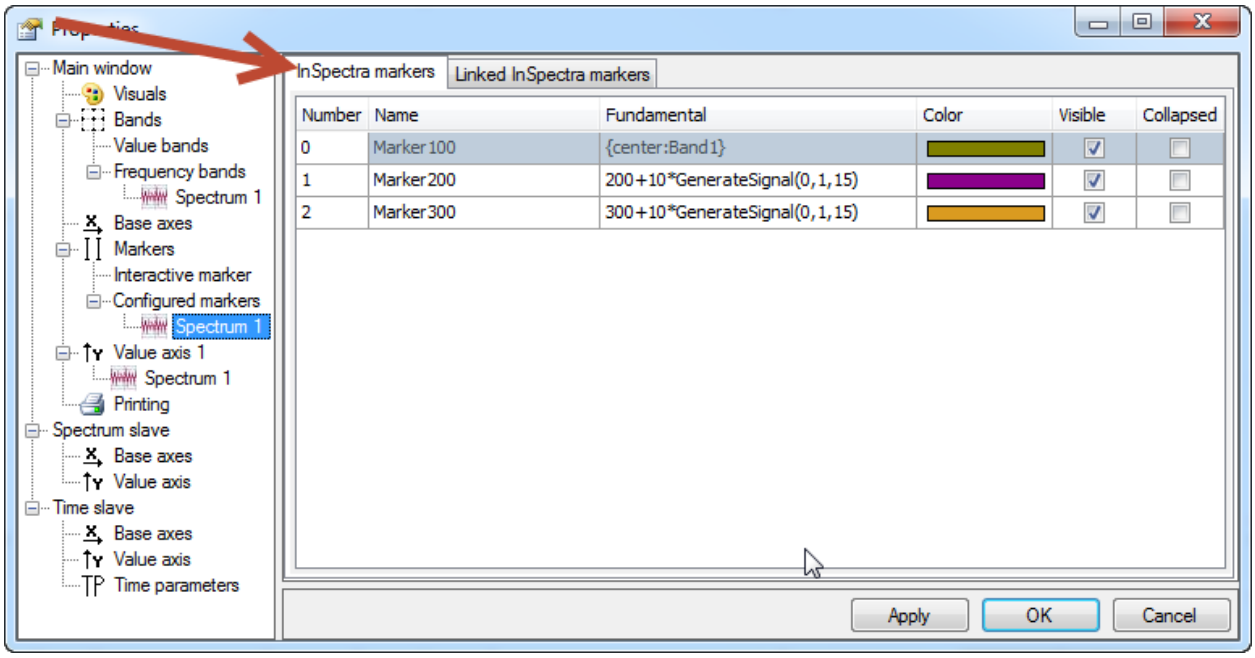
For the most columns in this table, header clicking is supported. If you click on the header (red arrows below), the value of the selected cell is copied and pasted in all cells below.



The collapsed column is only visible if the “Enable collapsed markers” setting is switched on.

4.1.1.2 InSpectra markers

It is possible to define markers in an InSpectra Expert profile. If you are studying an InSpectra Expert module in the FFT view, you have access to all the markers of its InSpectra Expert profile:



The first three columns are readonly. The color, the visiblity and the collapsed state of the marker can be set for each marker individually

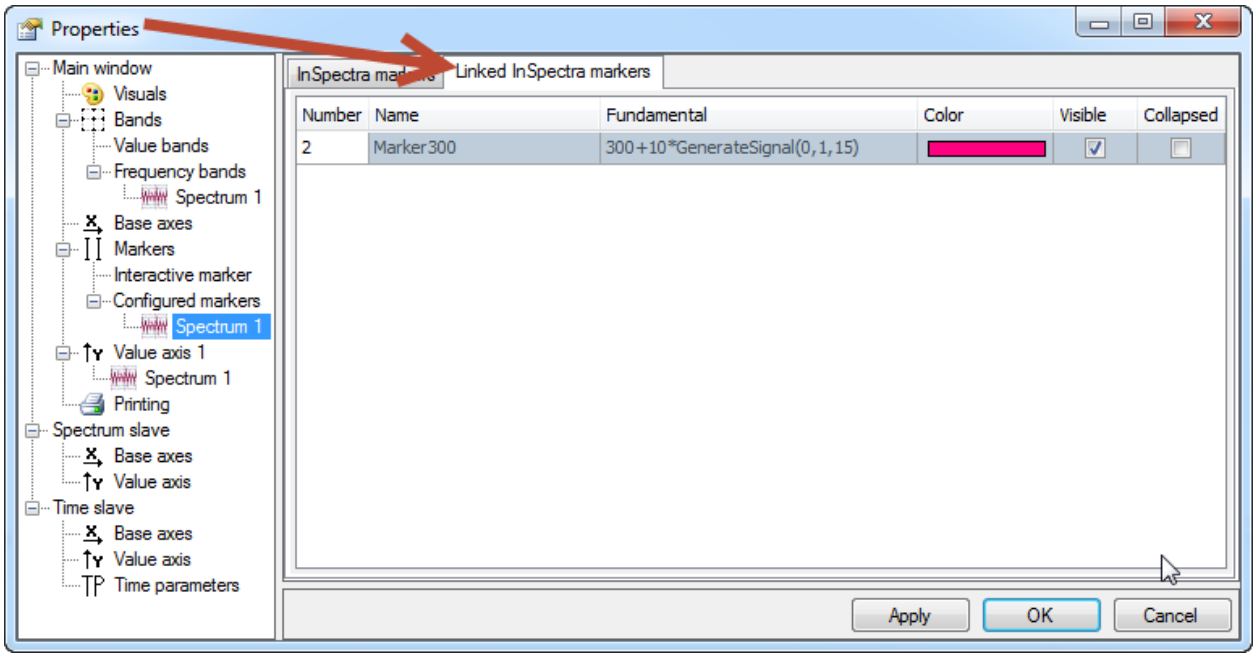
Again, header clicking is supported. The collapsed column is only visible if the “Enable collapsed markers” setting is switched on.

If you drag an InSpectra Expert module in an FFT view then its markers will be set to visible by default.

InSpectra markers behave in the same way as local markers.

4.1.1.3 Linked InSpectra Expert markers

It is possible to link markers of other InSpectra Expert modules with an InSpectra Expert module. This is explained in 3.2. If you are studying an InSpectra Expert module in the FFT view, you have access to all its linked markers.

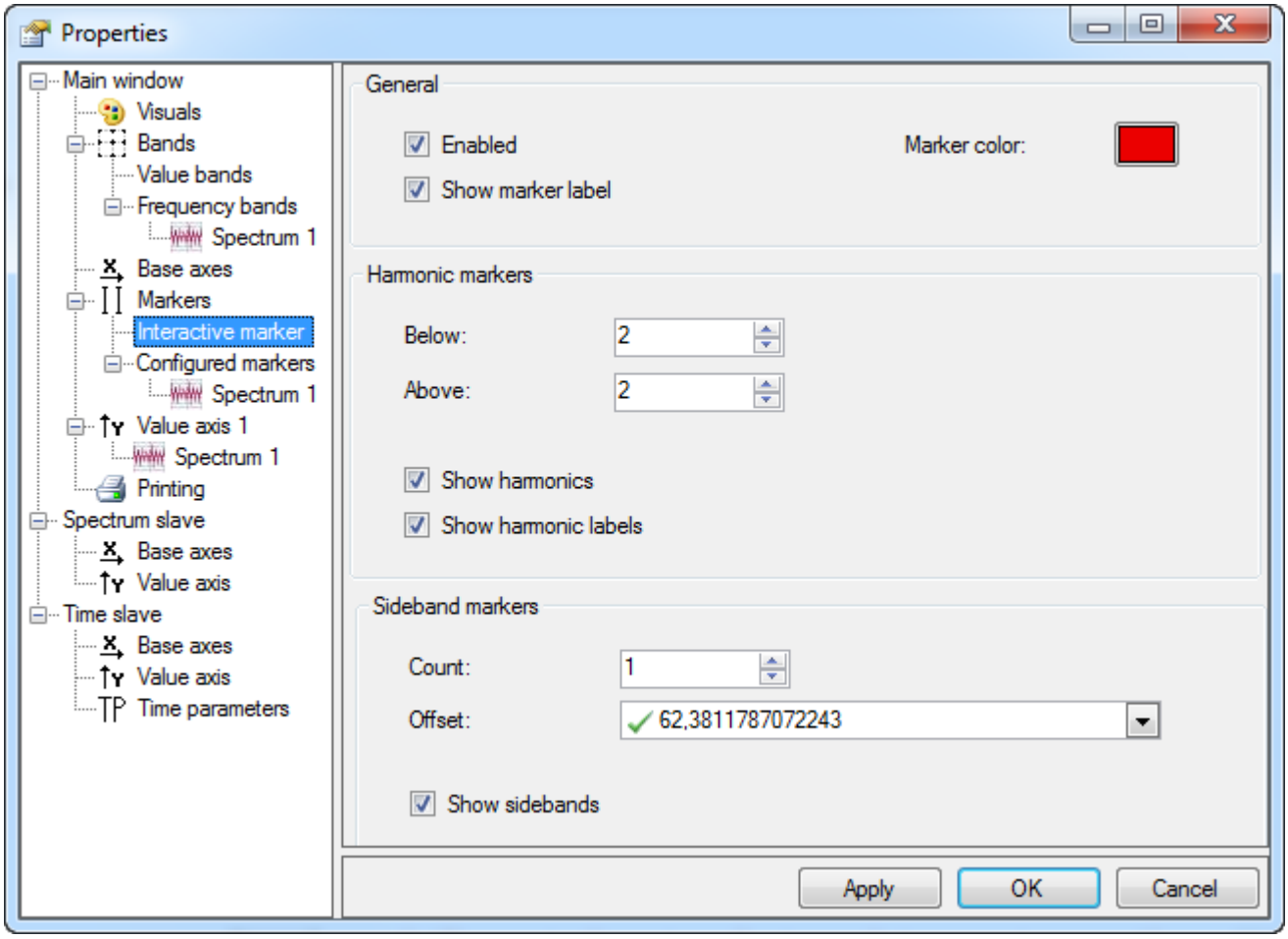


Again, the first three columns are readonly. The color, the visiblity and the collapsed state of the marker can be set for each marker individually.

Header clicking is supported.

If you drag an InSpectra Expert module into an FFT view, then its linked markers will be set to invisible by default. All linked markers origining from the same InSpectra Expert module will have the same color by default. In case there are linked markers of multiple InSpectra Expert modules, they are grouped by module:

4.1.2 The interactive marker

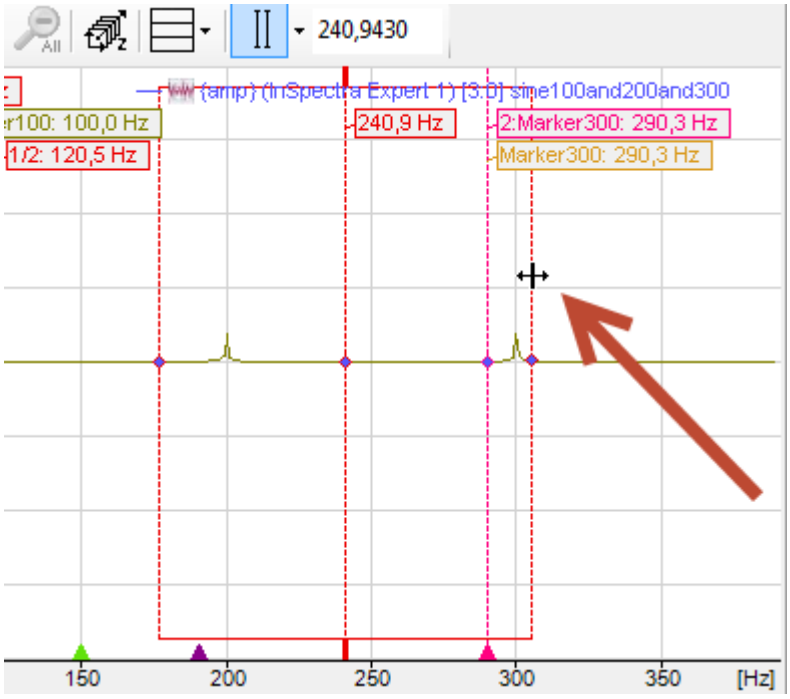


With the checkboxes it is possible to enable or disable:

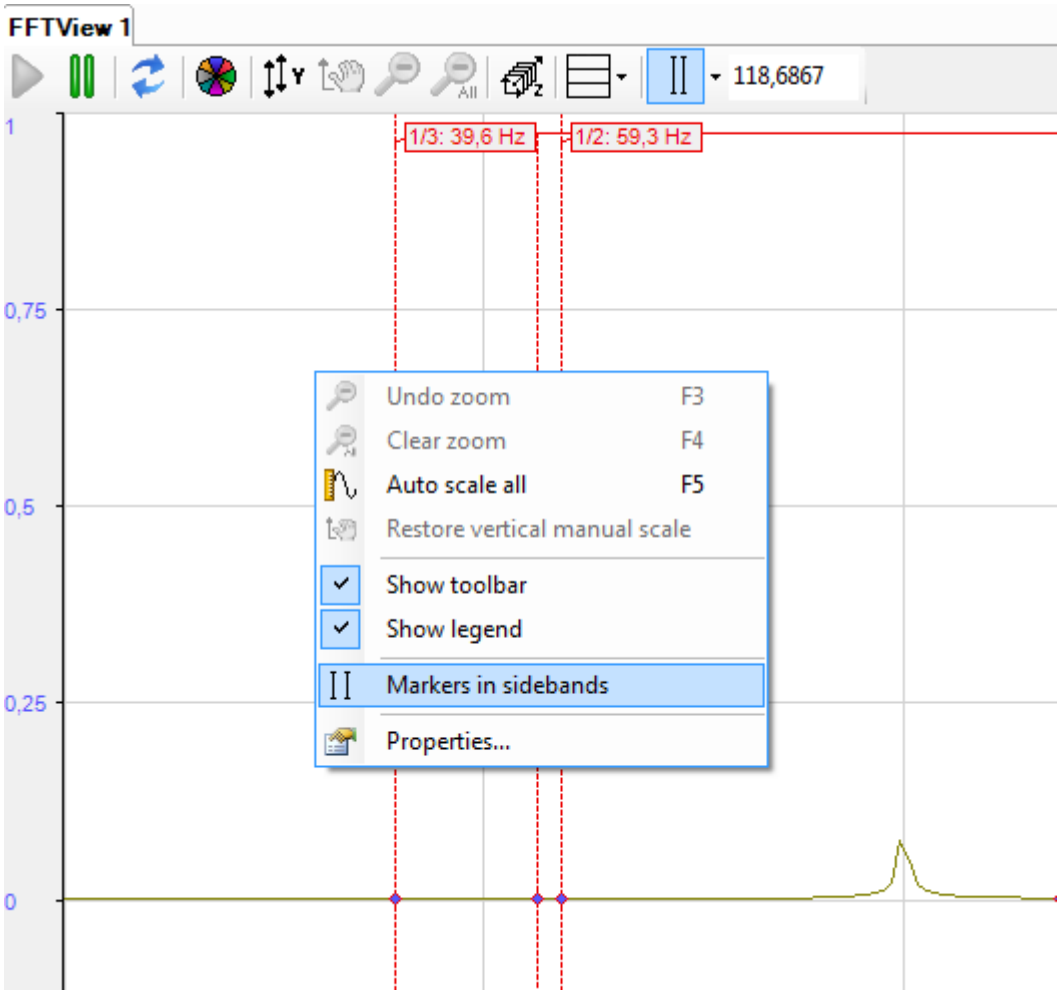
- The interactive marker and all it's harmonics and sidebands
- The label of the interactive marker
- The harmonics of the interactive marker
- The labels of the harmonics of the interactive marker
- The sidebands of the harmonic marker

The offset of the sideband markers can either be static or a signal.

One can change the width of sidebands of the interactive marker by dragging one of the outer sideband lines. This is only possible if the sideband offset is a static value, it is not possible if the sideband offset is a signal.

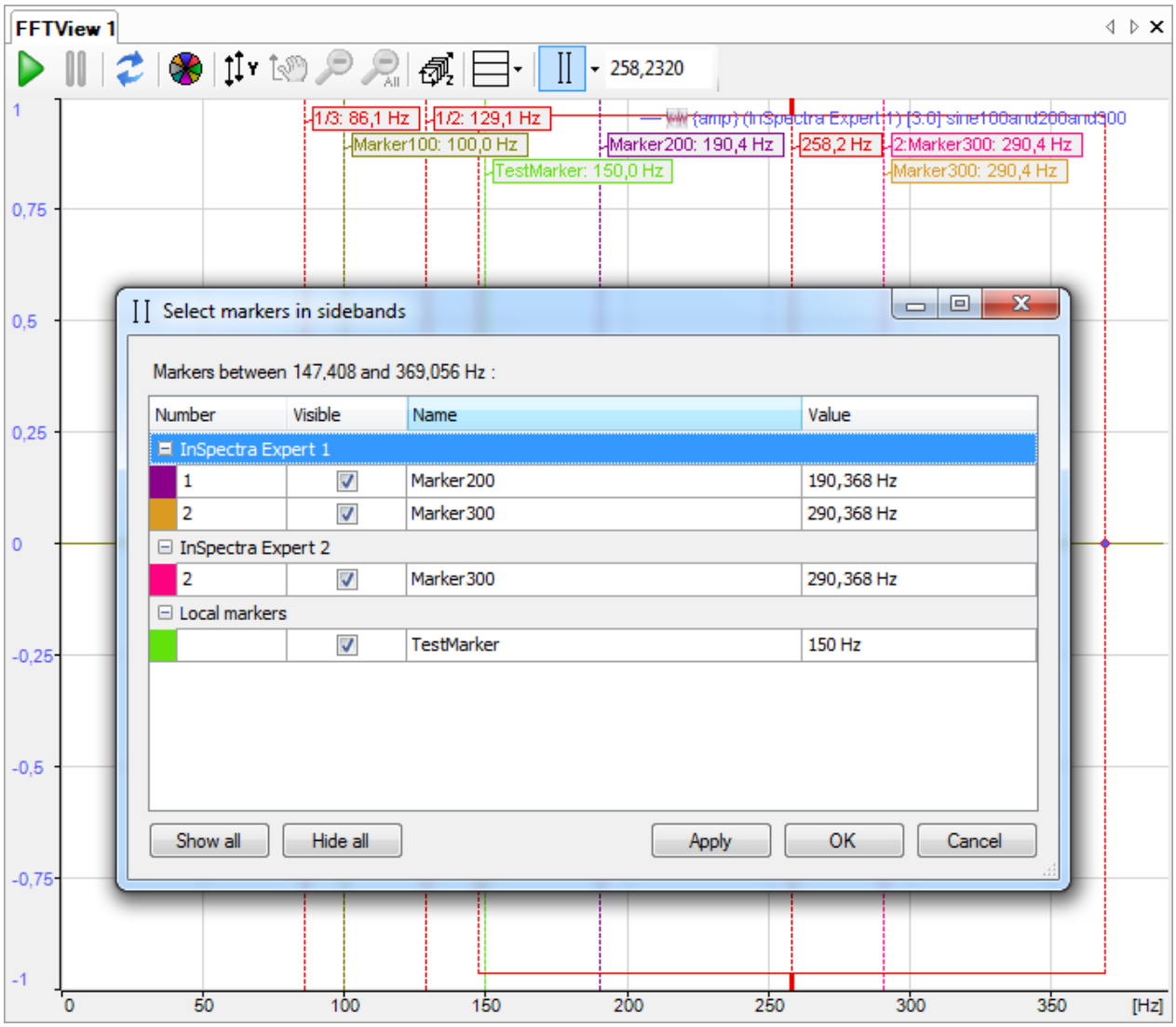


The feature “Markers in sidebands” is supported. This means you can easily retrieve a list of all markers that are within the sidebands of the interactive marker. First, you have to enable the interactive marker and make sure that the sidebands of the marker are visible. Then you can access the feature through the context menu:



Just before the select markers in sidebands dialog is opened, the FFT view is paused automatically.

All markers within the sidebands of the interactive marker are listed in a grid (except for the interactive marker itself). They are grouped per InSpectra Expert module. The local markers are in a separate group.



It is possible to change to visibility of the markers with the checkboxes or the two buttons at the bottom left of the dialog. You have to press OK or Apply to save and apply the changes.

If the option “Enable collapsed markers” is set to true in the settings of the Configured markers, then the collapsed column will appear in this grid too.

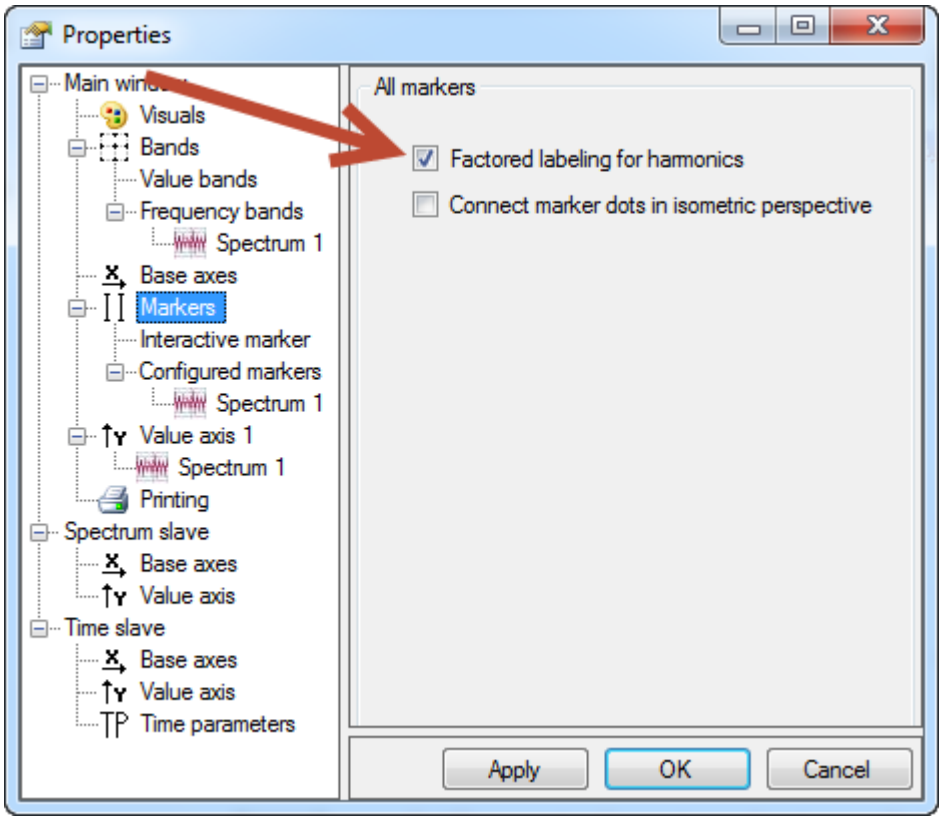
Label clicking: By clicking on the label of the interactive marker, you can run over the following settings:

- Show interactive marker (+ label)
- Show interactive marker and it’s harmonics (+ label)
- Show interactive markers (+ label) and it’s harmonics (without label)
- Show everything: interactive marker + harmonics + sidebands + all labels
- Show interactive marker (+ label), all harmonics and sidebands (without label)
- Show interactive marker (+label) and sidebands without harmonics

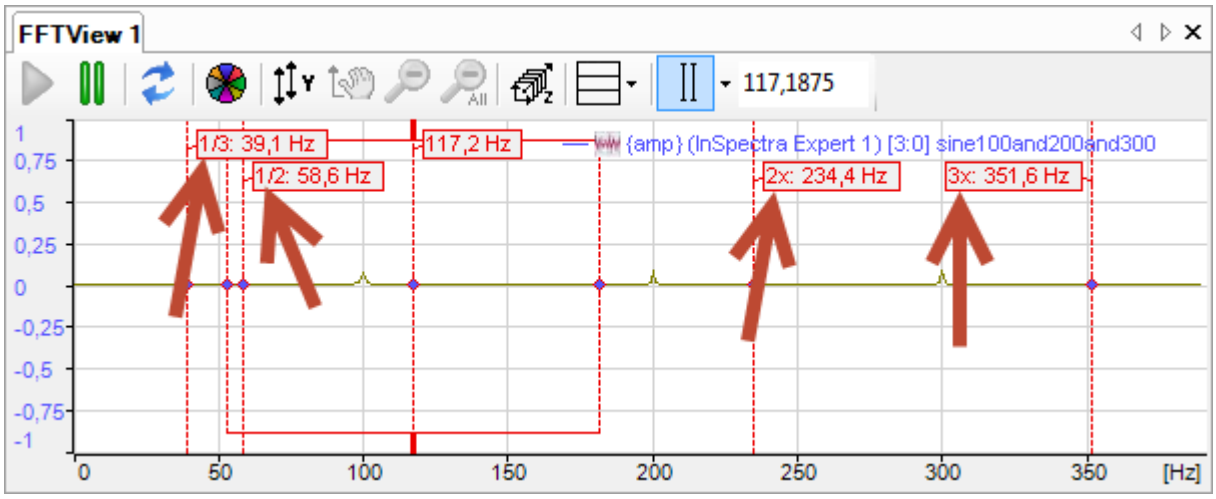
By clicking on the label, the settings of the interactive marker are changed accordingly. This functionality is based on the functionality in ibaAnalyzer.

4.1.3 All markers: factored labeling for harmonics

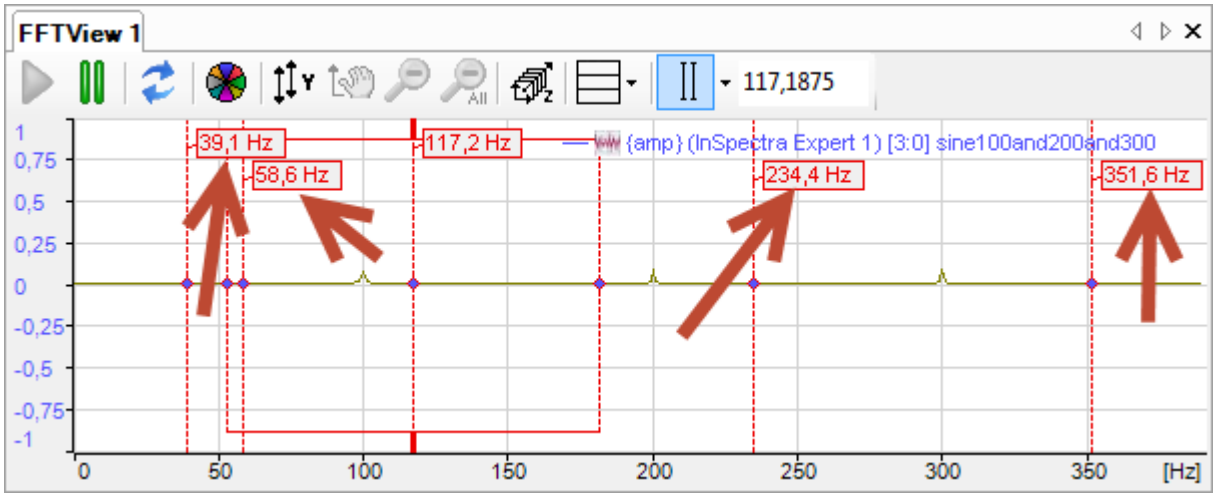
An option has been added to display the labels of harmonic markers in the same way as in ibaAnalyzer. This option applies to all enabled harmonics labels.



In case factored labeling is on, the harmonic labels look like this:



In case factored labeling is off, the harmonic labels look like this instead:



4.2 Frequency bands

There are three types of frequency bands

- Color bands
  - 1) Global color bands
  - 2) Spectrum specific color bands
- 3) InSpectra bands

4.2.1 Global & spectrum specific color bands

The functionality of the color bands has not changed, but the tables for configuring them have been rearranged.

It is possible to put multiple spectra in the same FFT view:

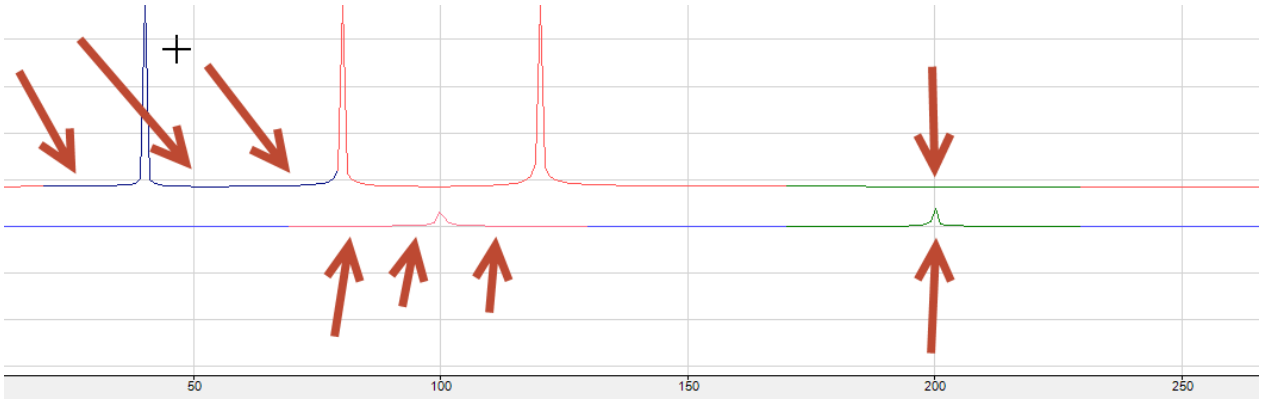
- The global color bands will apply to all spectra.
- The spectrum specific color bands only apply to one spectrum.

A color band causes the curve to have another color.

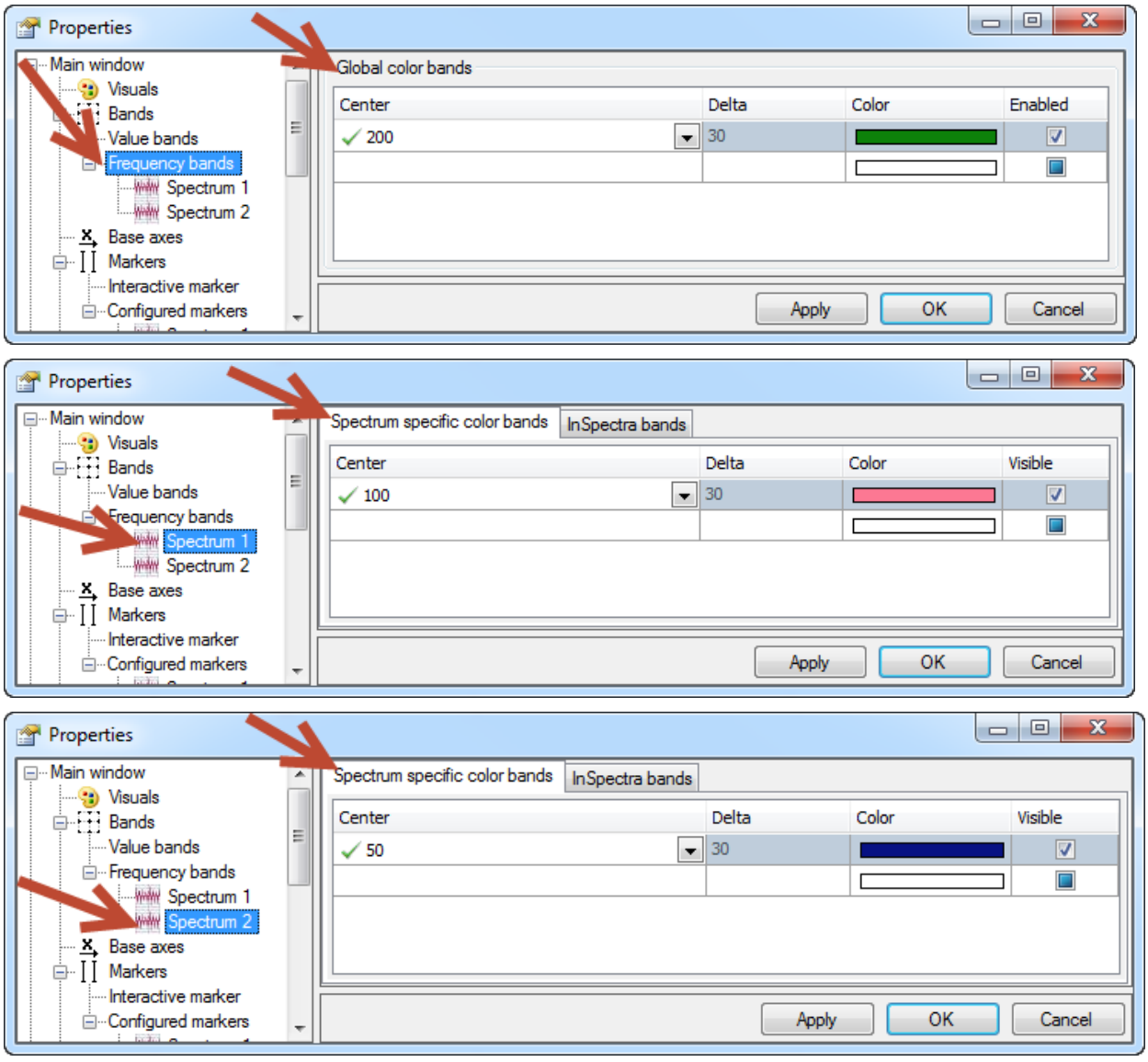
In the picture below you see a part of an FFT view containing two spectra. The top one has a red color; the bottom one has a blue color. As you can see, three color bands have been defined:

- On the left, you see that the top curve has a dark blue segment. This is because a dark blue spectrum specific color band was defined with a center of 50 Hz.
- In the middle, you see that the bottom curve has a red segment. This is because a red spectrum specific color band was defined with a center of 100 Hz.

- On the right, you see that both curves have a green segment. This is because a green global color band was defined with a center of 200 Hz.



Below, you can see what settings result in the picture above.

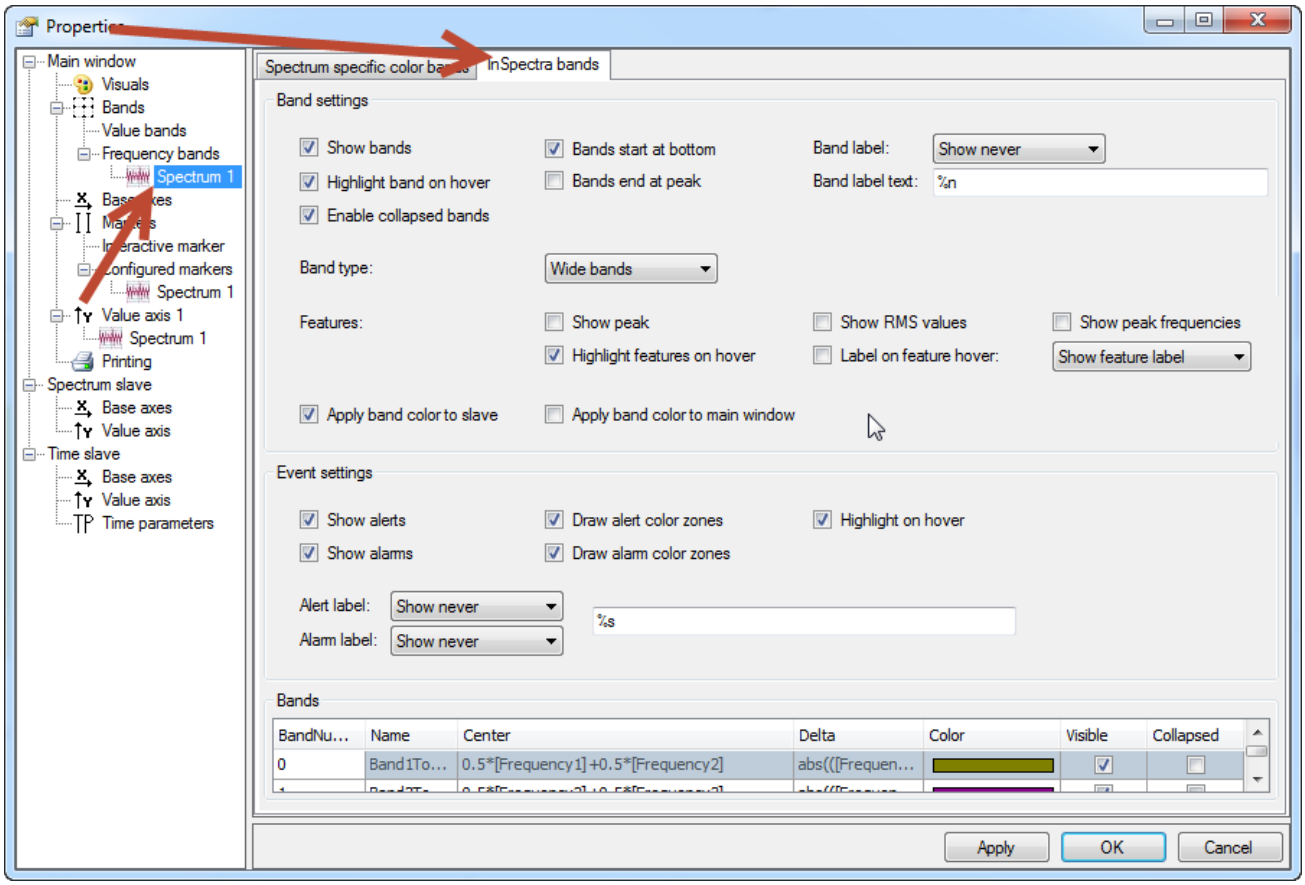


4.2.2 InSpectra bands

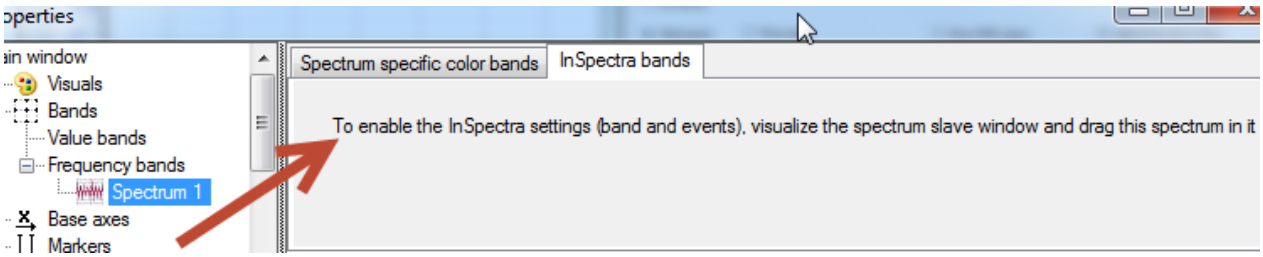
It is possible to visualize bands and events from InSpectra Expert modules in the spectrum slave window. They can never be displayed in the main window.

To visualize the bands in the spectrum slave window, you must drag the InSpectra Expert module into the slave. By default, if you drag an InSpectra Expert module into an FFT view that does not yet contain spectra, the dragged module is added to the spectrum slave automatically.

You can see and change the visualization settings of the bands and events in the following dialog. What you see are the default settings.



Note that in case the FFT view contains an InSpectra Expert module that is not in the spectrum slave window, you will see the following:



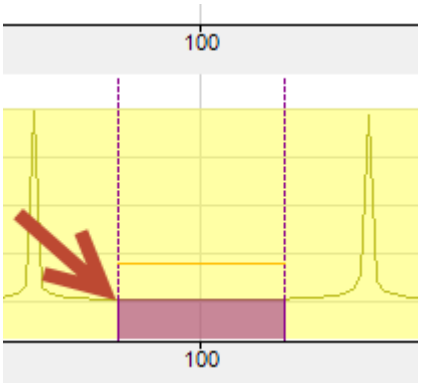
4.2.3 Band settings

The following settings can be configured:

Now a short description of all 7 settings follows:

1) Show bands: Determines whether the bands are shown. If unchecked, all other settings are disabled.

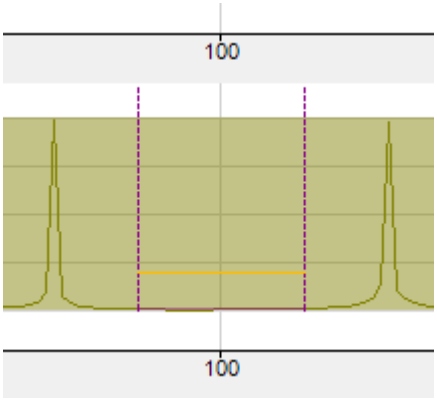
2) Bands end at peak: If checked (A), the highest point of each band is determined by the maximum value of the curve in that band. If unchecked (B), the bands end at the top of the chart:

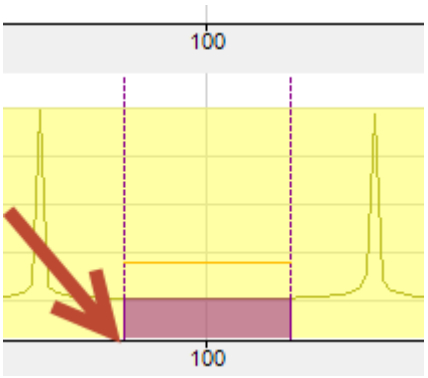
A) 

B) 

Note: in case the peak signal of the band is not active, the “Bands end at peak” setting does not apply. This is because in that case we do not know the peak value, so the band always ends at the top of the chart as in B.

3) Bands end at bottom: If unchecked (A), the lowest level of each band is the zero level. In case the values of the curve in the band are near zero, the band is difficult to see. If checked (B), the lowest level of each band is the bottom of the chart:

A) 

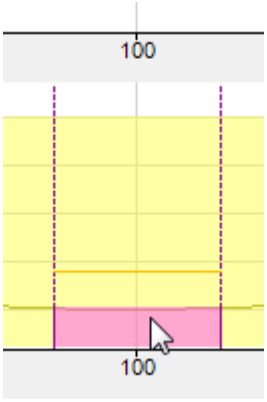
B) 

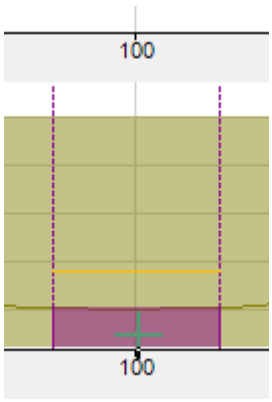
Note: in case the scaling of the value axis is set to Decibels, the band will end at the bottom irrespective of this setting. The reason is that the zero level is never reached when using a decibel scale.

4) Highlight band on hover: If checked (A), if you hover over the band surface, the band will become highlighted: the color of the band will brighten and your cursor will change into an arrow. In case the band has a label, this label will also brighten. If unchecked (B), nothing happens.

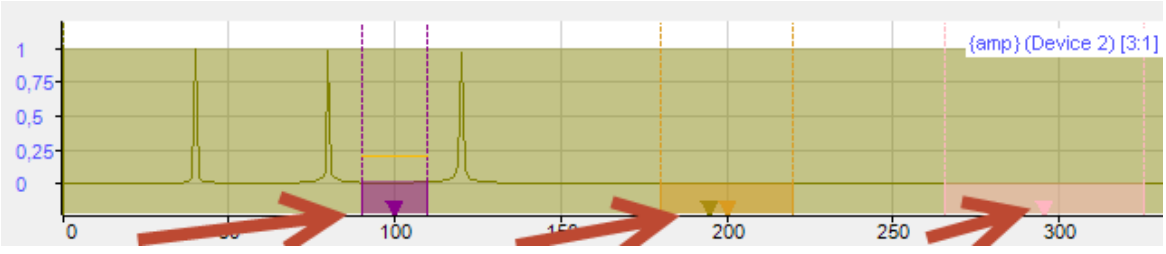
   Enabling this option has some other advantages as well. If you hover over a band, you can delete it by pressing DEL (deleting here means hiding). Also, the corresponding band row in the band table will lighten up (in case the band table is visible). Moreover, the band table will automatically scroll to this band.

   If multiple bands are below your cursor, multiple bands will be highlighted. If you press delete, the band which has the most right left bound will be deleted first.

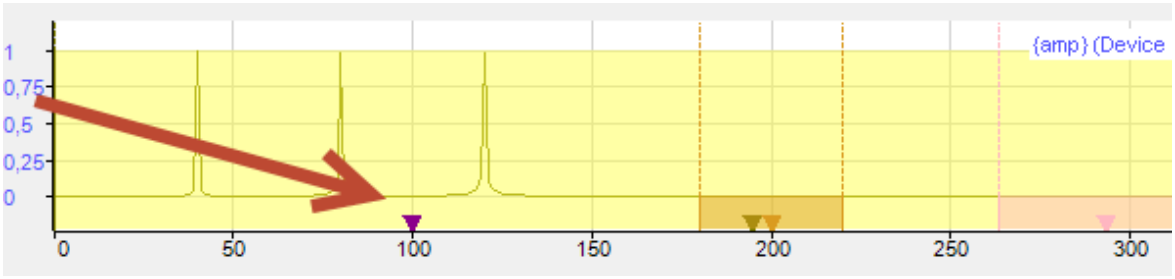
(A) 

(B) 

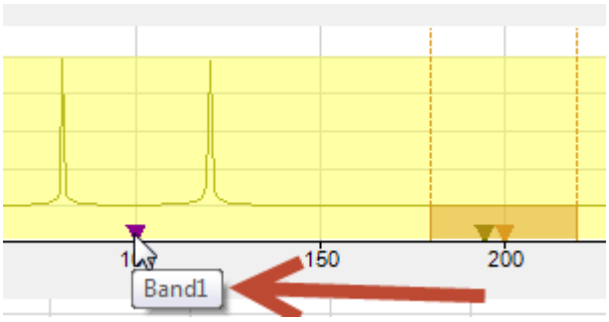
5) Enable collapsed bands: The functionality of collapsing bands is similar to the functionality of collapsing markers. In case the setting enable collapsed bands is on, a triangle appears at the center of the band. The triangle of a collapsed band is an upside down version of the triangle of a collapsed marker. This difference allows distinguishing easily between collapsed markers and bands.



You can collapse the band by clicking on the triangle:

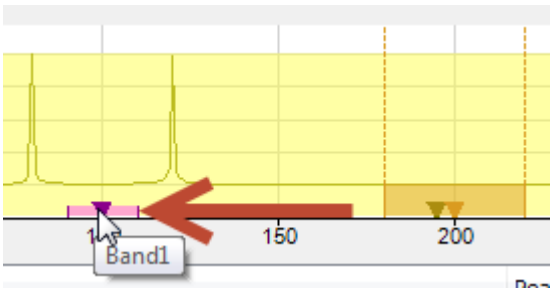


If you click again, the band reappears.If you hover over the triangle, a tooltip containing the band's name appears:



If you press DEL while hovering, the band will become invisible.

When a collapsed band is hovered, you can estimate the width of the band by pressing and holding the SPACE bar (the shown band height is a percentage of the chart's height).

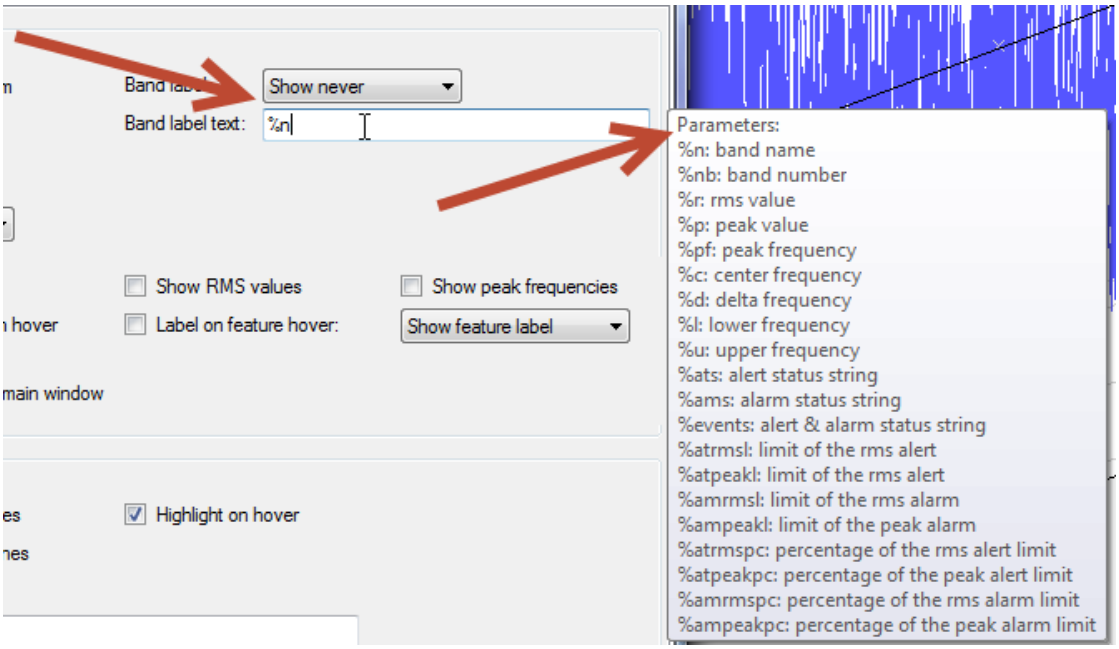


By pressing and holding the SPACE bar the system will also select the corresponding band in the band table (even if the band table is not visualized).

6) Band label: This dropdown has three options to display the band label defined in the textbox below:
   - Show always
   - Show never
   - Show on hover

In case “Show never” is selected, you can still display the label by hovering over the band and press and hold CTRL. However, this only works if “Highlight band on hover” is set to true.

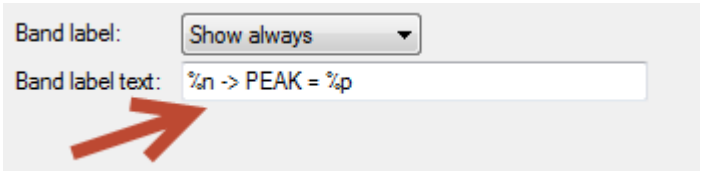
7) Band label text: This is the label text of a band label. There is no support for a multiline label. It possible to use placeholders as you can see in the screenshot below:



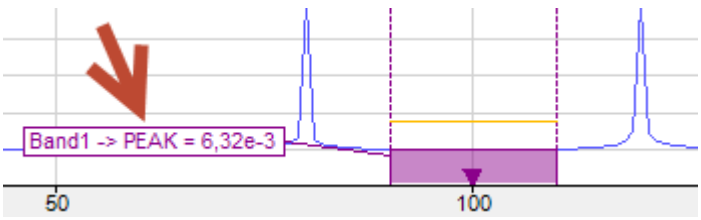
The last four placeholders will show a percentual value indicating how far the current monitored value is from the limit value.

In case the system cannot assign a value to a placeholder (e.g. because no alerts are defined or because the rms signal of a band is not active), then this placeholder is replaced by an empty string. In case the resulting label text is an empty string, the label is not shown.

You can combine the placeholders with your own text as well:



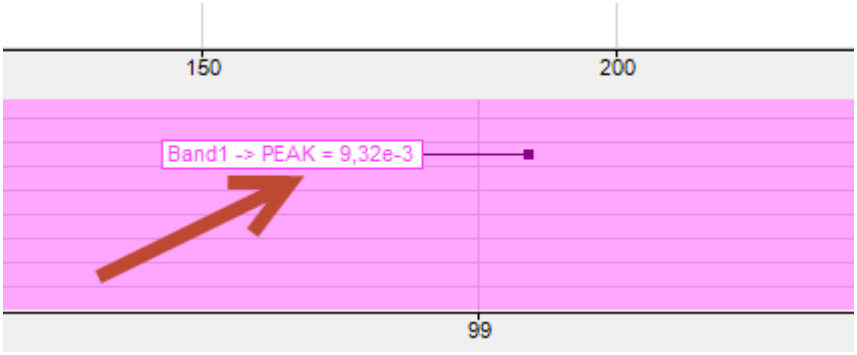
The band label looks like this:



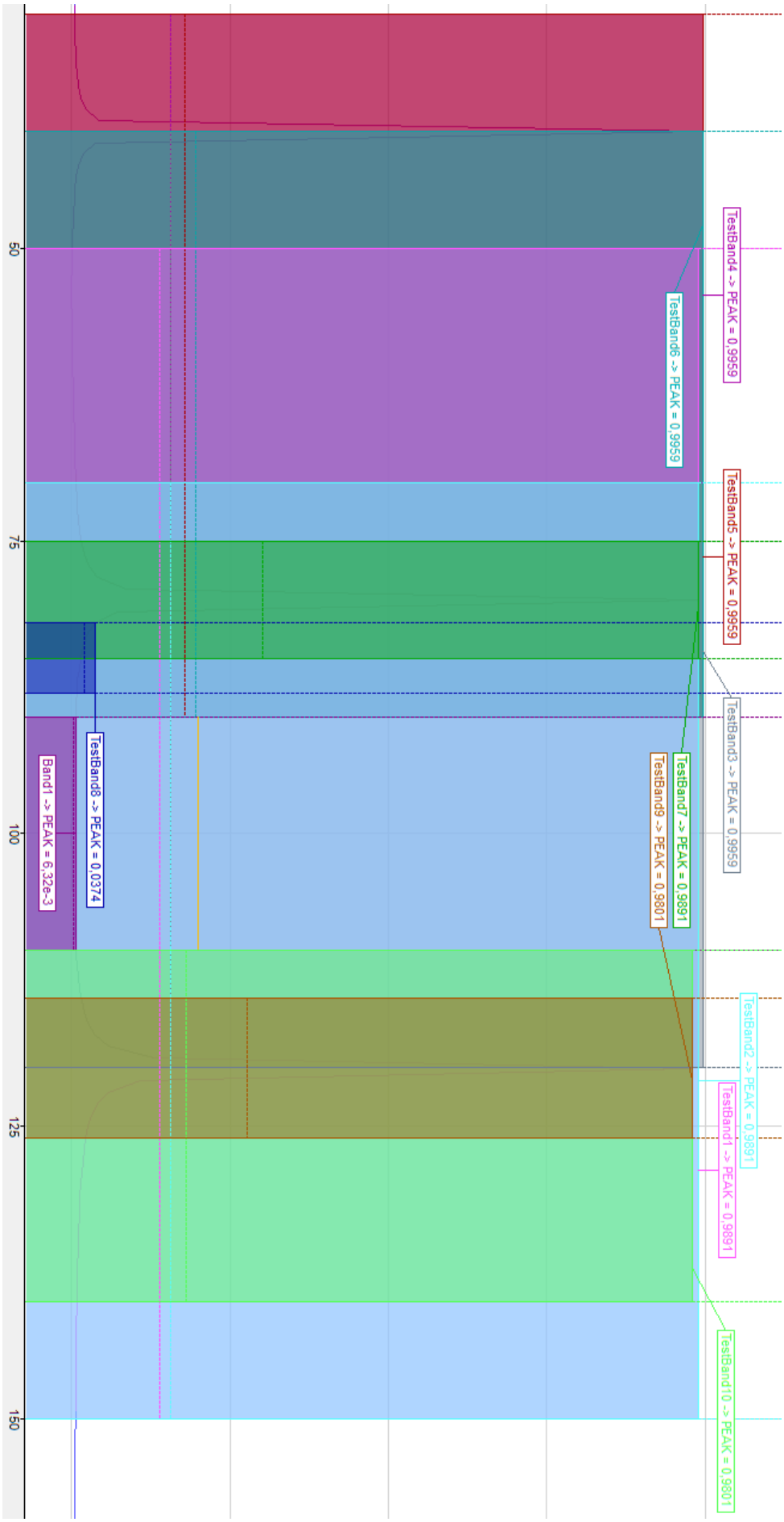
The position of the band label is detemined dynamically, but in a deterministic way. This means if you pause the FFT view and hover over a band multiple times, the label will appear at the same position each time.

The algorithm determining the band label positions guarantees that no labels will overlap. Labels are never positioned above important line segments such as RMS line sigments, lower or upper frequency line segments, peak line segments, … .

If you zoom in on a band, the band label appears in the following way:



In case many bands are defined and set to visible, it becomes difficult to interpret the labels and to see the curve itself.


50
75
100
125
150
TestBand4 -> PEAK = 0,9959
TestBand6 -> PEAK = 0,9959
TestBand5 -> PEAK = 0,9959
TestBand3 -> PEAK = 0,9959
TestBand7 -> PEAK = 0,9891
TestBand9 -> PEAK = 0,9801
TestBand8 -> PEAK = 0,0374
Band1 -> PEAK = 6,32e-3
TestBand2 -> PEAK = 0,9891
TestBand1 -> PEAK = 0,9891
TestBand10 -> PEAK = 0,9801

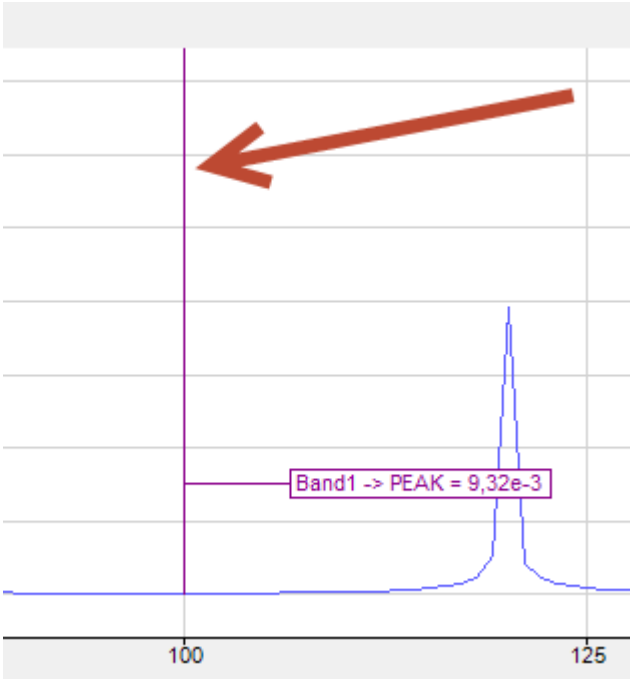
In such situation, the band table can be of great help (see later).

Bands can be visualized in two modes:

- Wide band mode: this is the mode shown in the screenshots so far. The complete frequency range of a band is shown.
- Line band mode: lline band are drawn like markers: the width of a line band is not shown.

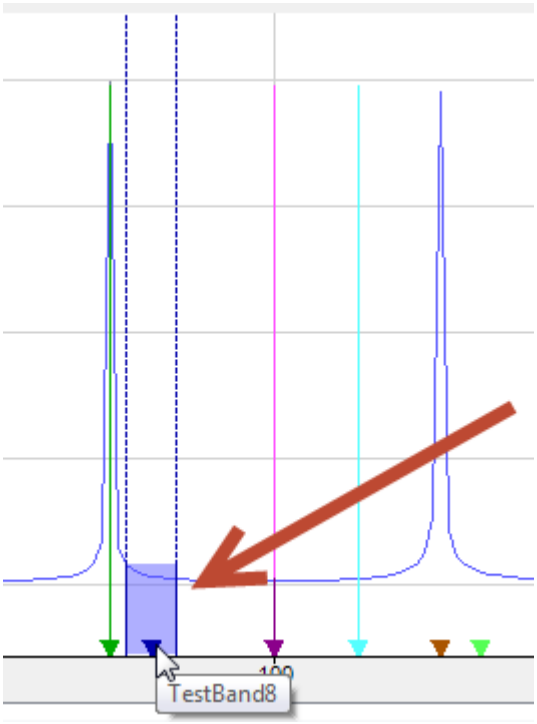
All previous settings apply to both modes.

Here you can see a band in line band mode:

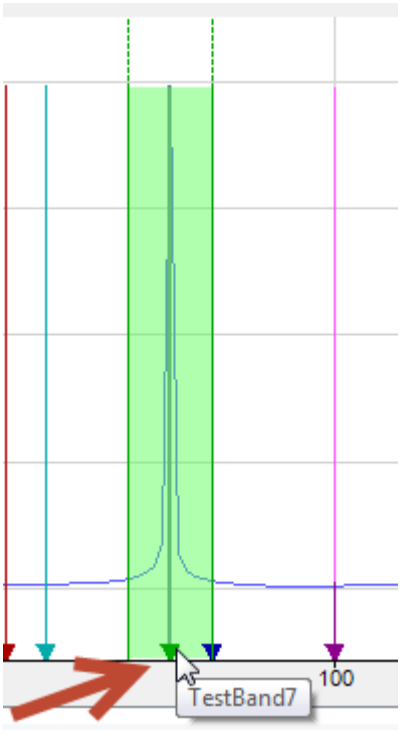


One can still visualize a wide version of a hovered line band by pressing and holding the SPACE bar:

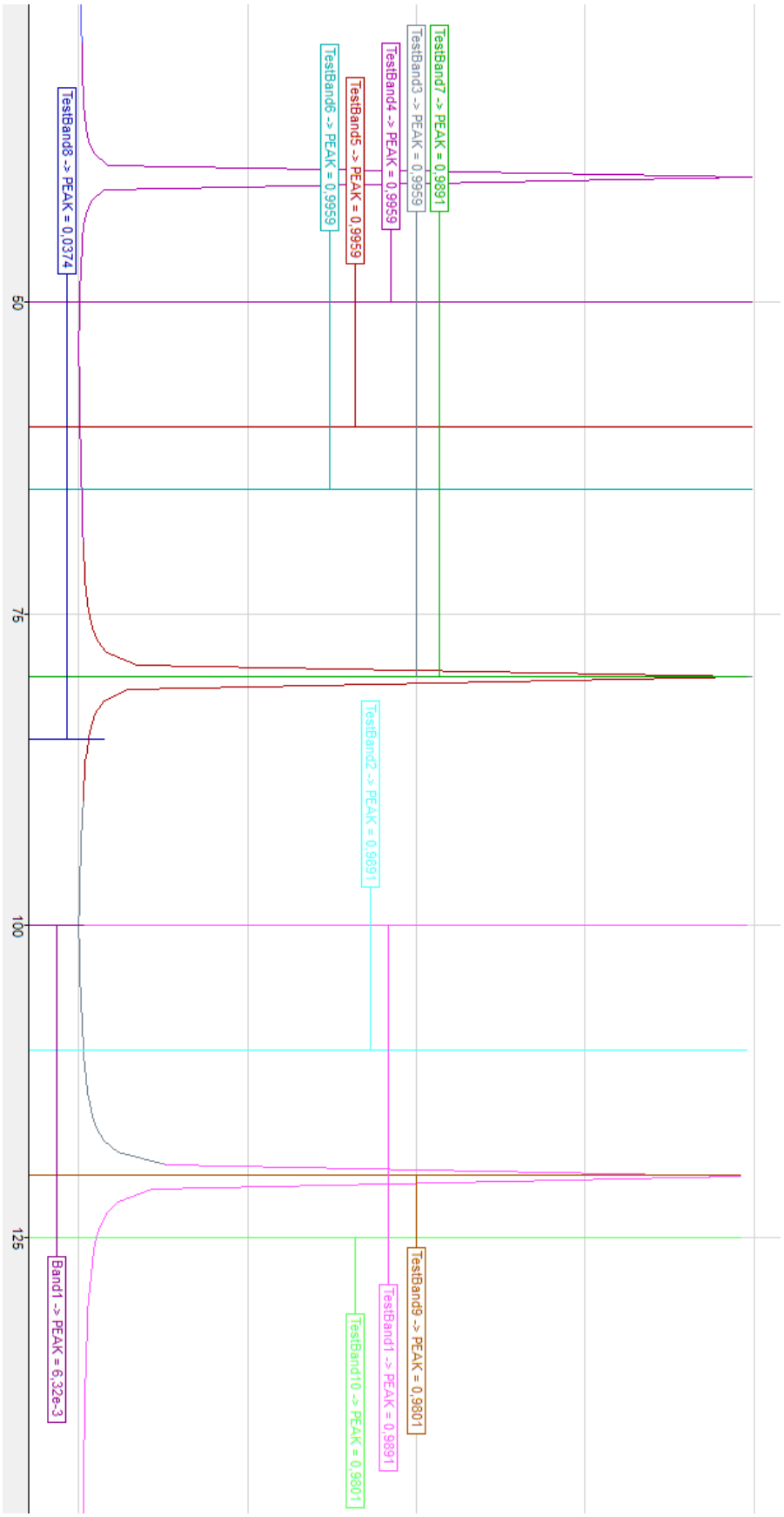
- In case the line band is collapsed, the wide band will have a limited height, its height is percentage of the chart height:



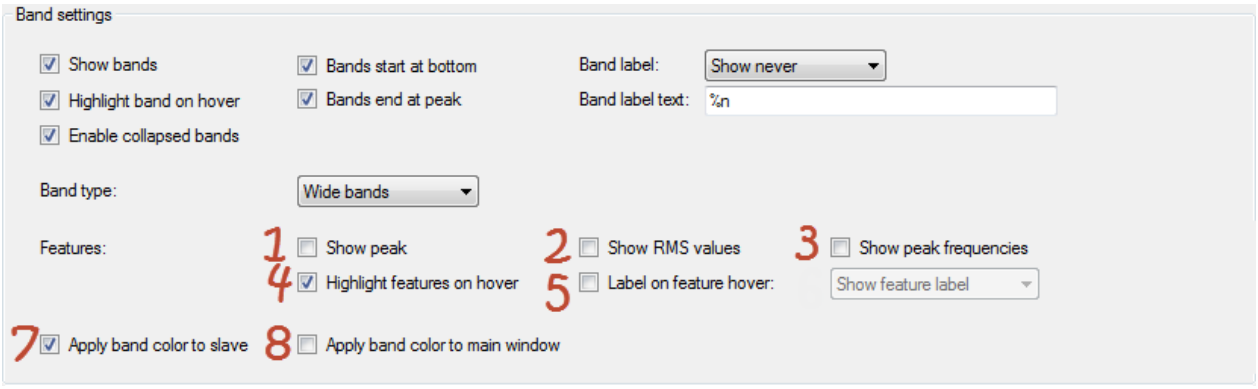
- In case the line band is not collapsed, the wide band will have the normal height (which depends on the other band settings):



In case many bands are defined and set to visible, with the use of line bands, it is easier to interpret the bands, the labels and the curve than with the use of wide bands:


TestBand8 -> PEAK = 0,0374
TestBand6 -> PEAK = 0,9959
TestBand5 -> PEAK = 0,9959
TestBand4 -> PEAK = 0,9959
TestBand3 -> PEAK = 0,9959
TestBand7 -> PEAK = 0,9891
50
75
TestBand2 -> PEAK = 0,9891
100
125
Band1 -> PEAK = 6,32e-3
TestBand10 -> PEAK = 0,9801
TestBand1 -> PEAK = 0,9891
TestBand9 -> PEAK = 0,9801

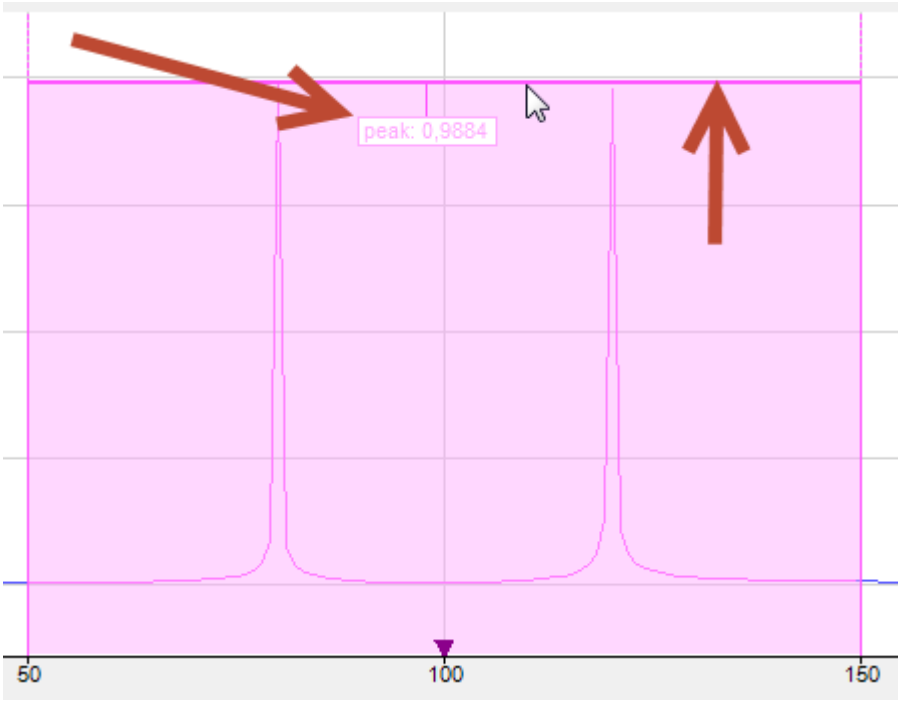
There are a couple of settings that only apply to wide bands.



Now a short description of all 8 settings follows:

1) Show peak: This setting determines whether the system draws a line segment indicating the peak of the band. “The peak” is the first of the three available features. This setting only applies to wide bands. If “Highlight features on hover” is checked, this line segment is highlighted when hovered. The line segment’s label functionality is determined by the “Label on feature hover” setting.

   Here you can see the highlighted peak line segment and its label:

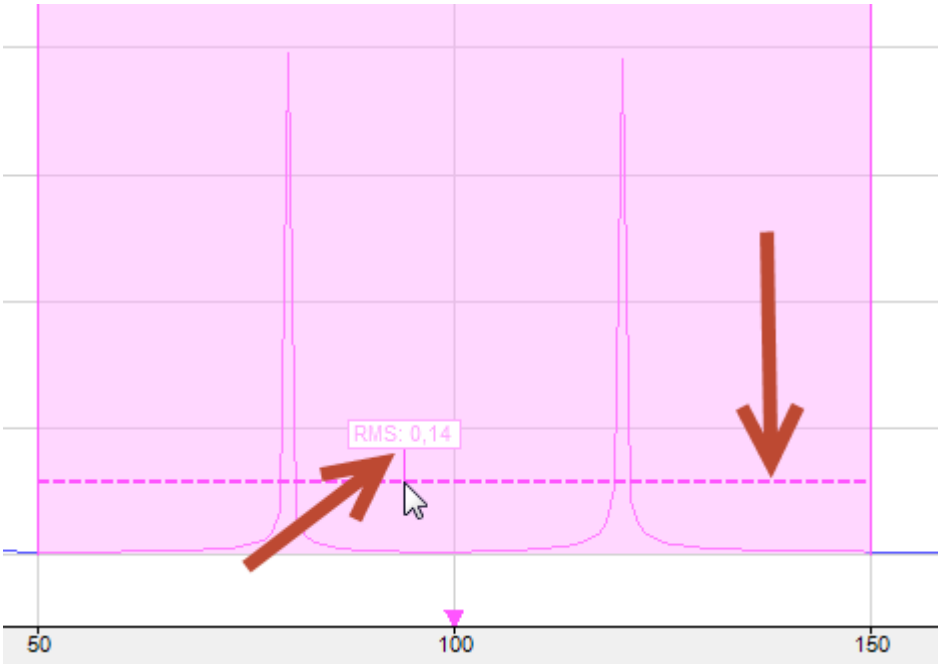


   Note: this peak line segment is only visible if the peak signal of the corresponding InSpectra Expert band is active.

2) Show RMS values: This setting determines whether the system draws a dashed line segment indicating the RMS value of the band. “The RMS” is the second of the three available features. This setting only applies to wide bands. If “Highlight features on

hover” is checked, this line segment is highlighted when hovered. The line segment’s label functionality is determined by the “Label on feature hover” setting.

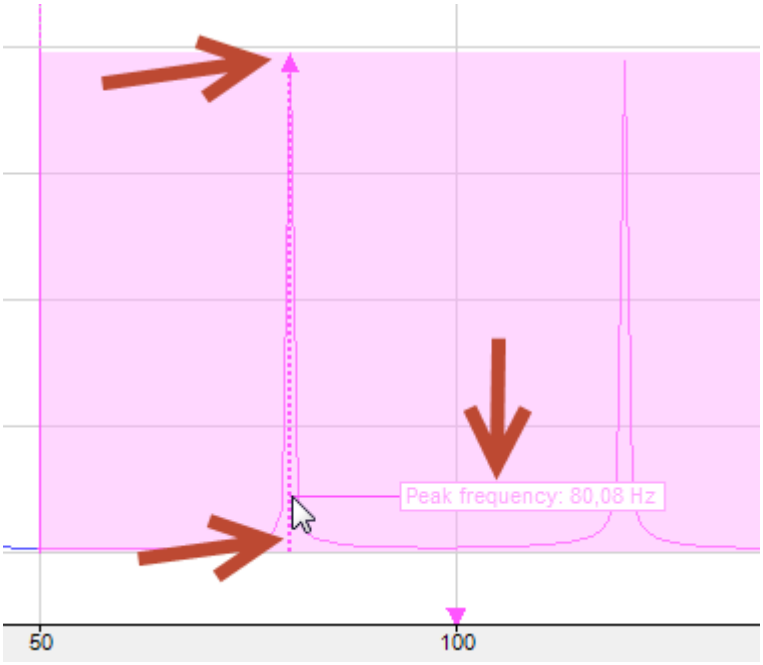
Here you can see the highlighted peak line segment and its label:



Note: this RMS line segment is only visible if the RMS signal of the corresponding InSpectra Expert band is active.

3) Show peak frequency: This setting determines whether the system draws a line segment indicating the peak frequency of the band. This line segment also has an arrow pointing to the peak. “The peak frequency” is the third of the three available features. This setting only applies to wide bands. If “Highlight features on hover” is checked, this line segment is highlighted when hovered. The line segment’s label functionality is determined by the “Label on feature hover” setting.

   Here you can see the highlighted peak frequency line segment and its label:



Note: this peak frequency line segment is only visible if the peak frequency signal of the corresponding InSpectra Expert band is active.

4) Highlight features on hover: If set to true, the three aforementioned features are highlighted when hovering over them. If set to false, nothing will happen if you hover over a feature line segment. You will not be able to see any feature label when this setting is off.

5) Label on feature hover: If you want to see any labels when hovering a feature, this setting must be set to true. The combox right of it determines what label will be displayed. The combobox has two choices:

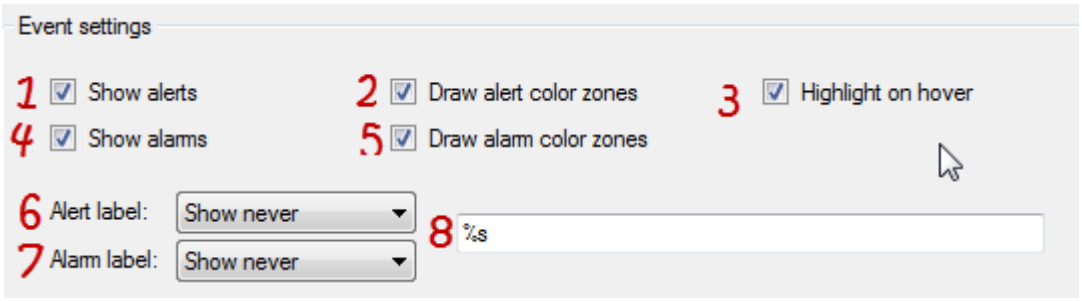
   - Feature label: the label of the feature is shown, the three previous screenshots show this label.
   - Band label: instead of the feature label, the band label is shown

   Note: even if the “Label on feature hover” is set to false, it is possible to visualize the chosen label by pressing and holding CTRL while hovering.

4.2.4 Event settings

The events defined in an InSpectra Expert module can be visualized in the FFT view.

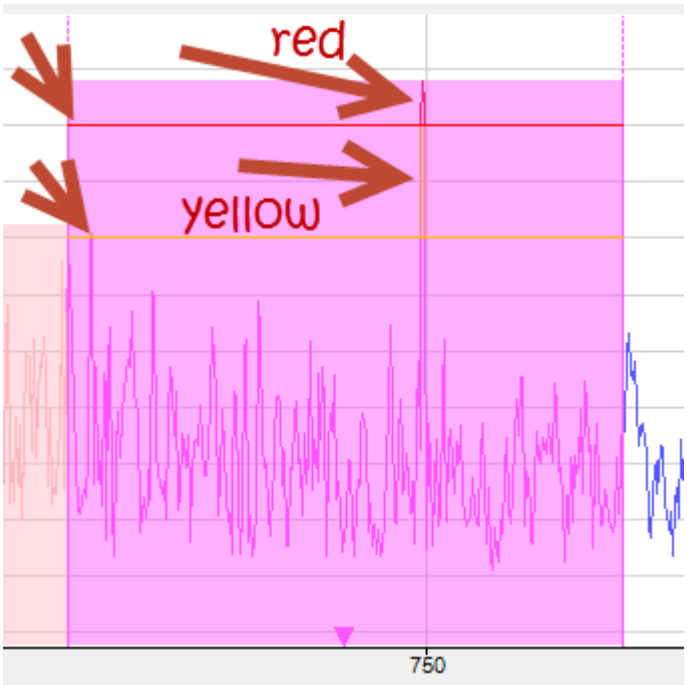
The following settings can be configured:



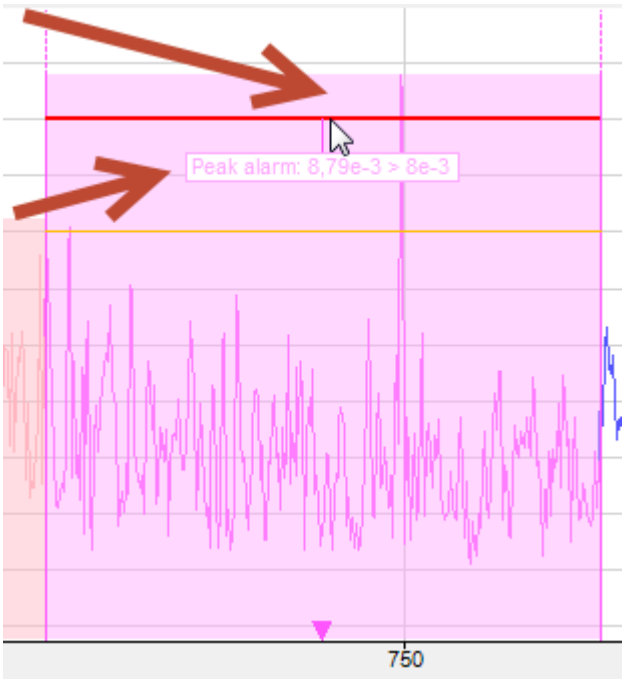
Now a short description of all 8 settings follows:

1) Show alerts: Determines whether the **alerts** are shown. If unchecked, setting (2) is also disabled. Note that alerts are only shown in the chart in case of wide bands.

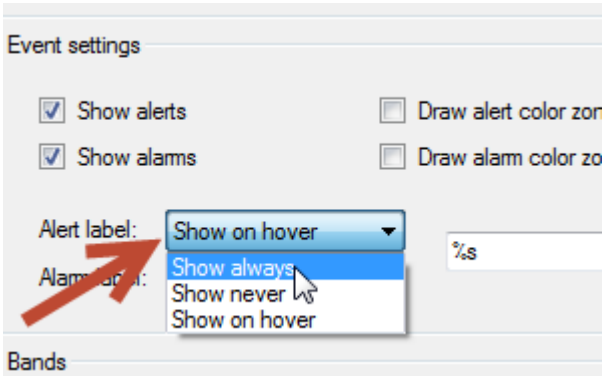
2) Draw alert color zones When checked on, the curve is painted in yellow when it is above the alert level.



3) Highlight on hover: Determines whether the alert and alarm lines are highlighted when hovering. When this option is checked, it is possible to display labels when hovering (depending on the settings 6, 7 and 8).

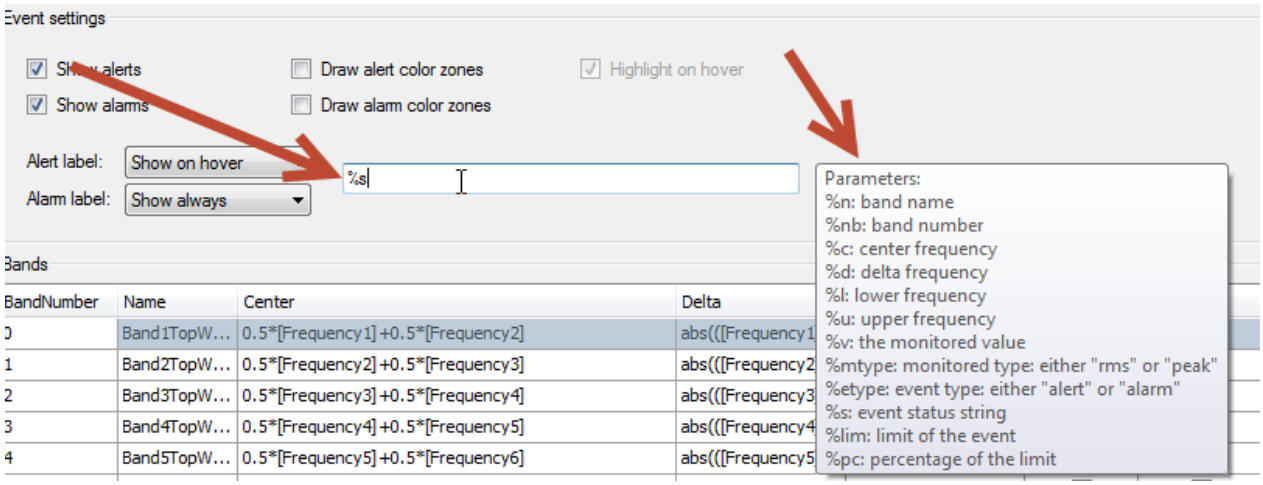


4) Show alarms: Determines whether the **alarms** are shown. If unchecked, setting (5) is also disabled. Note that alarms are only shown in case of wide bands. See point 1.
5) Draw alarm color zones**:** same as point 2, but the red color is used instead.
6) Alert label: Determines what label is displayed. There are three options which are self explanatory:



The text of the label is determined by the text box on the right (= setting 8).

7) Alarm label: same as point 6.
8) Event label text: here you can specify the event label text by combining custom text with placeholders



4.2.5 Band table

In 6.32 the table with the bands is upgraded:

Show bands | Enable collapsed bands : (Top_WR_DS) [16:2] T_WR DS_13652

Nb	Band name	Center	Delta	Peak	Peak Freq	RMS	Alert	Alarm	Alert	Alarm	Visible	Collapsed
0	Band1To...	159,736	46,375	5,38846e-3	143,555	2,13853e-3					☑	☐
1	Band2To...	244,757	38,6458	5,19776e-3	216,797	1,93422e-3					☑	☐
2	Band3To...	341,75	58,3476	6,19027e-3	395,508	2,49998e-3					☑	☐
3	Band4To...	483,452	83,3538	6,21606e-3	436,523	2,69461e-3					☑	☐
4	Band5To...	708,507	141,701	8,78527e-3	748,047	2,41297e-3	> 0,006	> 0,008			☑	☐
5	Overall	780,762	780,762	8,78527e-3	748,047	2,27667e-3					☐	☐
6	ttt	101	5	3,19259e-3	102,539	1,96339e-3					☑	☐

On the left you see an arrow (in the indicator column). This arrow indicates that this band is selected. Only one band can be selected (no multi select).

On the left you also see colored squares. This color is the color of the band.

The bands are grouped per module. In the screenshot there is one module named “Top_WR_DS”. For each module, the table has two checkboxes:

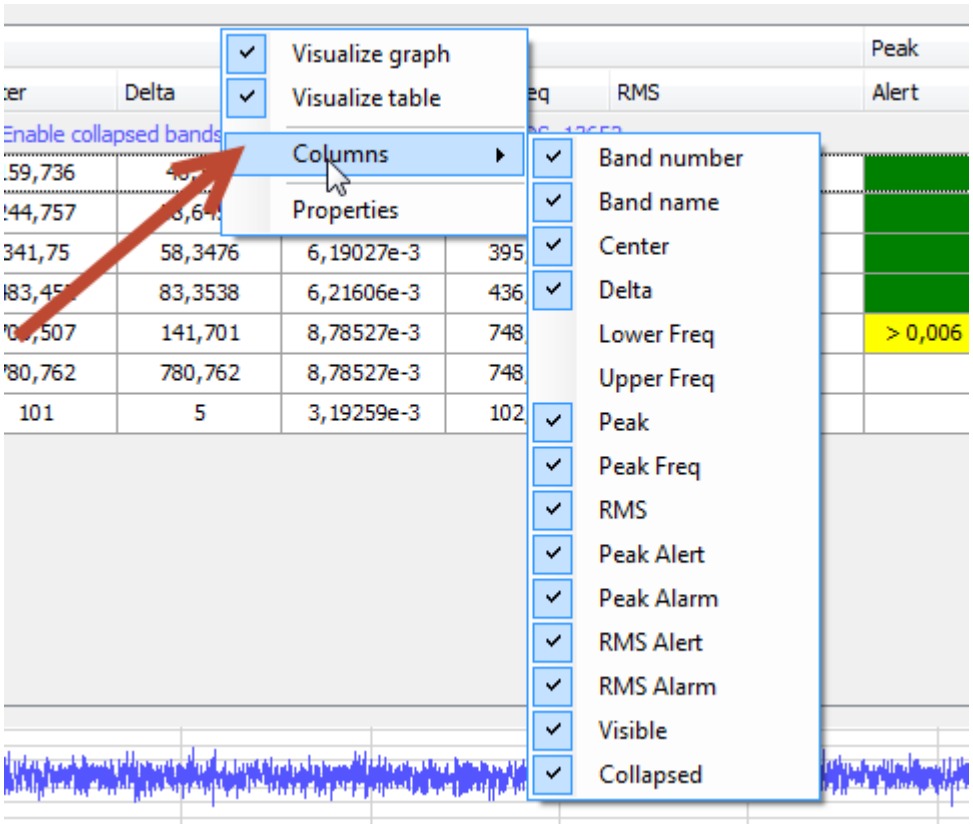
- Show bands: determines whether the bands are shown in the spectrum slave chart. This option is the same setting as option 1 in the band settings (see 4.2.3).

  If this option is set to false, you cannot edit the visible column in the band table.

- Enable collapsed bands: determines whether bands can be collapsed. This option is the same setting as option 5 in the band settings (see 4.2.3).

  If this option is set to false, you cannot edit the collapsed column in the band table.

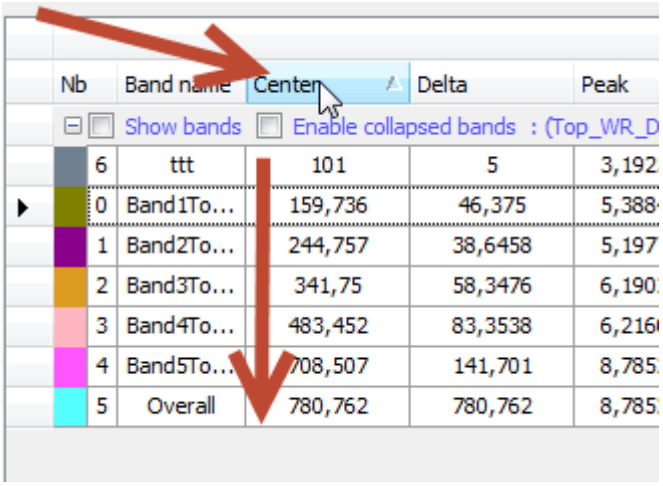
You can choose what columns you want to see through a context menu:



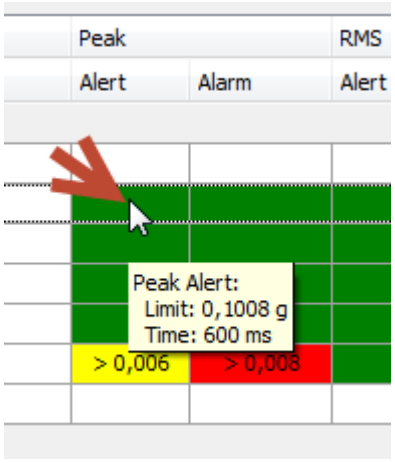
As you can see, you can visualize the “Lower Freq” and “Upper Freq” columns as well. So, you can choose whether you want to see the center/delta notation or the lower/upper notation.

You can easily check or uncheck some columns without having to reopen the context menu over and over again.

You can easily **sort the table** based on most of the columns:



When hovering an event column, you see a tooltip indicating the limit, time and deadband of the event (if time or deadband is zero, it is not shown).



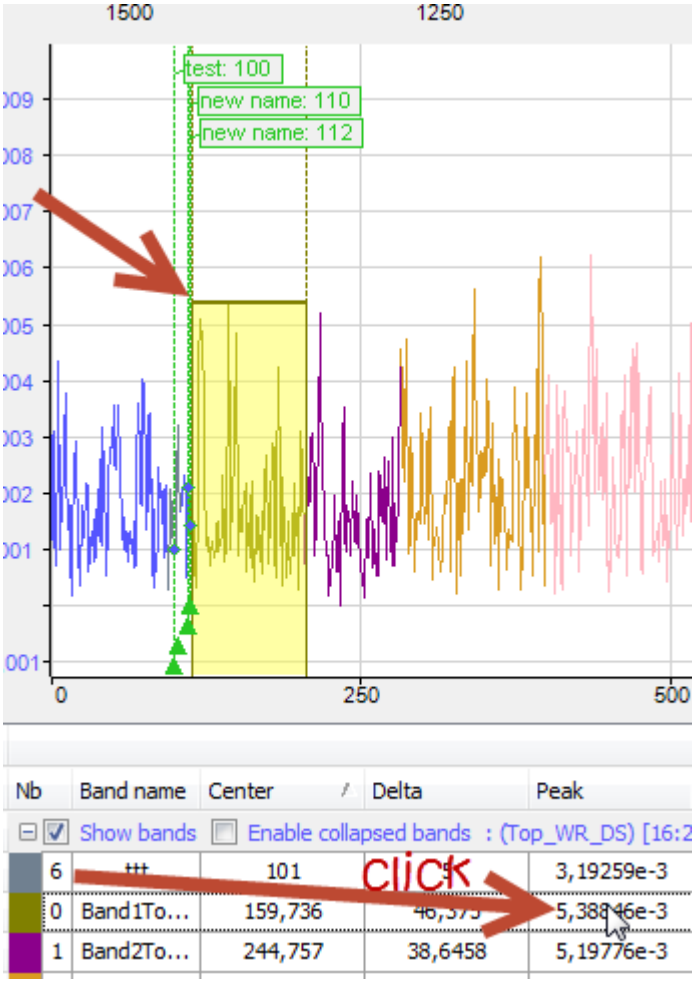
This does not work for the visible and collapsed column, because there the usual **ibaPDA header clicking** was implemented. This usual header clicking copies the value of the selected cell to all cells below.

A lot of interactions between the spectrum slave chart and the band table have been implemented:

1) If you **double click on a band** in the table, it's visiblity state is changed. This only works if "Show bands" is checked. If you **double click on a band while you hold C** (abbreviation of "**C**ollapsed"), then the collapsed state of the band changes. This only works if "Enable collapsed bands" is checked.
2) If **you click (and hold) on a band in the table, then the band is highlighted in the spectrum** slave chart. This only happens if the "Highlight band on hover" setting is checked on (see 4.2.3)

   Moreover, **if you click on the peak cell of a band in the band table, then the peak line in the spectrum slave chart is also highlighted** (i.e. becomes ticker). This only

works if the Highlight features on hover setting (see 4.2.3) is activated. The same is true for the peak frequency and the rms. It also works for the event columns, but this requires the Highlight on hover setting in the event settings to be activated (see 4.2.4).



3) **Zooming on a band temporarily**: if you select a band in the band table and you press the Z button, then the spectrum slave chart will zoom onto the band. You can hold the zoom button and select another band in the band table to quickly zoom onto some consecutive bands. You can do this with the arrow keys or with the mouse.

   You cannot zoom onto bands with a delta frequency lower or equal to zero.

   This zooming only works if your mouse cursor is in the region of the fft view.

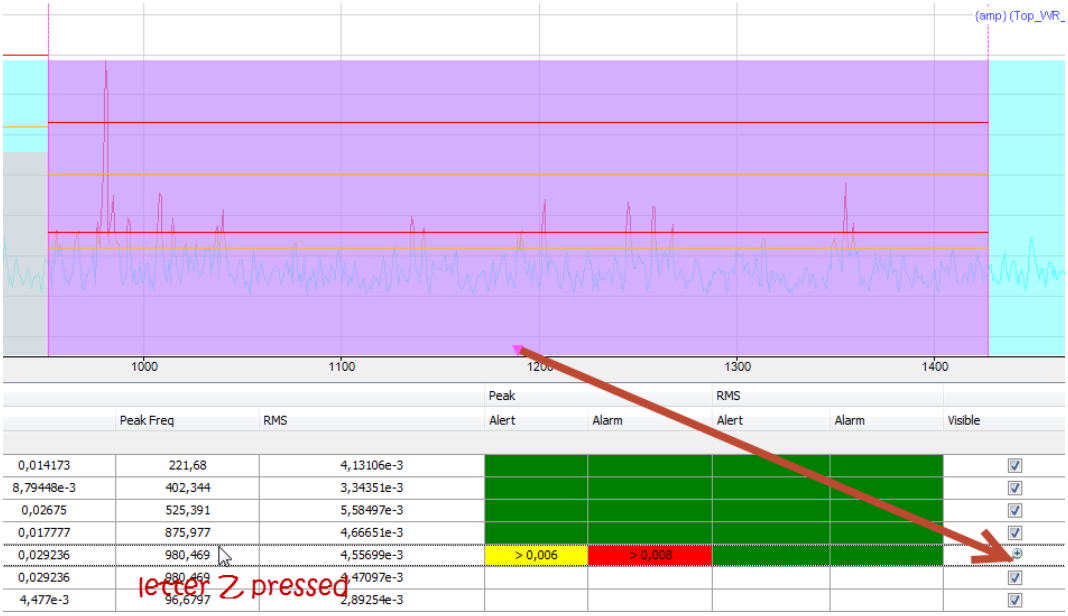
   If the Show bands setting is off, the zooming also does not work.

   If you are zooming, a magnifying glass appears in the visible column.

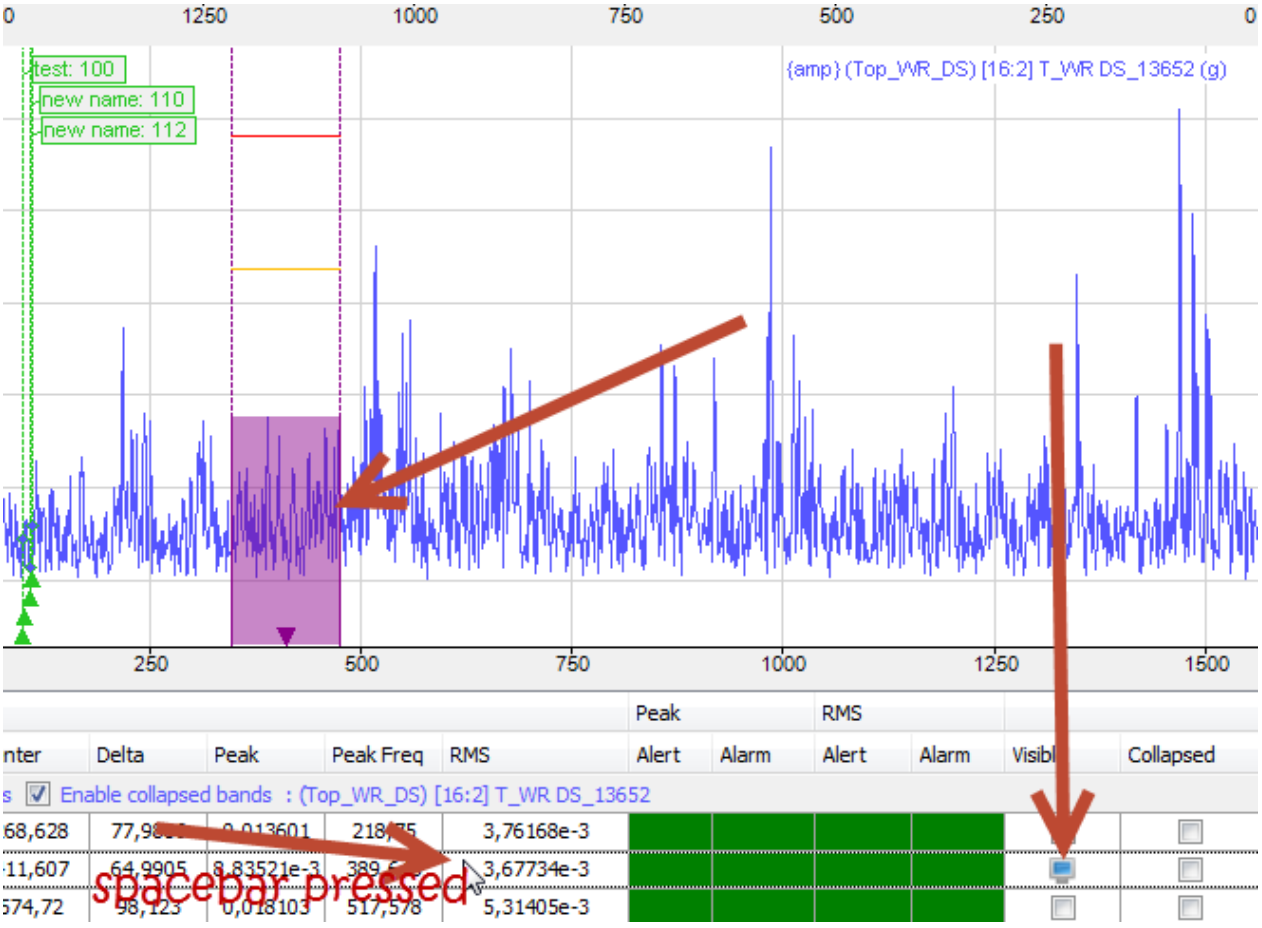
   Even if the band was not visible, the zooming will work, because the system will visualize the band anyhow during the zooming.

   During zooming, you can check or uncheck the visibility or collapsed state of other bands.

   If you release the Z key, the zooming ends automatically and the visibility state of the band is restored.



4) **Visualizing bands temporarily**: if you select a band or a module in the band table and you press the SPACE bar, then this band (or all bands in case of a module) are visualized temporarily. You see a blue screen icon while the spacebar is pressed.



This zooming only works if your mouse cursor is in the region of the fft view.

You can hold the SPACE bar and select another band in the band table to quickly visualize some consecutive bands.

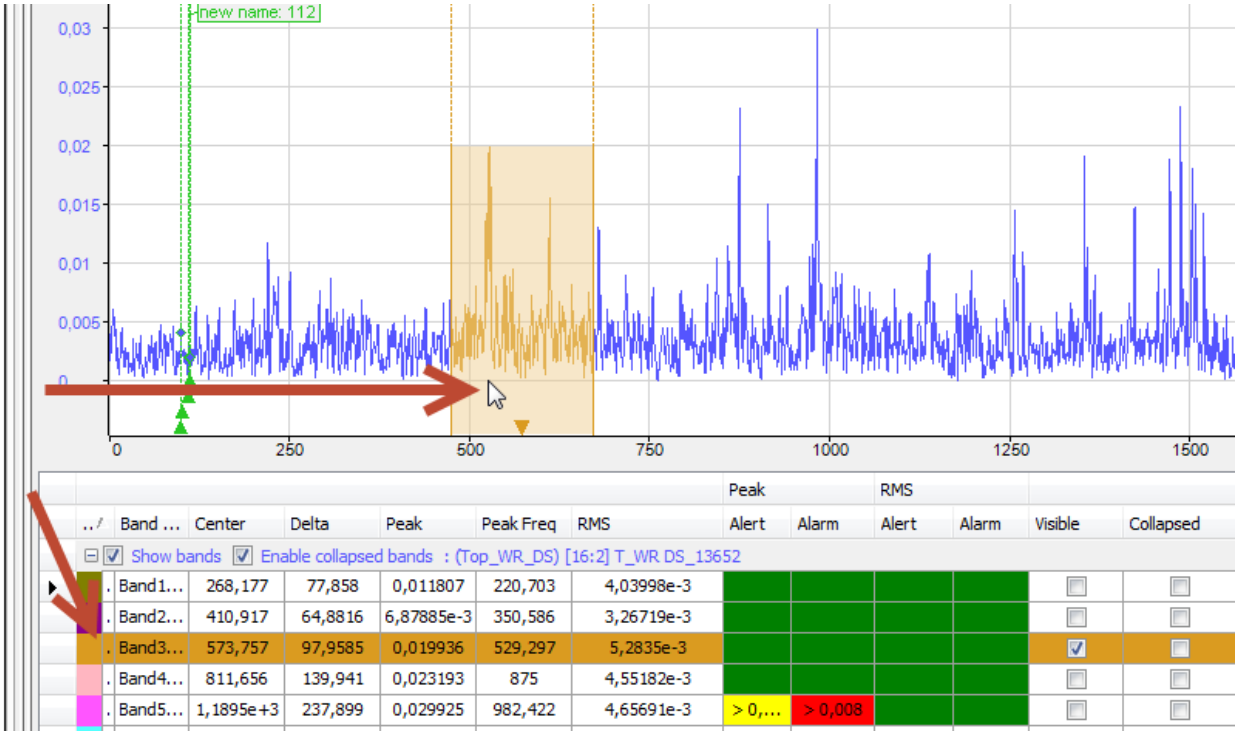
If the Show bands setting is off, this does not work.

If you release the SPACE bar, the visibility state of the bands is restored.

During this operation, you can check or uncheck the visibility or collapsed state of other bands.

If the selected band is collapsed when pressing the SPACE bar, the band is visualized with a limited height.

5) **Hovering in spectrum slave -> colored selection in band table + automatic scrolling**: If you hover over a band in the spectrum slave chart, the band table automatically colors this band and scrolls to this band:



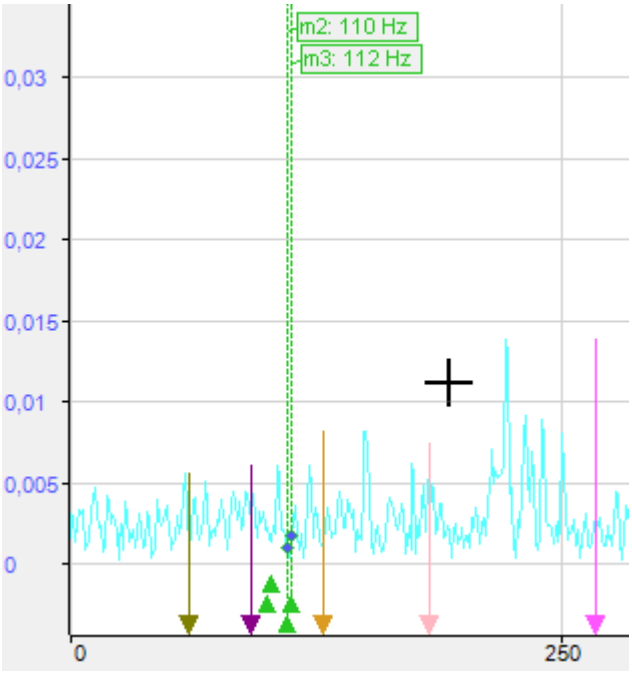
If you hover over multiple bands, the system will try to scroll the band table in such a way that you see as many as possible hovered bands.

When scrolling, the hovered bands with the largest left bound have priority when deciding what band to visualize in the band table.

4.3 Stacking of collapsed markers and bands

As explained previously it is possible to collapse markers (main window + spectrum slave) and bands (spectrum slave). A collapsed marker/band is drawn as a triangle.

If many markers and/or bands are displayed near a specific frequency, we do not want all these triangles to overlap. That is why we stack these triangles:

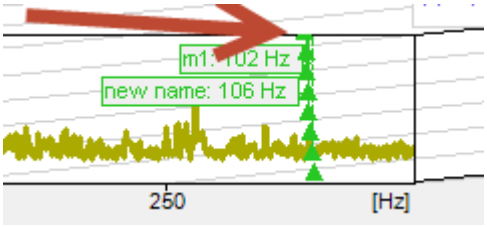


The four green upward triangles are markers. The two left markers are collapsed. The other triangles pointing downwards are bands (shown as line bands).

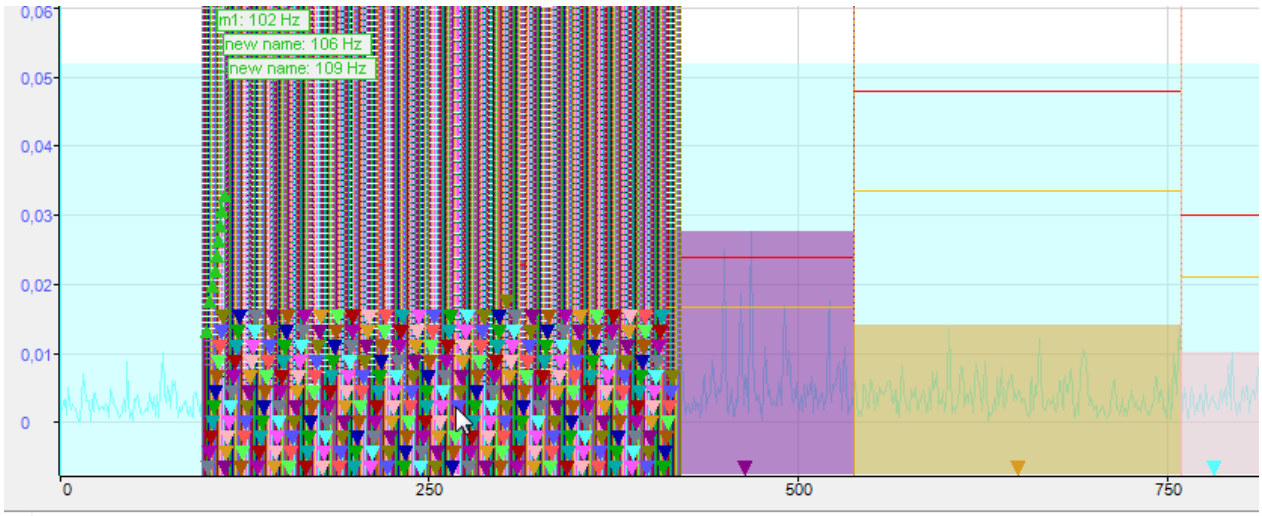
Thanks to the stacking of the triangles it is still possible to click on or hover over these triangles deterministically.

The triangles of the bands are drawn in a first step, the triangles of the markers in a second step. Note that in the main window no bands are displayed (so there we only have marker triangles).

Note that the stacking also has a disadvantage. If too many markers or bands are present near a frequency, it is possible that the height of the chart is not sufficient to display them all:



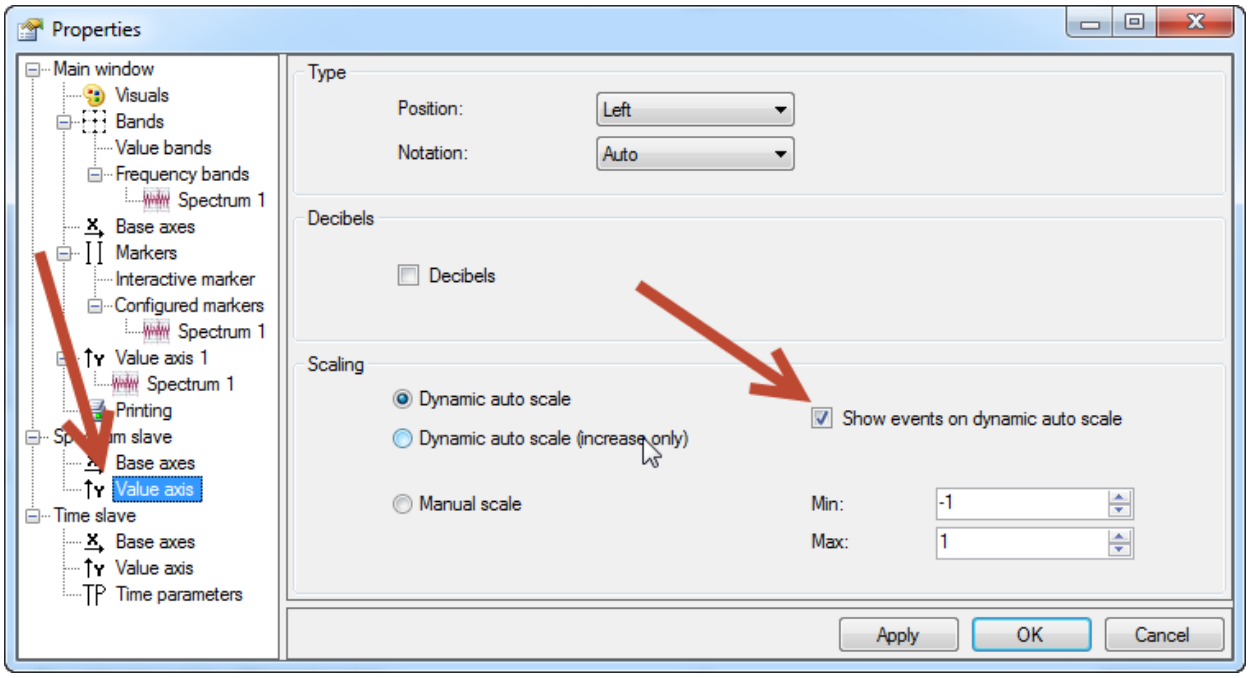
The following screenshot represents an artifical situation illustrating that visualizing 400 bands is not really useful but yet possible.

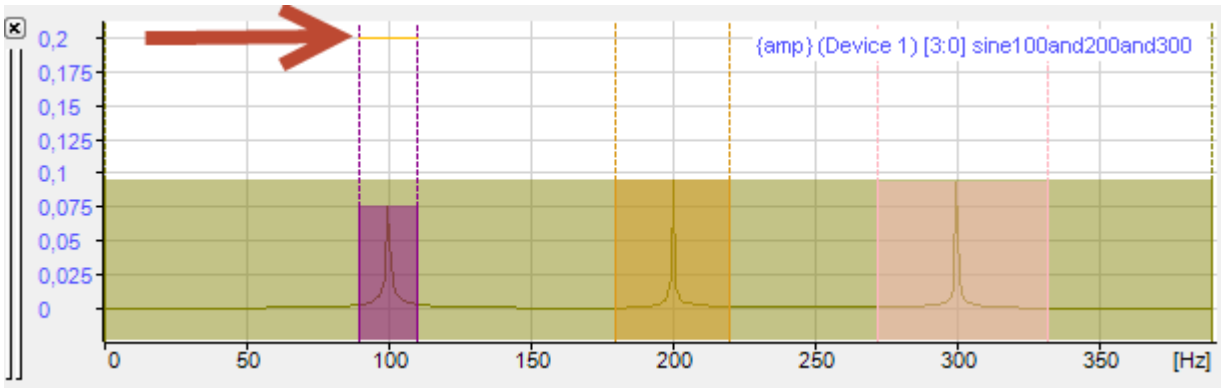


Nb	Band name	Center	Delta	Peak	Peak Freq	RMS
167		262	5	8,29449e-3	260,742	4,13354e-3
168		263	5	8,29449e-3	260,742	4,16144e-3
169		264	5	8,29449e-3	260,742	4,17773e-3
170		265	5	8,29449e-3	260,742	4,26215e-3
171		266	5	6,21245e-3	270,508	3,89172e-3
172		267	5	8,22645e-3	271,484	4,38646e-3
173		268	5	8,22645e-3	271,484	4,53731e-3
174		269	5	8,22645e-3	271,484	4,3554e-3
175		270	5	8,22645e-3	271,484	4,35872e-3
176		271	5	8,22645e-3	271,484	4,28282e-3
177		272	5	8,22645e-3	271,484	4,20978e-3
178		273	5	8,22645e-3	271,484	4,12726e-3
179		274	5	8,22645e-3	271,484	4,1818e-3
180		275	5	8,22645e-3	271,484	3,97448e-3
181		276	5	8,22645e-3	271,484	3,49661e-3

4.4 Spectrum slave: dynamic autoscale

In case the scaling type is set to “Dynamic auto scale” or “Dynamic auto scale (increase only)”, it is possible to choose whether the automatic scaling should guarantee the event limits to be displayed:



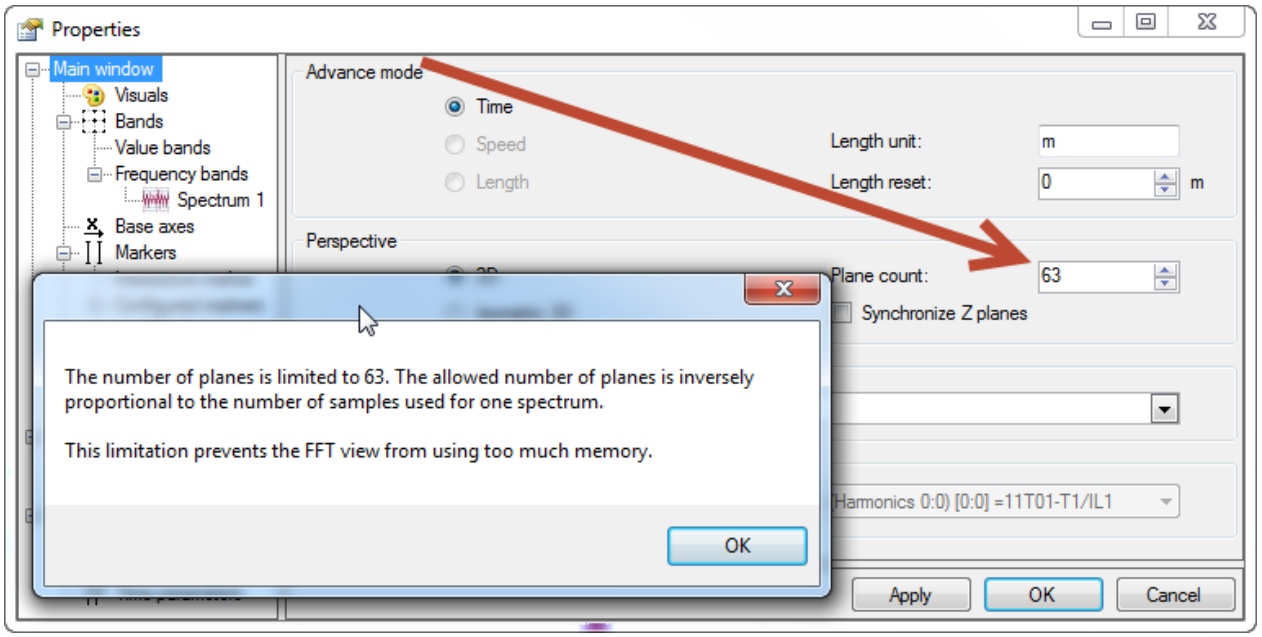


In case the aforementioned checkbox would be unchecked, the yellow limit line segment in the chart above would not be visible.

4.5 Number of planes

The number of planes for the isometric perspective (3D) in the FFT view is limited. The allowed number of planes is inversely proportional to the number of samples needed to calculate one spectrum (not taking into account averaging). If multiple spectra are shown in the FFT view, the **highest number of samples** is used.

If you increase the number of planes in the properties dialog of the FFT view, you will see a message box explaining that the number of planes you entered is too high and that this number of planes was limited automatically to the maximum allowed number:



More specifically, “highest number of samples” multiplied by “the number of planes” cannot exceed 524288. In case the number of samples is 4096, you can visualize 64 planes.

This limitation will be different when using the FFT view from within ibaAnalyzer (which is not possible yet).

5 IntelliSense improvements

We improved the implementation of Intellisense for expressions in ibaPDA:

a) Suppose you start typing something and the Intellisense window opens. Suppose nothing proposed by the IntelliSense system matches with what you are typing. **If you now press the space bar, then the Intellisense window will close and the space will be added to the expression**. In the old version, the IntelliSense window was also closed, but the space was swallowed instead of being added to the expression.

b) The Intellisense for technostrings in 6.31 was not really user friendly. It was possible to select technostrings or sections, but to be able to use a section in an expression, you should type a combination of a technostring and a section, something like:

   ➔ "[technostring.section]".

   This format is now supported.

   In 6.32 you can now easily select a section:

   - Either you type **"** which will automatically be replaced by "" and press CTRL + SPACE to see the IntelliSense window. If you start typing, the Intellisense window will also appear.
   - Either you type **"[** which will automatically be replaced by "[]". If you press CTRL + SPACE, the IntelliSense window will appear. If you start typing, the IntelliSense window will also appear.

6 ibaBM-DP

6.1 Device

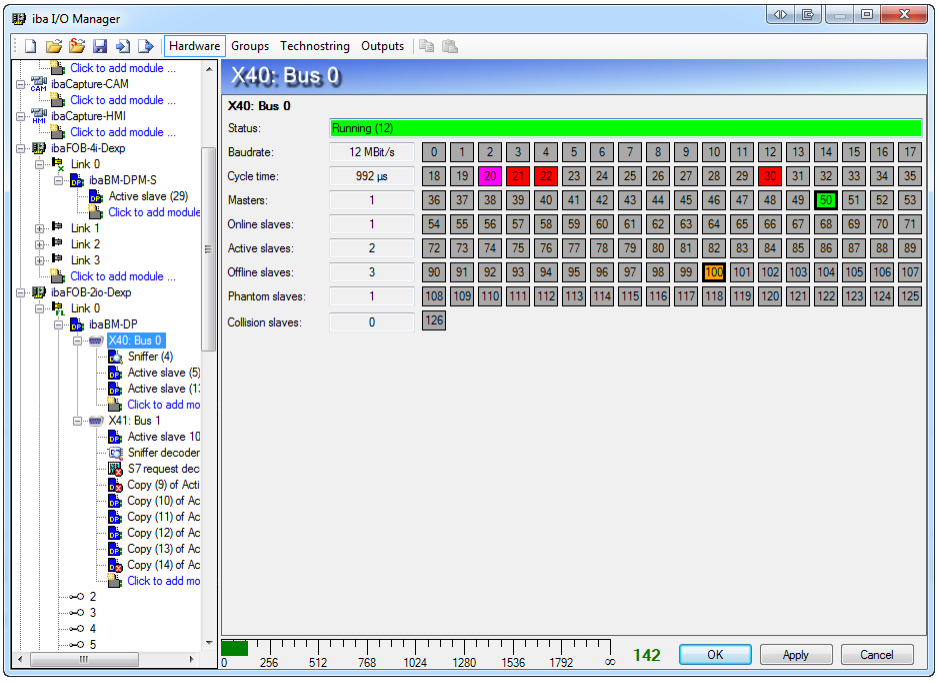
The ibaBM-DP is the successor to the ibaBM-DPM-S. The device has 2 modes:

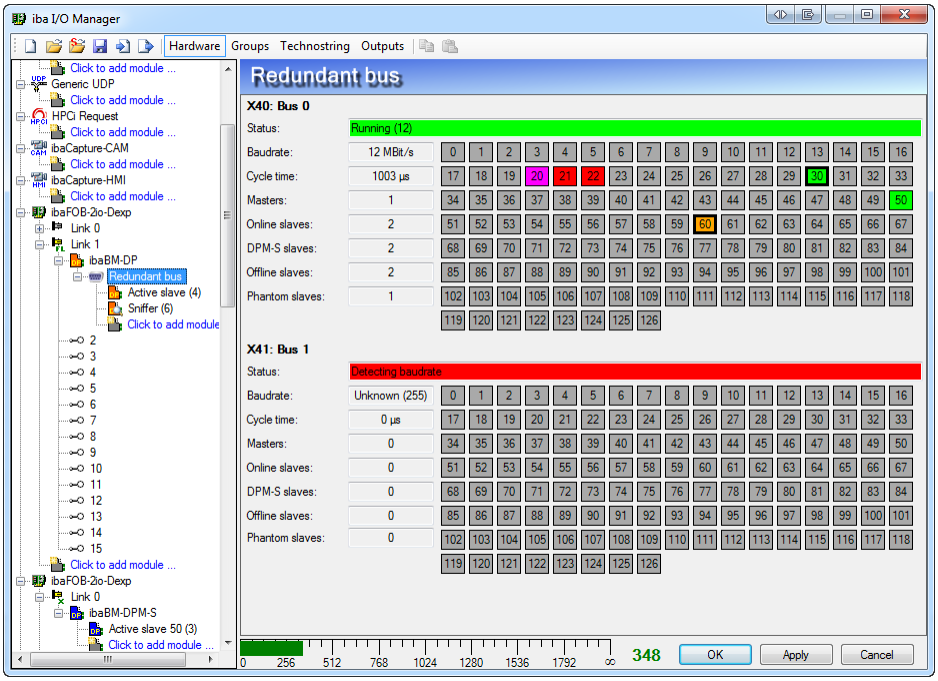
- Compatibility mode. In this mode the device behaves completely the same as the old ibaBM-DPM-S. It uses the 32 Mbit/s fixed protocol on the FO link. It can measure 512A + 512D signals for a total size of 1984 + 64 bytes at 1ms. A network cable needs to be connected so that ibaPDA can load the configuration onto the device.
- Flex mode. In this mode the device uses the 32 Mbit/s flex protocol on the FO link. This means that it can be cascaded with multiple devices on the same link. It can measure now 1024A + 1024D signals with a total size of 4060 bytes. The 4060 bytes can be transferred at 1.4ms. At 1ms the device can transfer 3100 bytes and at 0.5ms 1540 bytes. In this mode 1024A + 1024D outputs are supported as well. No network cable is required because ibaPDA uses the Ethernet channel on the flex FO link to load the configuration.

You can switch between the 2 modes by changing the S2 switch on the device. S2=0 is compatibility mode. S2=1-F is the flex mode with S2 corresponding with the flex address. The S1 switch needs to be set to 1 which means sniffer mode. In ibaPDA you can switch by changing the “Mode” property. Autodetect will also set the property correctly. During validation the mode will be checked as well.

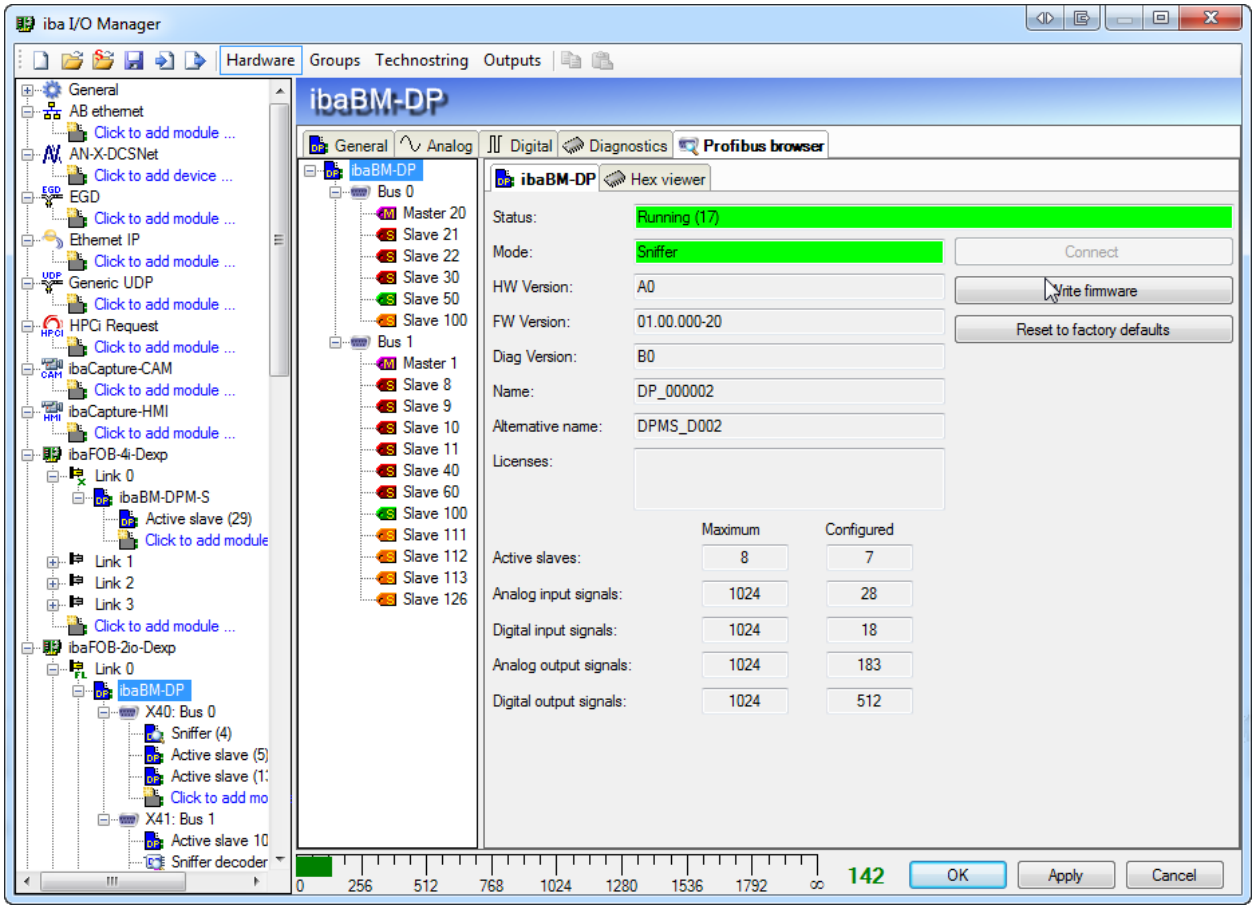
In the I/O manager there are a number of differences between the ibaBM-DP and ibaBM-DPM-S modules. The 2 profibus connectors are shown as separate nodes in the tree. Each module is

explicitely assigned to one profibus connector. Therefor some of the modules have changed or new module types have been created for the ibaBM-DP.





The bus node shows diagnostics for the single profibus or for both profibuses when redundancy mode is enabled. You can click on a slave to go to the profibus browser.



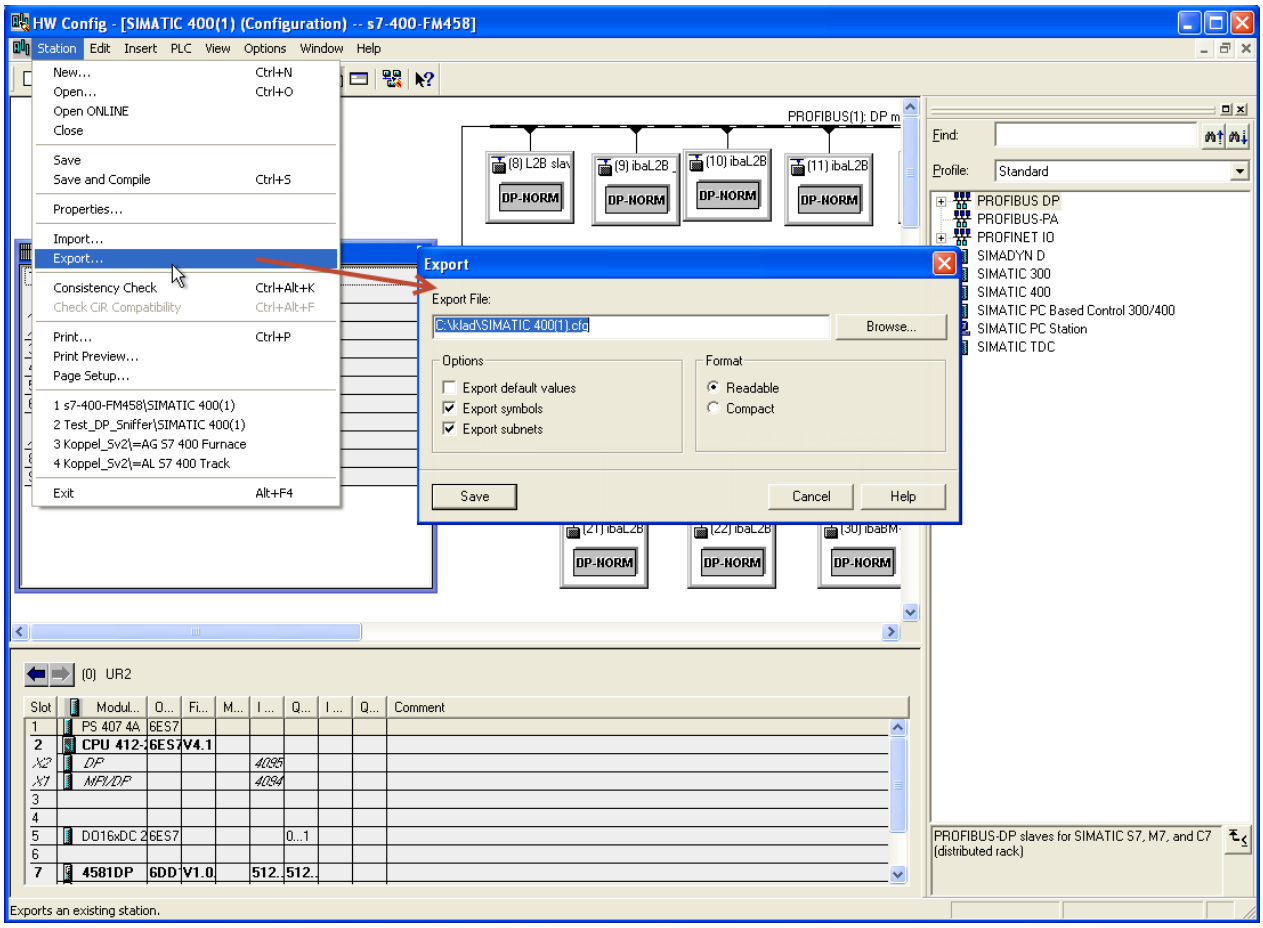
On the profibus browser there have also been some changes. You can now see the name of the device and the available licenses (e.g. redundancy mode). You can also see how many active slaves and signals there are configured and how many there are maximally allowed.

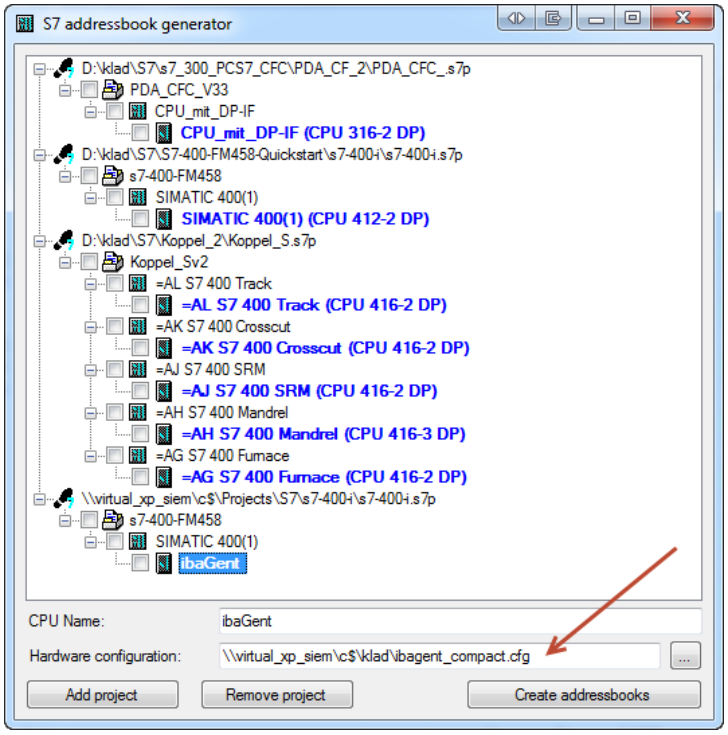
You can also update the device firmware via the profibus browser.

6.2 Sniffer module

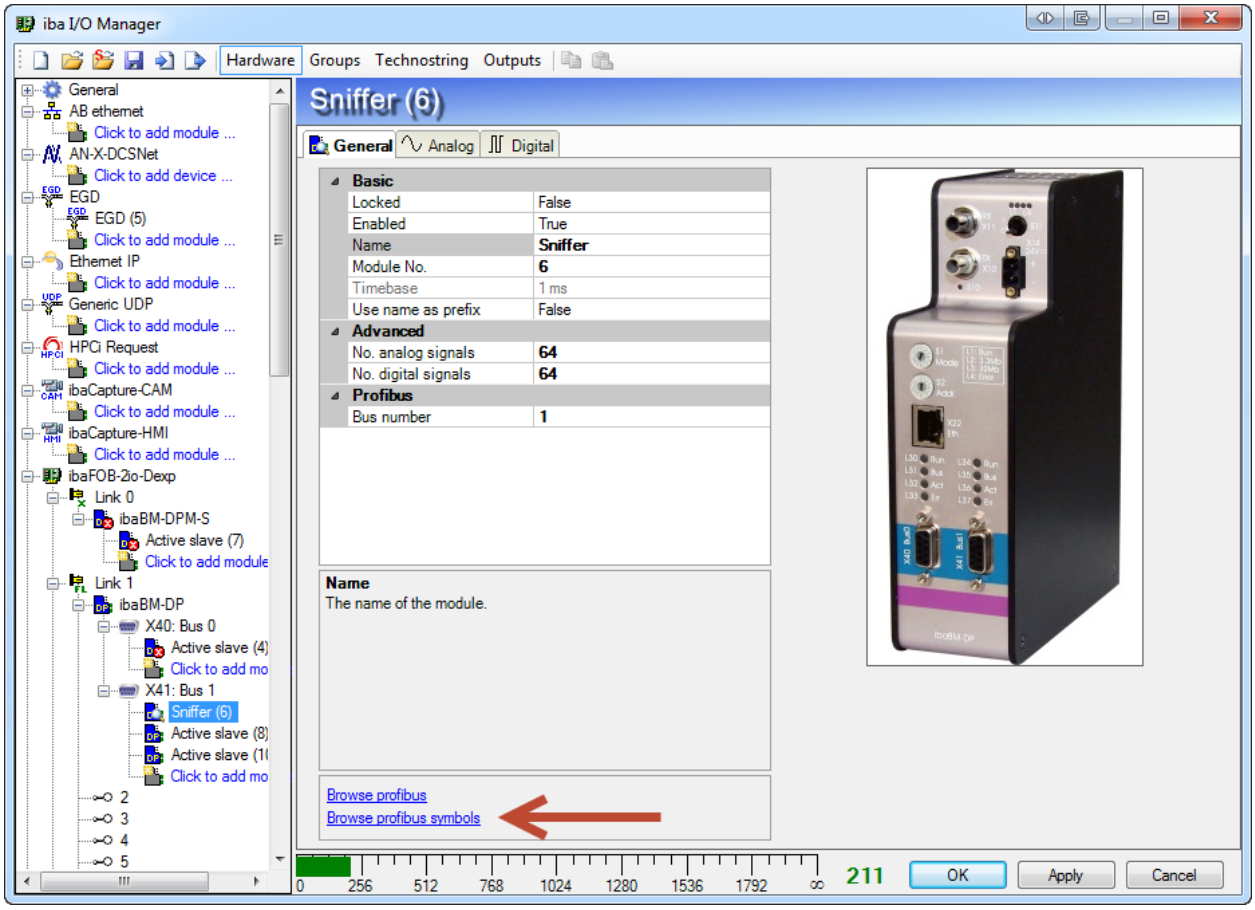
The sniffer module on the ibaBM-DP is now a pure sniffer module. You can no longer define active slaves in it. It is also coupled to a single bus so there is no bus column anymore in the signal grids.

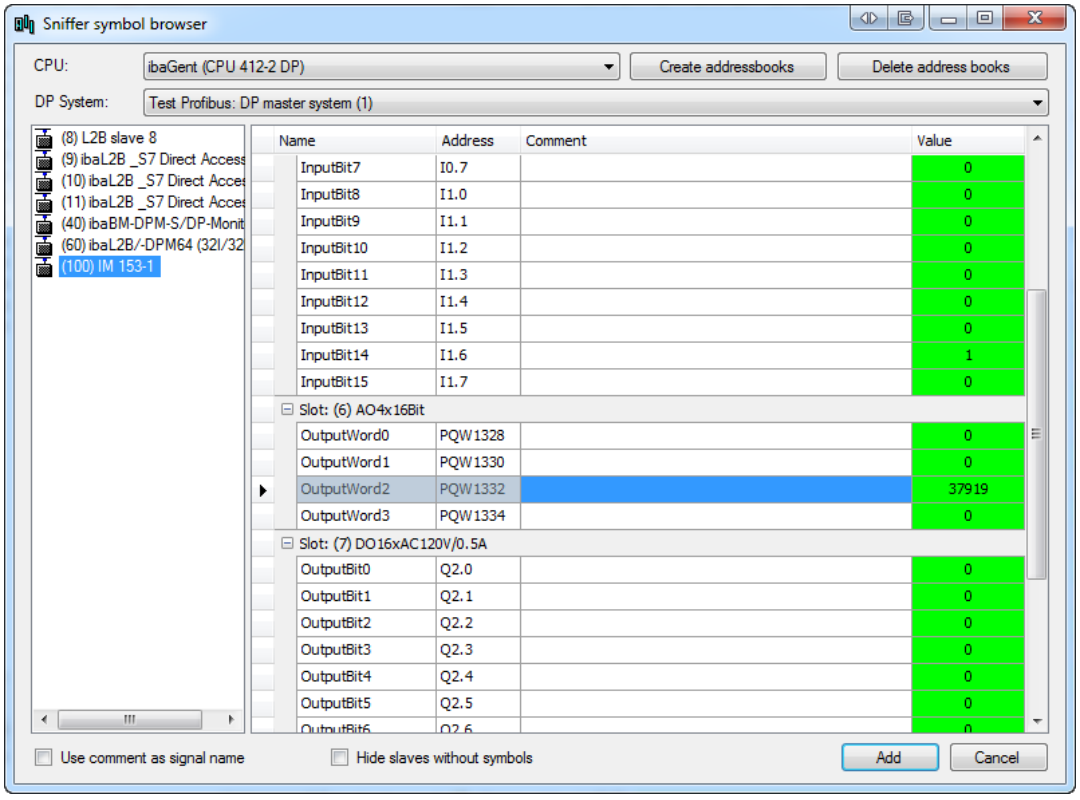
The sniffer module now has the ability to browse the profibus symbolically. The symbols are extracted from the Siemens Step 7 hardware configuration. In the Siemens hardware config tool you have to select Station -> Export. You then need to select “Export symbols” and “Export subnets”. The format doesn’t matter. Both readable and compact are supported.





In the ibaPDA S7 addressbook generator you can now add the path of the exported hardware configuration file on the rack or CPU node. If you do this then the generated addressbook will contain the symbols for the different profibus slaves. On the sniffer module there is a “Browse profibus symbols” hyper link. Click this to open the symbolic profibus browser.

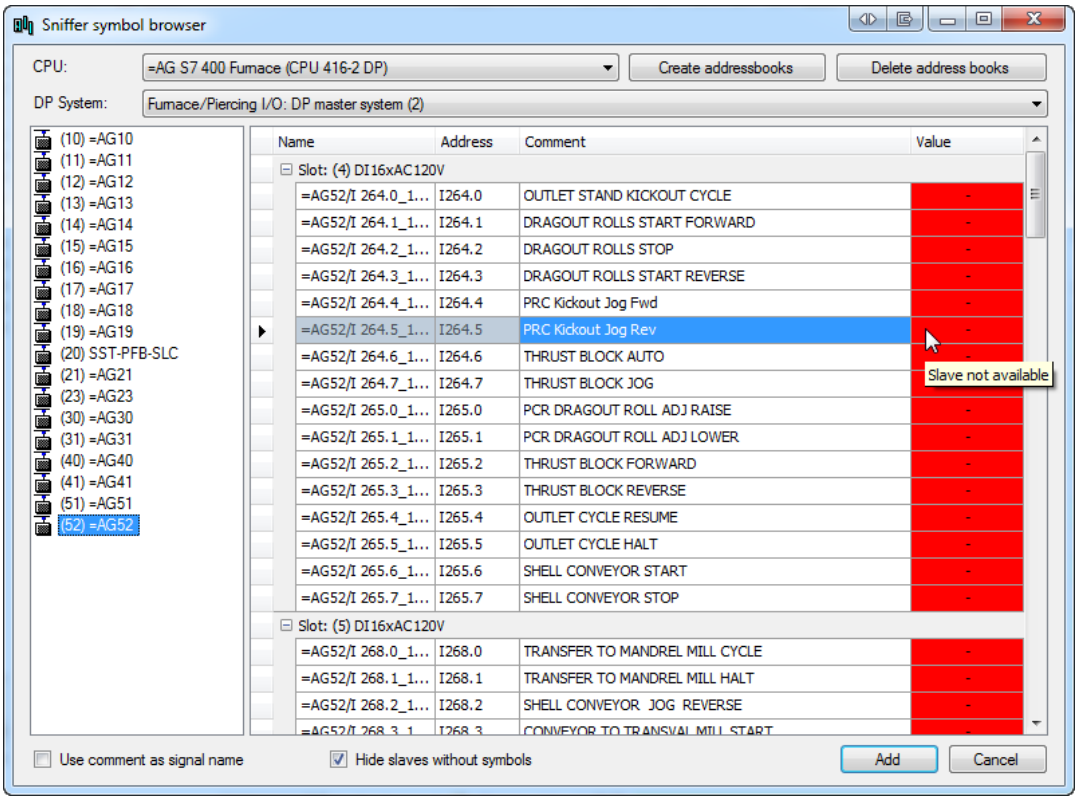




You first have to select a CPU from the list of addressbooks. If the addressbook contains hardware information then you can select the profibus you want from the DP system dropdown list. The tree on the left will then show all the profibus slaves on the system. The slave number is displayed in front of the slave name.

The table shows the different input and output symbols grouped by slot. The value column shows the current value of each symbol. The background will be green if the slave is available and the offset fits inside of the input or output data area. It will be red in case of an error. The error message is shown as tooltip when you hover over the cell.

You can double-click a row to add the symbol to the signal grid of the sniffer module. You can also select one or more rows and then click the Add button to add the symbols to the signal grid.



The symbolic browsing also works on the sniffer module of the old ibaBM-DPM-S.

6.3 Active slave module

The only difference between the active slave module of the ibaBM-DP and the ibaBM-DPM-S is that the one on the ibaBM-DP supports outputs. You can configure up to 1024A + 1024D outputs in total on a single ibaBM-DP device. For each output you have to configure the address within the slave, data type and an expression that supplies the output value. Like all outputs in ibaPDA the values are only updated with a cycle time of at least 50 ms.

On the ibaBM-DP device you can enable default values for the outputs. If these are enabled then you can assign a default value to each output signal of the active slave module. The ibaBM-DP device uses these default values for the active slaves when the FO input link on the device is broken. This can happen e.g. when the PC is powered off.

6.4 Decoder modules

Decoder modules measure analog signals (words) from the profibus and split them into 16 digital signals. There are 3 decoder modules: sniffer decoder, active slave decoder and S7 request decoder. The sniffer decoder just sniffs from slaves on the profibus. The active slave

decoder represents one active slave and can only measure from that slave. The S7 request decoder also represents one active slave and the data of the slave is written by an S7. What data the S7 writes can be determined by the ibaPDA user.

On the old ibaBM-DPM-S there were only 2 decoder modules: dig512 sniffer and dig512 S7 request. The dig512 sniffer could sniff and could also define multiple active slaves.

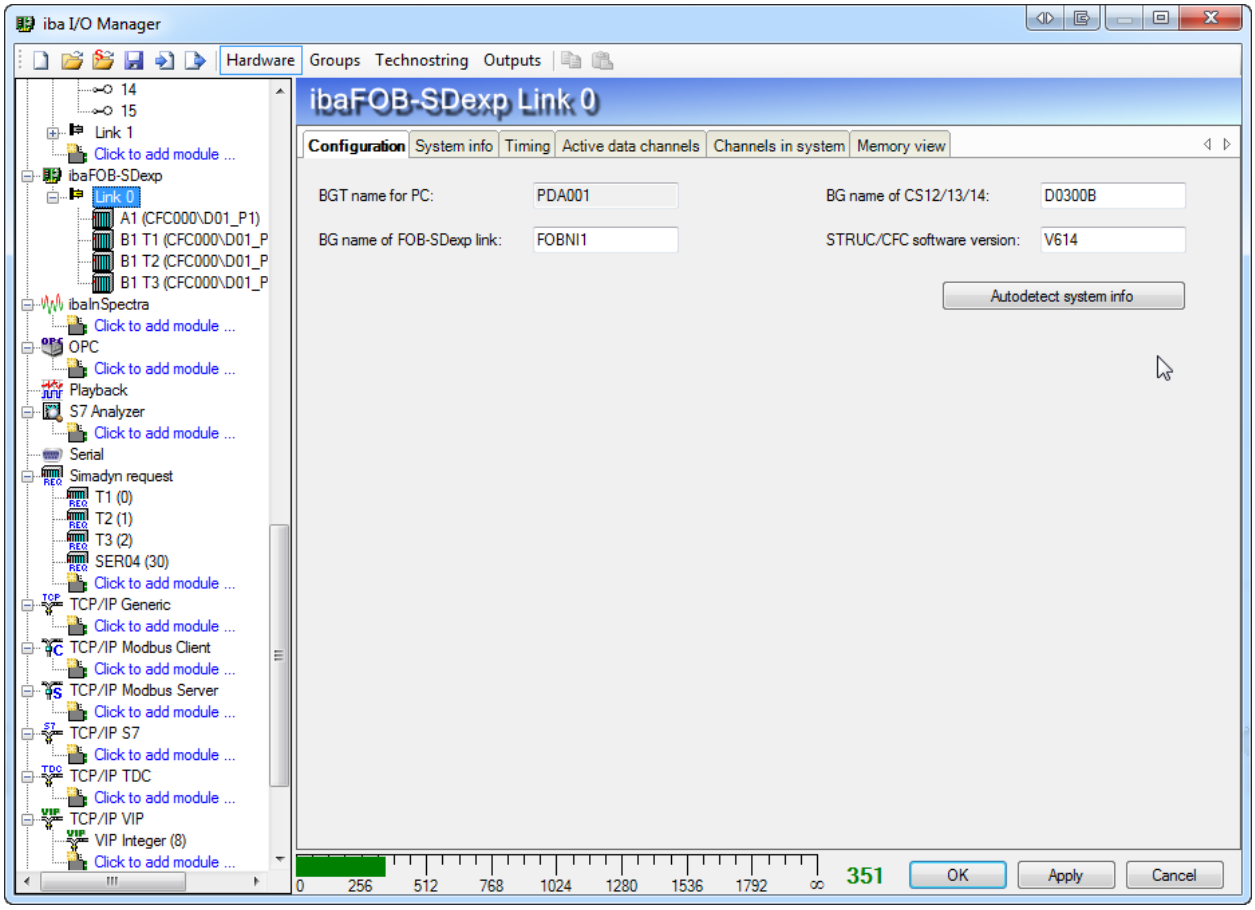
The sniffer decoder supports 512 words, the active slave decoder 122 words and the S7 request decoder 64 words. The old dig512 sniffer and dig512 S7 request modules are limited to 32 words.

The new S7 request decoder module can also be mapped to the old ibaBM-DPM-S.

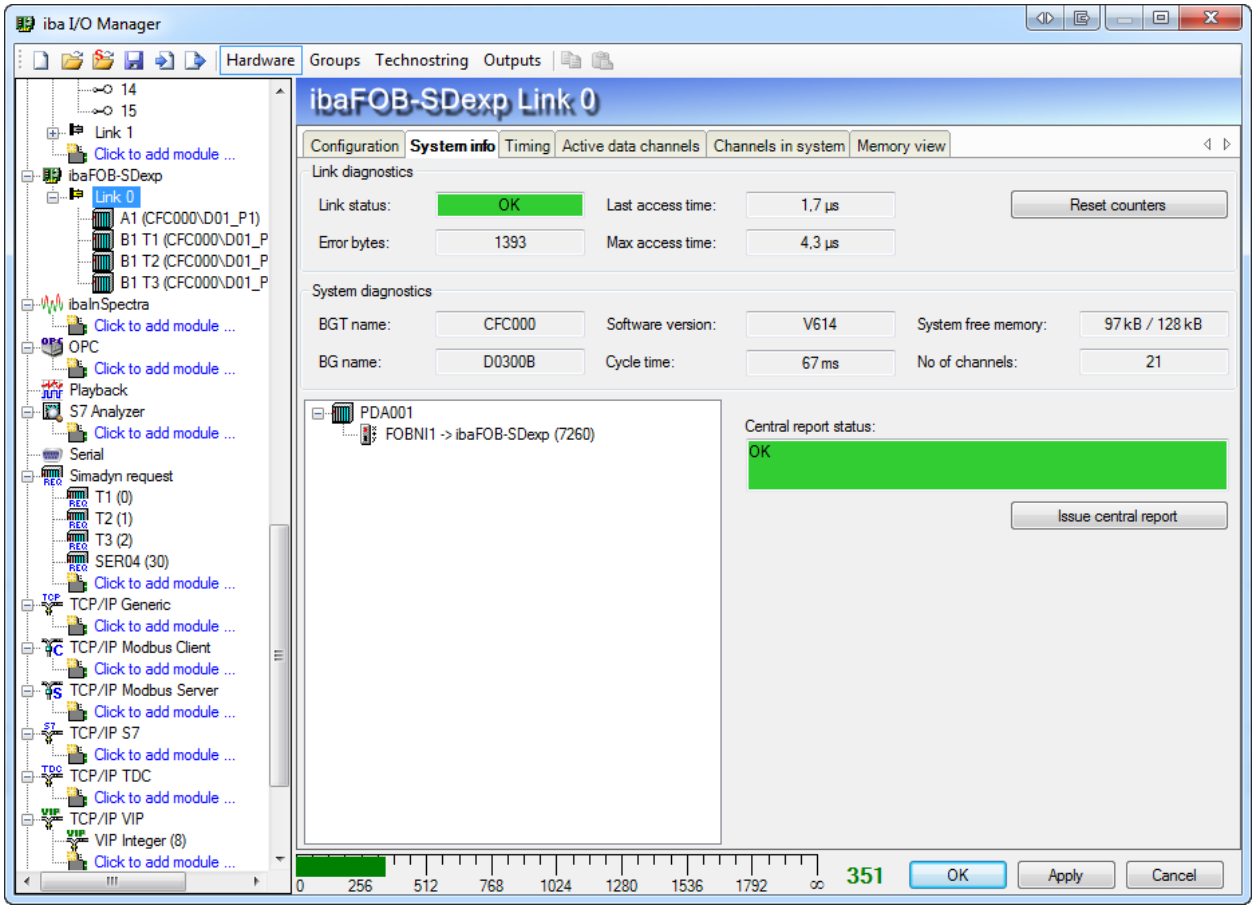
7 ibaFOB-SDexp and ibaFOB-TDCexp

7.1 Board

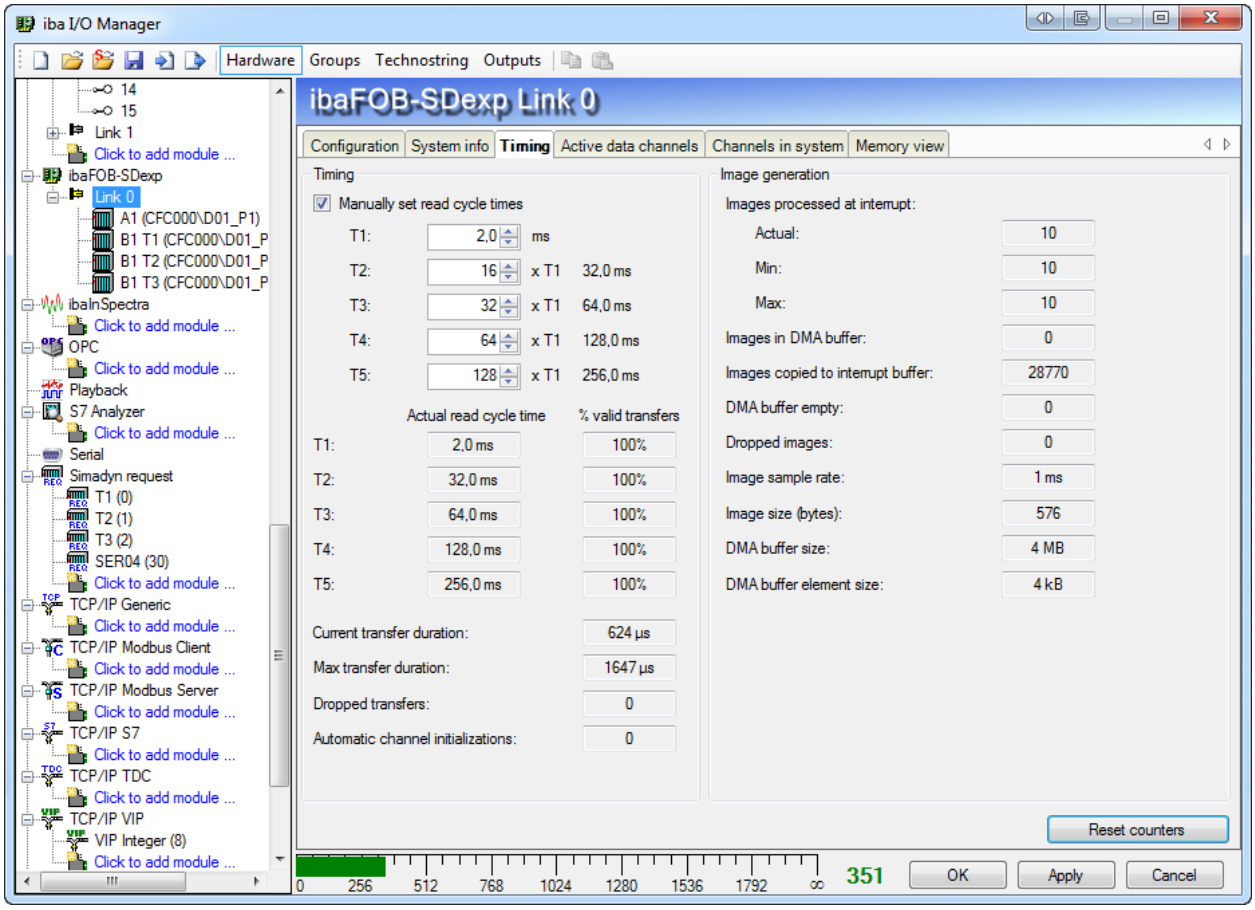
The ibaFOB-SDexp and ibaFOB-TDCexp boards are the successors to the ibaFOB-SD and ibaFOB-TDC boards. The new boards have a PCI express interface and they use DMA to transfer the data into the RAM of the PC. The new boards support up to 256 data channels and they support 5 time classes. The old boards supported 50 data channels and had only 1 time class.



The interface link shows different tabs similar to the old boards. On the configuration tab you can define the name of this board. The name and software version of the rack this link is connected to can be automatically filled in by clicking the “Autodetect system info” button.

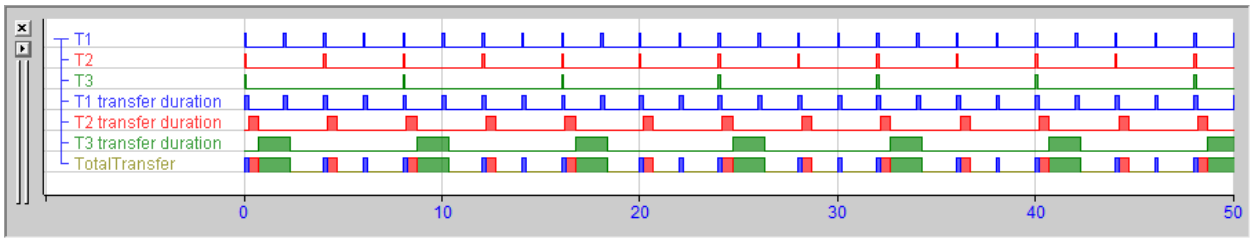


The system info tab shows diagnostic information about the link and about the connected system. You can press the “Issue central report” button to register the FOB board in the system. This is only required for debug purposes. Normally ibaPDA will automatically register the board when needed.



The timing tab shows information about how fast data is read from the system via the data channels on the left side. It shows information about how fast the data is transferred via DMA into the main memory of the PC on the right side.

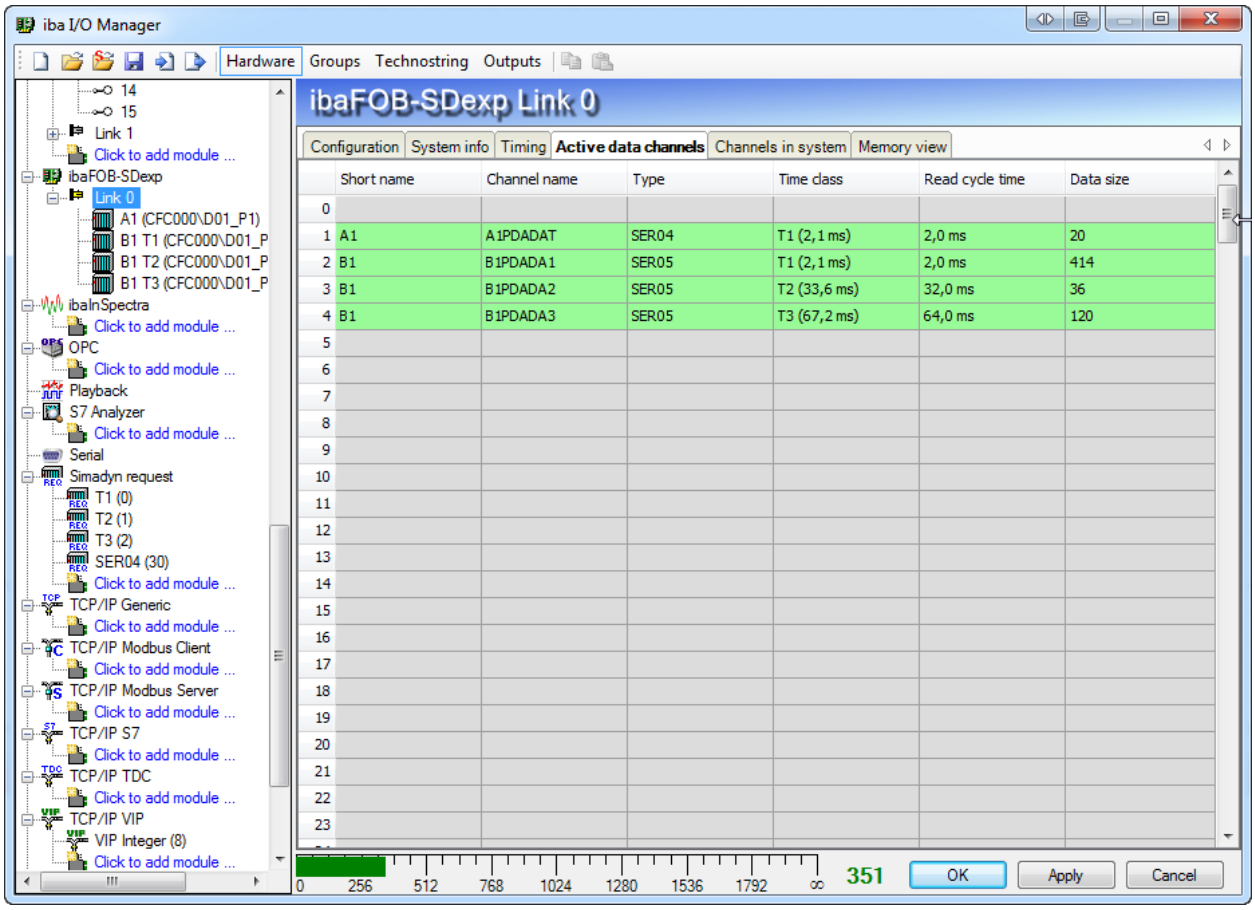
The left side shows the cycle times used to read data from the data channels. The cycle times can be automatically calculated by ibaPDA depending on the configured channels, the requested signals and the cycle times of the connected CPUs. You can also manually configure these cycle times. Each cycle time must be a multiple of the base cycle time (T1).



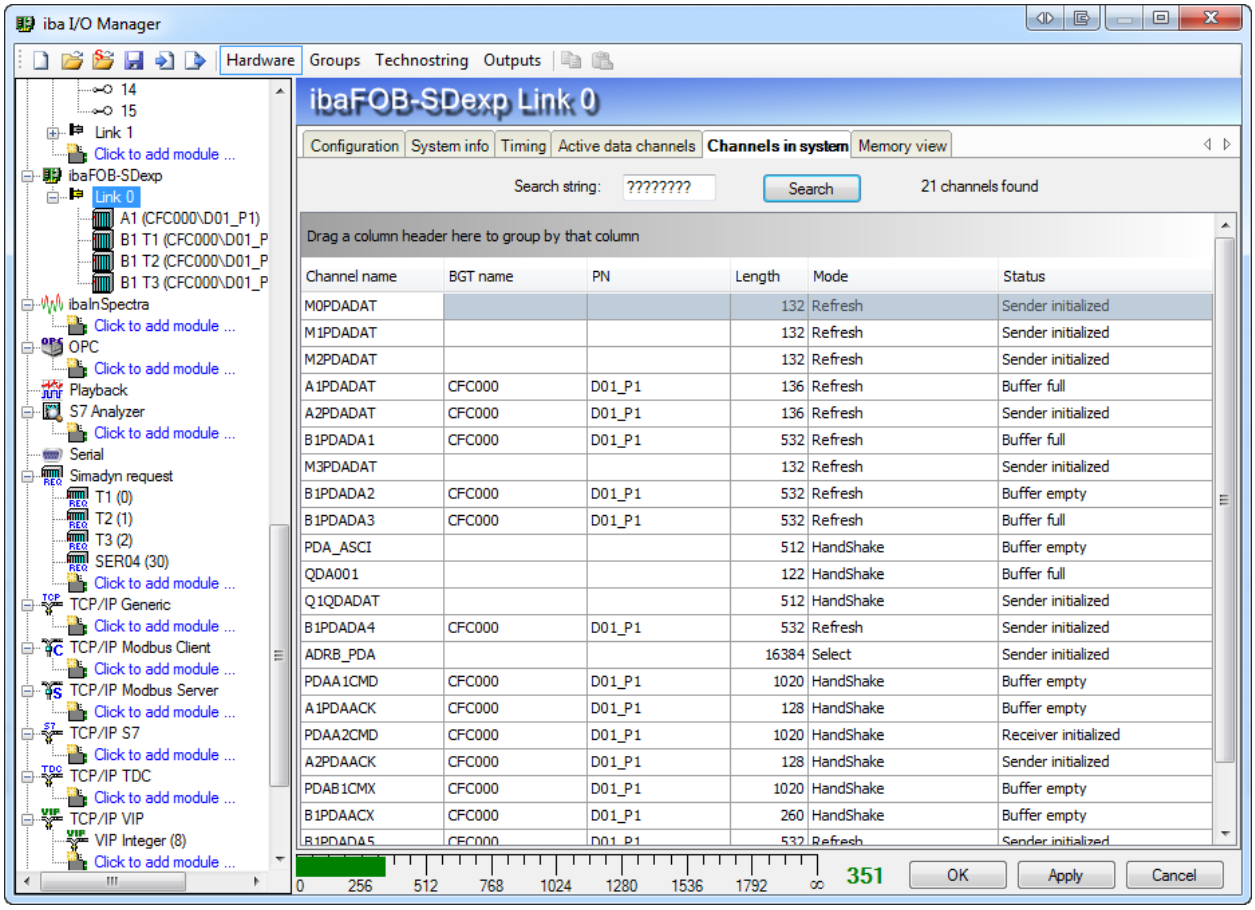
The figure shows how the channels are read. In the example there are 3 time classes: T1=2ms, T2=4ms and T3=8ms. It takes 0.2ms to transfer the T1 data, 0.5ms to transfer the T2 data and 1.6ms to transfer the T3 data. The card tries to start a transfer at each tick of T1. If this tick coincides with a tick of another time class then the transfer for that time class is performed as well. If there is already a transfer busy when the T1 tick comes then the transfer scheduled to start at that time is not performed. In the example at t=0ms the ticks for T1, T2 and T3 all coincide so a transfer is started that reads data for T1, T2 and T3. This transfer takes 0.2 + 0.5 + 1.6 = 2.3ms. This means that when the next tick at t=2ms occurs the transfer is still busy so the next transfer which should read T1 is skipped. At t=4ms a new transfer is started that reads data from T1 and T2. This takes 0.7ms. At t=6ms a new transfer is started that reads data from just T1. This one takes 0.2ms. At t=8ms the same thing happens as at t=0ms. In this example

there is 1 transfer skipped every 4 transfers for time class T1. For all the other time classes no transfers are skipped. So on the timing tab the % valid transfers will be 75% for T1 and 100% for T2 and T3. The current transfer duration shows the time it took the last transfer to complete. The max transfer duration gives you an idea on how long the transfer takes when the reads for all time classes coincide. If this duration is longer than the T1 cycle time then T1 transfers will be dropped. If it is longer than the T2 cycle time then T2 transfers will be dropped as well.

The right side shows how fast data is copied via DMA. The image sample rate gives the rate at which data is copied and the image size shows how many bytes are transferred per copy.



The active data channels tab shows all the data channels that are configured on the board. Each row corresponds with one data channel. The grey ones are not activated. The green ones are ok and the red ones have an error. The error is shown as a tooltip. The short name and full name of the channel is shown. The channel type can be LITE, SER04, SER05 or ASCII. LITE are the channels with fixed content. SER04 and SER05 are request channels. The content of these channels can be configured by the user via the request modules. The time class column shows the time class plus in brackets the CPU cycle time corresponding with that time class. The read cycle time column shows how fast the board tries to read the data from the channel. The data size column shows how many bytes are used from the channel. When you doubleclick a channel row then the memory view tab is selected and the viewer is positioned at the start of the channel data.

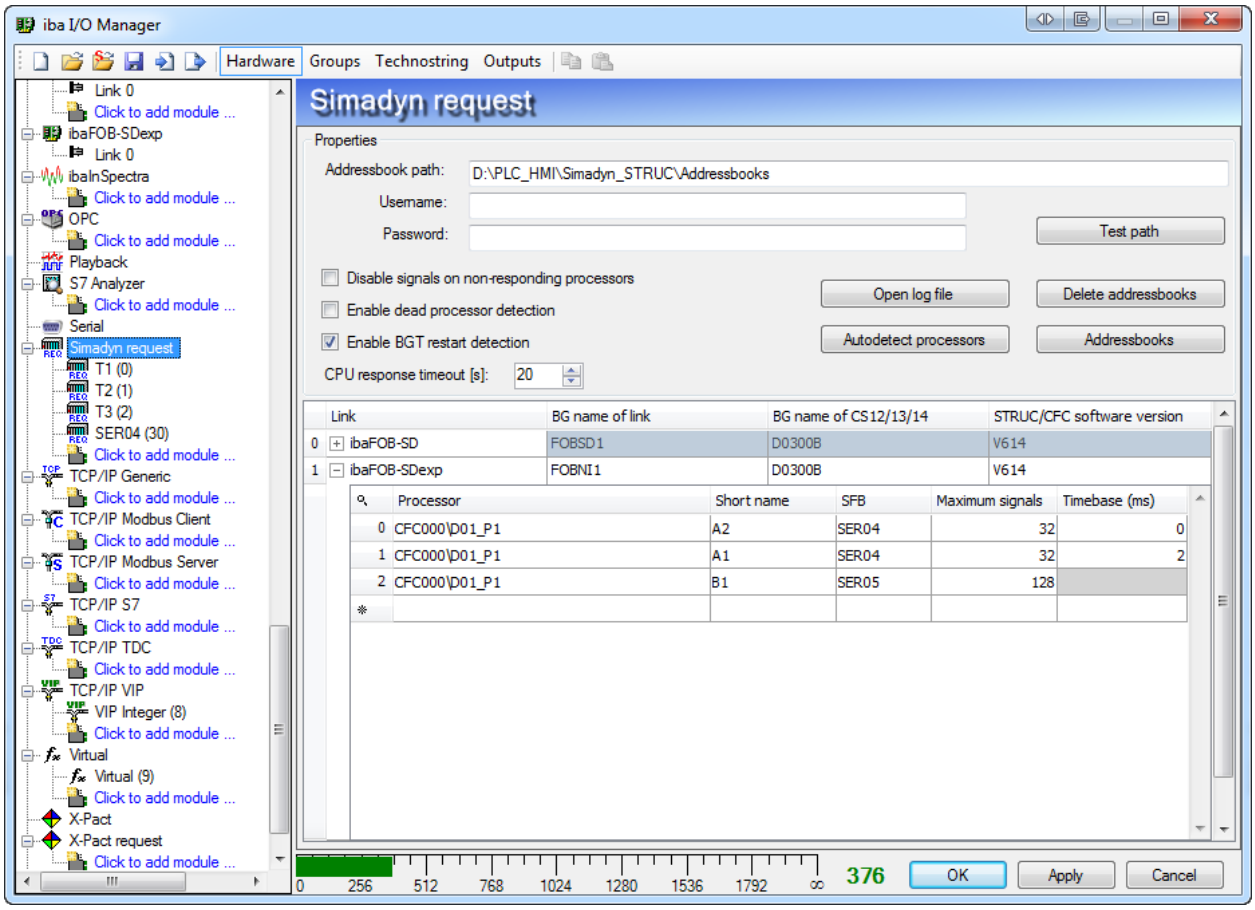


The channels in system tab shows all the channels that are configured in the connected system. These are not alone the configured data channels of the board but also all command and acknowledge channels and also all other channels that have nothing to do with ibaPDA.

7.2 Lite

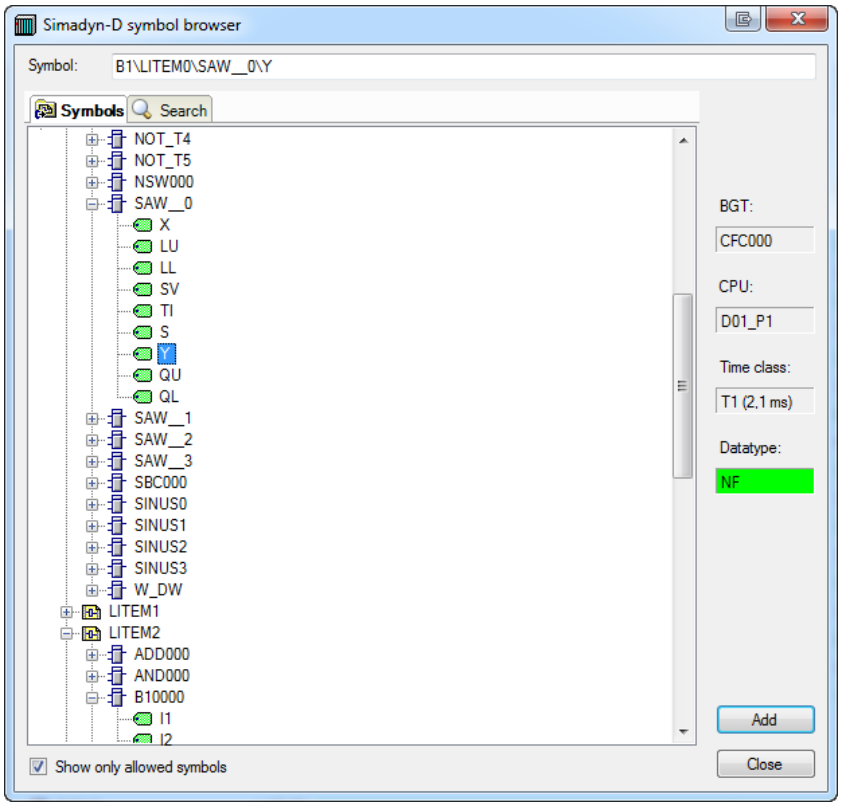
The lite channels are configured in the system and they have a fixed content. The channels all have the name MxPDADAT with x ranging from 0 to F. You can use autodetect to add a module for each detected lite channel. This autodetect functionality has been added to the old ibaFOB-SD and ibaFOB-TDC boards as well.

7.3 Request



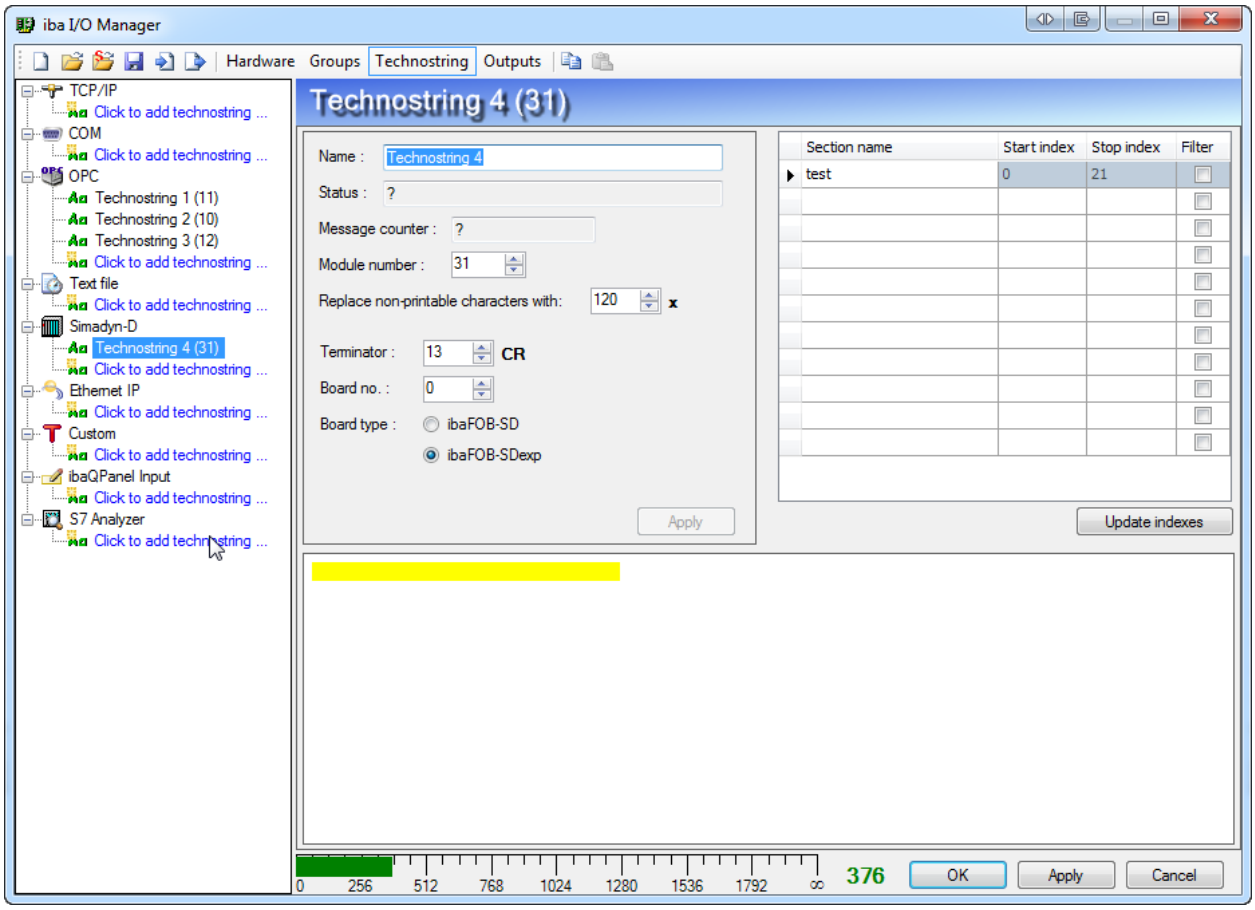
On the request interface you have to define the request channels that are going to be used. It is recommended to use the “Autodetect processors” button to automatically add the available channels. If there are multiple FOB boards then they are all shown in the table. If these boards are connected to the same system then the channels will be assigned to the first board. You can change the assignment via the context menu of the grid. This assignment is kept when you click “Autodetect processors” again. This wasn’t the case in ibaPDA versions prior to 6.32.0.

On the new boards you can choose between 2 types of the request function blocks via the SFB column. The SER04 type corresponds with the v1.0 SD/TDC request using the SER04A and SER04B function blocks. The SER05 type corresponds with the v2.0 SD/TDC request using the SER05A and 5 SER05 function blocks. The difference between SER05 and SER04 is that the SER05 channels are bigger and that up to 5 time classes can be used.



The symbol browser now also shows the time class for each symbol. This information is only available when the addressbook has been generated by a SER05A block instead of a SER04A block.

7.4 Technostring



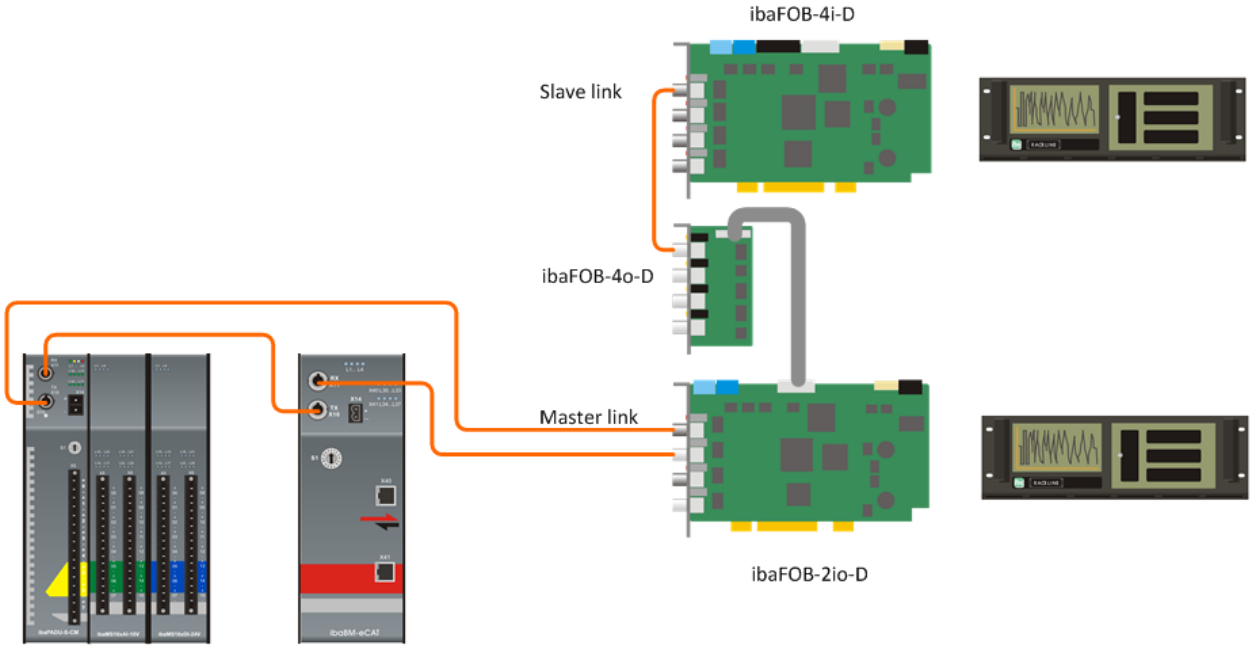
One technostring per board can be measured. The only thing that has changed with previous versions is that you now can set the board type to choose between the SD/TDC or SDexp/TDCexp boards.

8 Flex mirror mode

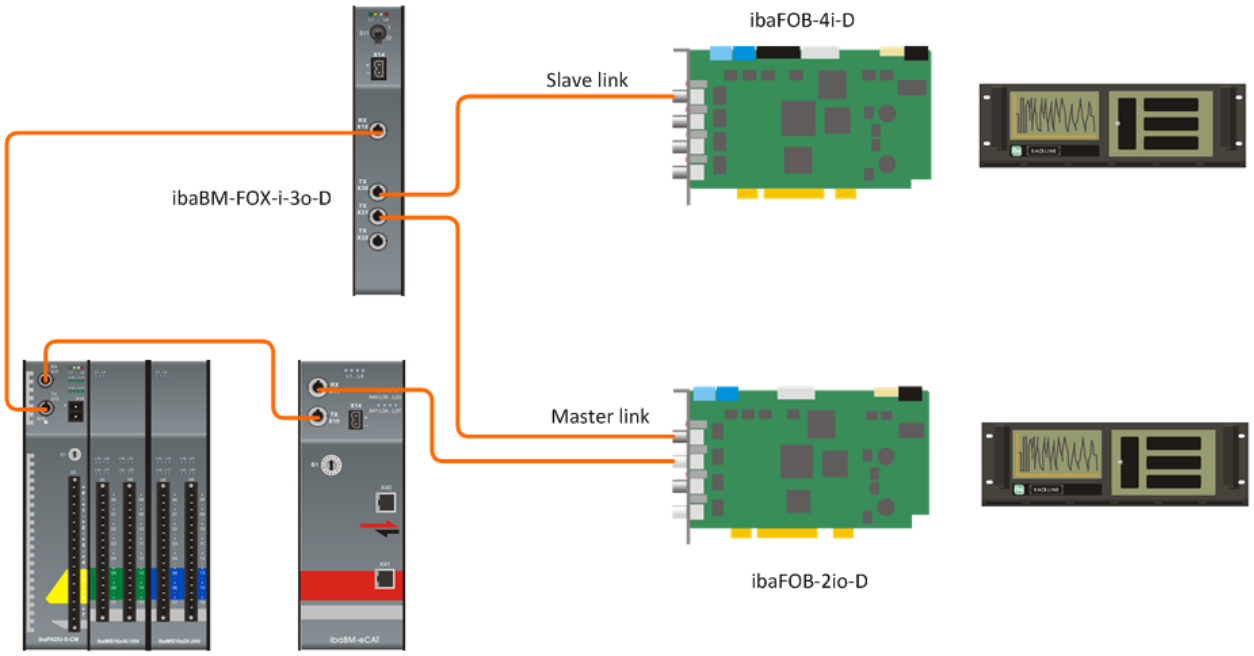
Flex mirror mode is a feature that allows multiple ibaPDA systems to measure the same flex devices. One ibaPDA system will be the master that configures the flex devices. The other ibaPDA systems will be slaves that can only measure the data configured by the master but can't change the configuration.

The master ibaPDA needs to have a bidirectional connection to receive and send data to the flex devices. The slave ibaPDA only needs a single connection to receive data from the flex devices. There are 3 ways to duplicate the TX connection of the flex devices:

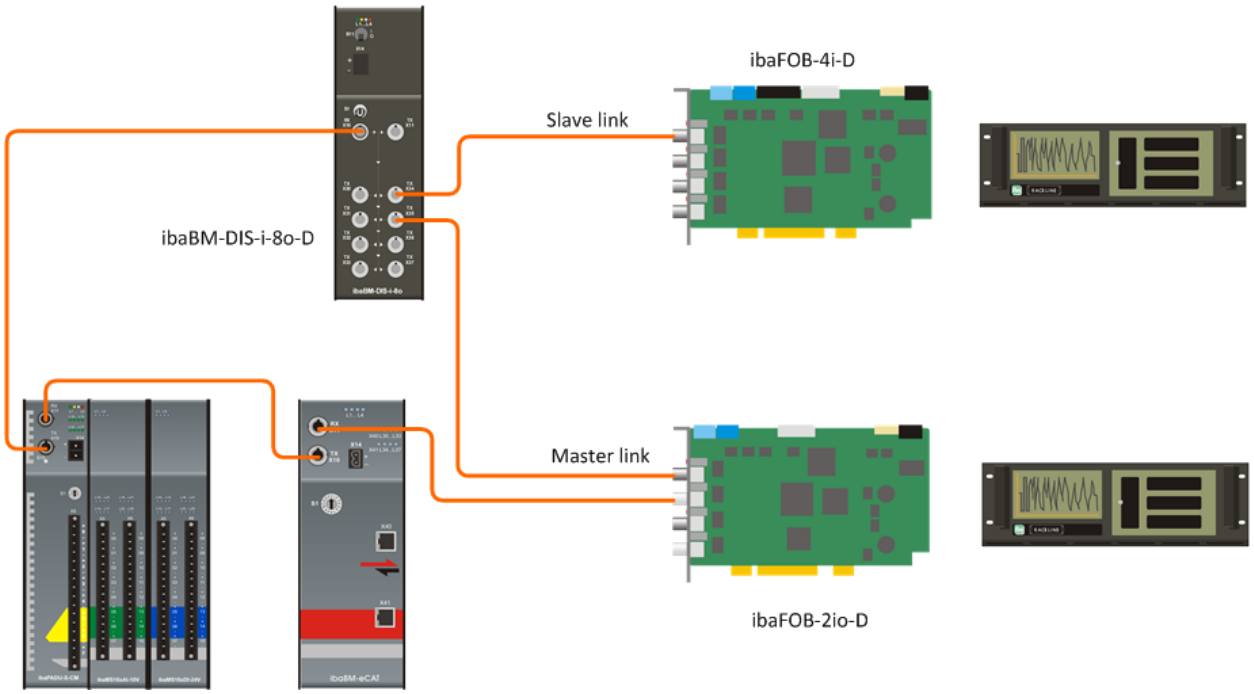
1. Connect an ibaFOB-4o-D to the mirror connector of the ibaFOB-D in the master ibaPDA system. The output of the ibaFOB-4o-D then needs to be connected to the ibaFOB-D input of the slave ibaPDA system.



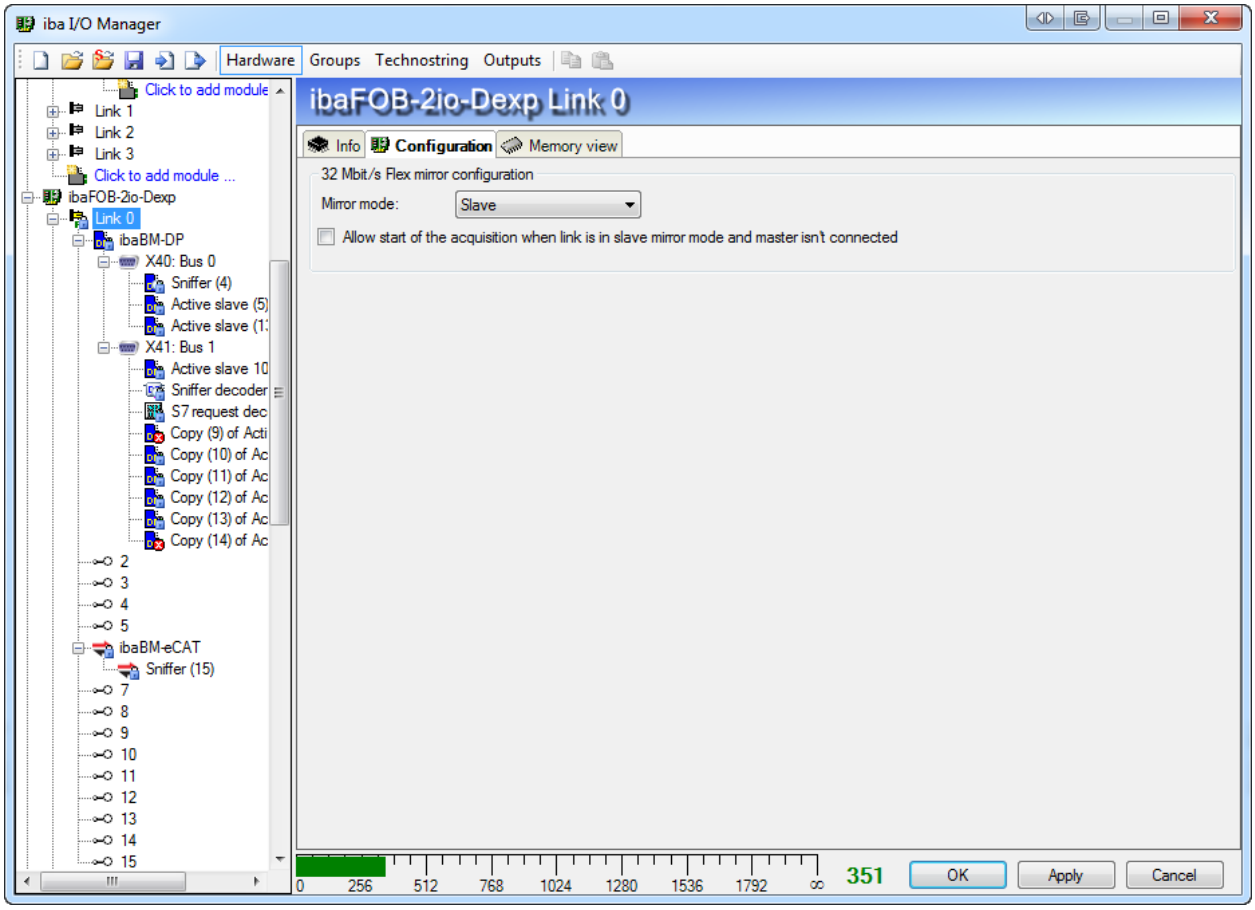
2. Connect the TX of the last flex device to the RX of an ibaBM-FOX-i-3o-D device. Connect one output of the ibaBM-FOX-i-3o-D to the ibaFOB-D in the master ibaPDA system and one output to the ibaFOB-D in the slave ibaPDA system.



3. Connect the TX of the last flex device to the RX of an ibaBM-DIS-i-8o-D device. Connect one output of the ibaBM-DIS-i-8o-D to the ibaFOB-D in the master ibaPDA system and one output to the ibaFOB-D in the slave ibaPDA system.



The advantage of modes 2 and 3 is that the slave link can still measure the data when the master PC has been shut down. The advantage of mode 1 is that you can mirror up to 4 different flex links with a single ibaFOB-4o-D.



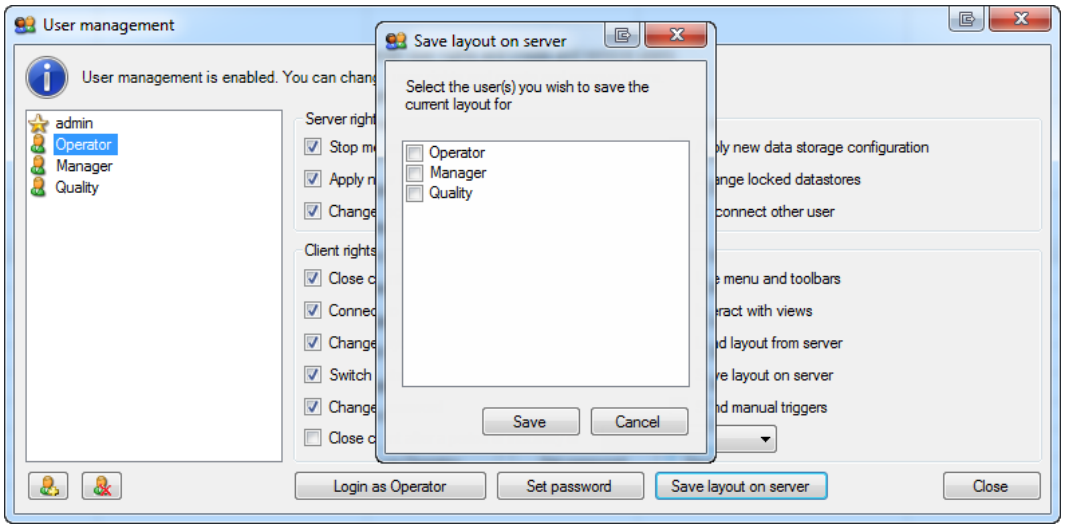
In ibaPDA you configure the flex mirror mode of a FOB-D link on the configuration tab of the link. There are 3 possible modes:

- **Disabled**: ibaPDA is connected via a bidirectional link. It configures the devices on the link and measures their data. This is like it has always been.
- **Master**: ibaPDA is connected via a bidirectional link. It configures the devices on the link and measures their data. Additionally it periodically sends the ibaPDA configuration of all modules of the link onto the fiber optic link via the special Ethernet channel of the flex protocol.
- **Slave**: Only the RX link of the FOB-D is connected. ibaPDA can only measure the data but can't configure the devices or get diagnostic information. It receives the ibaPDA configuration that is broadcast by the master on the FO link.

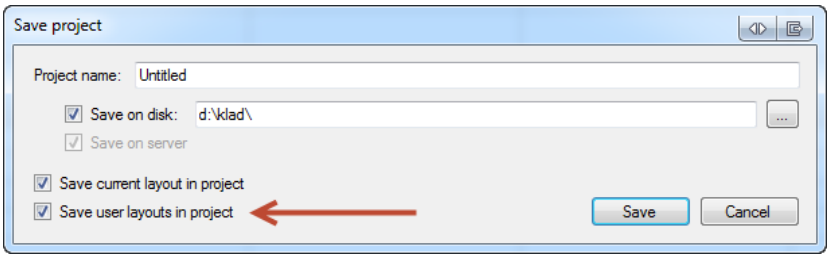
When the link is in slave mode then the user can't change anything on the modules of that link. The link and all its modules will have a lock image in the tree. You can use autodetect to get the configuration on a slave link. During the start of the acquisition the slave link will wait until it receives a configuration from the master. If it receives a configuration then it will compare the configuration and automatically update its own configuration when necessary. If it doesn't receive a configuration within 6s then an error will be generated. If the option "Allow start of the acquisition when link is in slave mirror mode and master isn't connected" is enabled then the acquisition will start anyway. When the master changes the configuration while the slave is measuring then the slave will restart automatically.

9 User layout changes

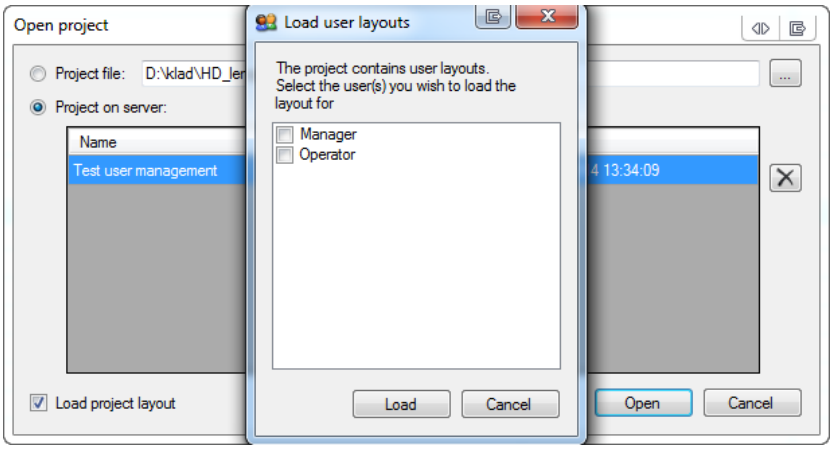
When user management is activated then users can store their layout on the server and when they connect to the server the layout can be loaded from the server. This feature existed since the first implementation of the user management in ibaPDA. In v6.32.0 there are some improvements implemented.



When you click the “Save layout on server” button in the user management form a window appears where you can select the users you wish to save the current layout for. In previous versions you could only select a single user.



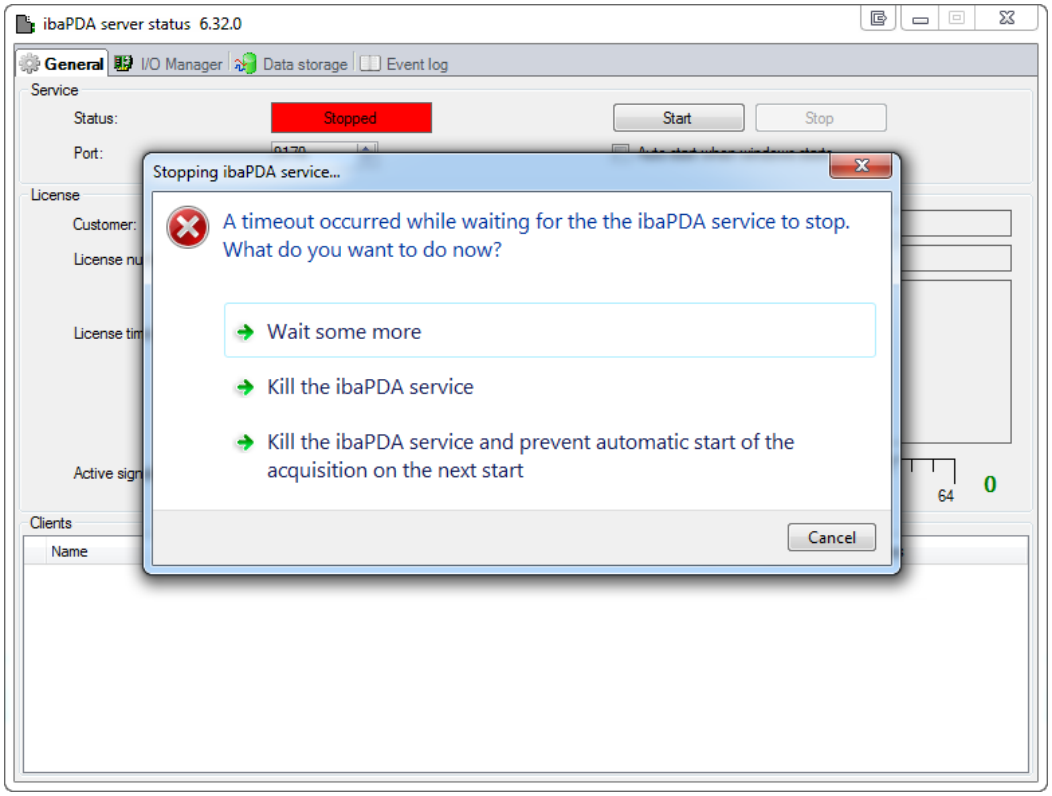
When you save the project you can now also include the user layouts saved on the server in the project.



When you load a project that contains user layouts then you can selec the users you wish to load the layout for.

10 Kill service

In some cases a timeout can occur when you try to stop the ibaPDA service from the ibaPDA status program. Usually the timeout happens because either the acquisition is still trying to start or the acquisition can't be stopped. You now have the opportunity to take some action when this timeout occurs.



You can wait 60 seconds longer in the hope that the service will close on its own. You can also kill the service process. The third option is to kill the service process and prevent automatic start of the acquisition on the next start. This option is usefull when the timeout is caused by the start of the acquisition. When you choose the third option you can then start the service again and start the acquisition from the ibaPDA client. You will then see where the start hangs and maybe you can do something about it. A warning message is created in the event log when the automatic start is skipped.