

**DATAMAN Oscilloscope add-on  
Spectrum analyzer  
User's guide  
Version 1.01**



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## Warranty conditions

Dataman Programmers Ltd guarantees reliable operation of the oscilloscope in compliance with this documentation during a period of 24 months (2 years) from the date of purchase.

Should a malfunction occur during the warranty period, excluding errors for which Dataman can not be held responsible, Dataman guarantees the repair of the product or its replacement with a new or repaired one free of charge.

Dataman shall not be responsible for malfunctions of the device caused by an accident, incorrect usage, unauthorized interventions or similar.

When requesting the warranty service the customer should send the device in its original packaging to Dataman with a description of the defect or malfunction. The customer agrees that when returning a product it would be insured against damage or loss during transport.

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## **Precautions (DATAMAN 520 and 570 series)**

Please follow these recommendations to avoid any possible problems that might occur while using the oscilloscope of DATAMAN 520 or 570 series:

- read the User's Guide
- always connect the device using the cable which is part of the package. If it is not possible, always use a USB 2.0 specification cable.
- never connect a signal with absolute voltage higher than 200V to the measuring inputs. This value is valid for frequencies lower than 100kHz. Over this frequency, the voltage lowers with raising frequency. For example frequency 200kHz of 100V, 400kHz of 50V is the limit. However we do not recommend connecting a voltage higher than 50V, because touching it can be dangerous.
- never connect a voltage lower than -10V and higher than +13V to the external triggering input (frequency lower than 20kHz). Over 20kHz, voltage lower than -0.5V or higher than +4V is not recommended.
- never connect a voltage to the oscilloscope ground, it may result in device or computer damage
- never disassemble the device, since there are no user serviceable parts inside

## **Precautions (DATAMAN 770 series)**

Please follow these recommendations to avoid any possible problems that might occur while using the oscilloscope:

- read the User's Guide
- always connect device using USB cable, which is the part of the package.
- never connect voltage higher than 200Vp between the measuring ground and the input. This value is valid for frequencies lower than 100 kHz. Over this frequency, the voltage lowers with rising frequency. For example voltage of 100Vp with frequency 200 kHz is the limit. You can always connect voltage with peak value up to 4 times the input range set (32 time the sensitivity in v/div) independent on frequency.
- never connect voltage lower than -10V and higher than +13V to the external triggering input (frequency lower than 20 kHz). Over 20 kHz, voltage lower than -0.5V or higher than +4V is not recommended.
- the measuring ground is common for all of the measuring connectors. The voltage connected to one of these grounds appears also on the other two of them. Do not connect different voltages to the grounds of the measuring connectors. It can destroy the measuring instrument and/or the measured device.
- when the voltage above 50V is connected to one of the measuring connector's ground, touching the other two of them can be dangerous for your health.
- when you connect the voltage higher then 50V to the measuring ground, please be sure that the instrument is dry. If you brought the instrument from the colder environment please wait until it warms up to the temperature of the new environment.
- when the voltage higher than 50V is connected to the measuring ground, for safety reasons we recommend connect the chassis ground of the instrument (connector on

the back side of the instrument) to the ground of the environment (i.e. main's ground, water pipe, etc...). The grounding cable is in the standard package.

- do not connect voltage higher than 500 Vp to the measuring ground. Also the  $V * \text{Hz}$  factor should be lower than 50000. For example if the voltage is 500V its frequency should be lower than 100 Hz.

- never disassemble the device, since there are no user serviceable parts inside.

## 1. Installation

### 1.1. Requirements

Minimum configuration:

- PC PENTIUM compatible computer
- 128MB RAM
- CD-ROM
- VGA with resolution 800 x 600
- USB port 1.1
- mouse or other tracking device
- at least 20MB free space on the hard drive
- MS Windows 98 SE, ME, 2000, XP or Vista

Recommended configuration:

- PC PENTIUM compatible computer with speed of at least 1.6GHz
- 512MB RAM
- CD-ROM
- VGA with resolution at least 1024x768
- USB port 2.0
- mouse or other tracking device
- at least 20MB free space on the hard drive
- MS Windows 98 SE, 2000, XP or Vista

### 1.2. Hardware installation

Connect one end of the cable to the computer and the other end to the device. Proceed with the software installation.

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**WARNING: Always use the cable which is the part of the package. Usage of an improper cable can cause problems with communication with the computer.**

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### 1.3 Software installation

The software and the device drivers are located on the enclosed CD. Insert the CD into the CD-ROM drive. Then follow the instructions of the setup program that should launch automatically. If the CD autorun is not enabled in your computer's settings, please run the file *autorun.exe* from the CD.



## 2. Basic information

### 2.1. Front and rear panel layout

#### 2.1.1. Front panel layout

Channel A, channel B, external synchronization input / compensation generator output and an LED are accessible on the front panel.



*Fig. 2.1.1.1. – Front panel of the DATAMAN 570 series oscilloscope*



*Fig. 2.1.1.2. – Front panel of the DATAMAN 520 series oscilloscope*



*Fig. 2.1.1.3. – Front panel of the DATAMAN 770 series oscilloscope*

If the LED color is:

- green, the device is configured and there is no communication with a computer at this time
- orange, the device is communicating with a computer
- red, device is powered, but not configured

#### 2.1.2. DATAMAN 770 series rear panel layout

Two connectors are available on the rear panel.

- USB connector for communication with computer (used for supplying device with power as well)
- banana jack (4mm) for optional ground connection. This connector is connected to the ground (chassis) of the host computer and should be connected to the environment

ground when the higher voltage than 50 V is connected to the instrument's measuring ground (shielding of the BNC connectors on the front panel).



*Fig. 2.1.2.1. – DATAMAN 770 series rear panel layout*

## 2.2. Basic terms

This Chapter explains the basic terms used throughout the text.

**Click** – Position the mouse cursor over the chosen object. Then press and release the left mouse button.

**Double-Click** – Two successive clicks of the left mouse button.

**Drag** – Position the mouse cursor over the object you want to move. Then press the left mouse button and hold it down. The chosen object moves with the mouse cursor. After releasing the mouse button the object moves to the new location.

**Enter the value into the edit box** – Click the edit box. Use the keyboard to enter the desired value and confirm by pressing “Enter”.

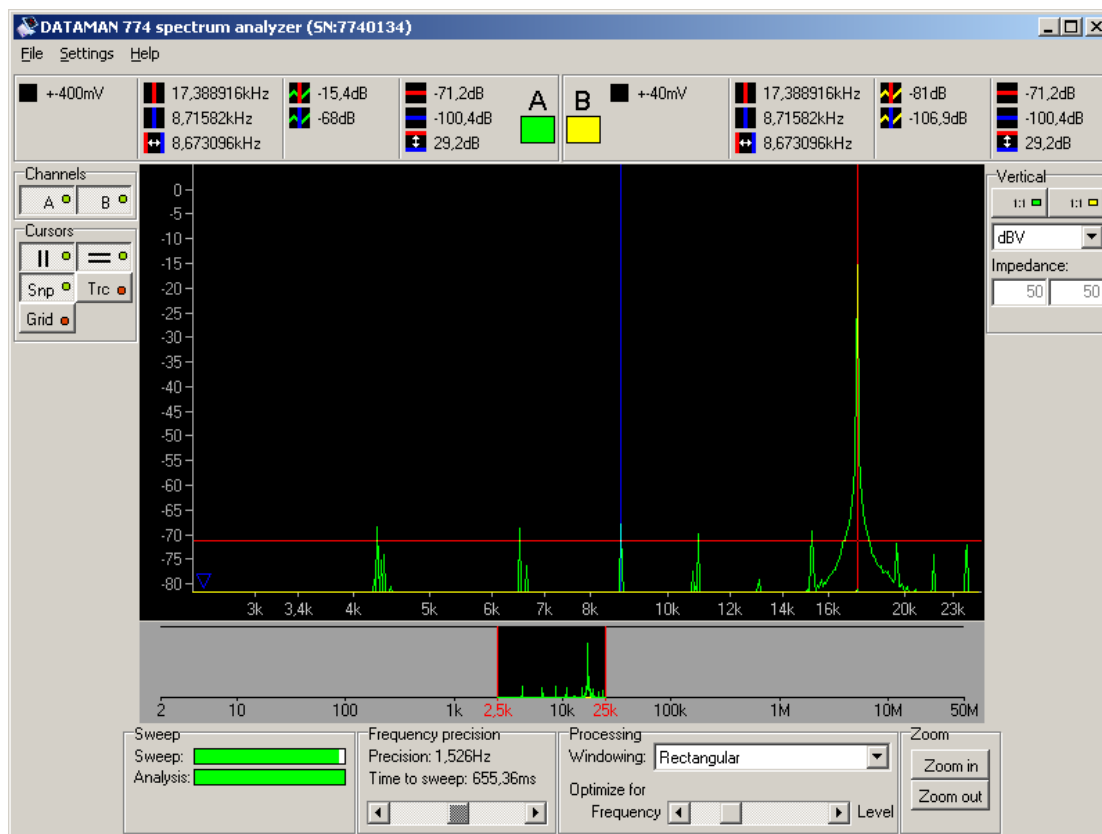
**Insert the value into the edit box** – Click the edit box. Use the keyboard to enter the desired value.

**Set the value using the scroll bar** – It is possible to change a value by simply dragging the scroll bar slider. Clicking the arrows of the scroll bar increases or decreases the value by minimal steps. Clicking in between the slider and the arrows changes the value by larger steps.

**Select the value from the combo box** – Open the list of all possible values of the edit box by clicking it. Then set the desired value by clicking it.

### 3. Main window

The main window opens after the application starts. The controls in the this window allow you to use most of the analyzer functions.



*Fig. 3.1. – Main window*

All controls connected to one of the channels have that channels color.

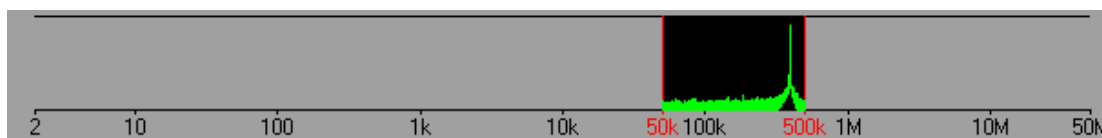
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**TIP: The channel color can be changed in the main menu.**

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#### 3.1. Navigator

The navigator is located below main screen. It allows you to select the band to be analyzed by the software.



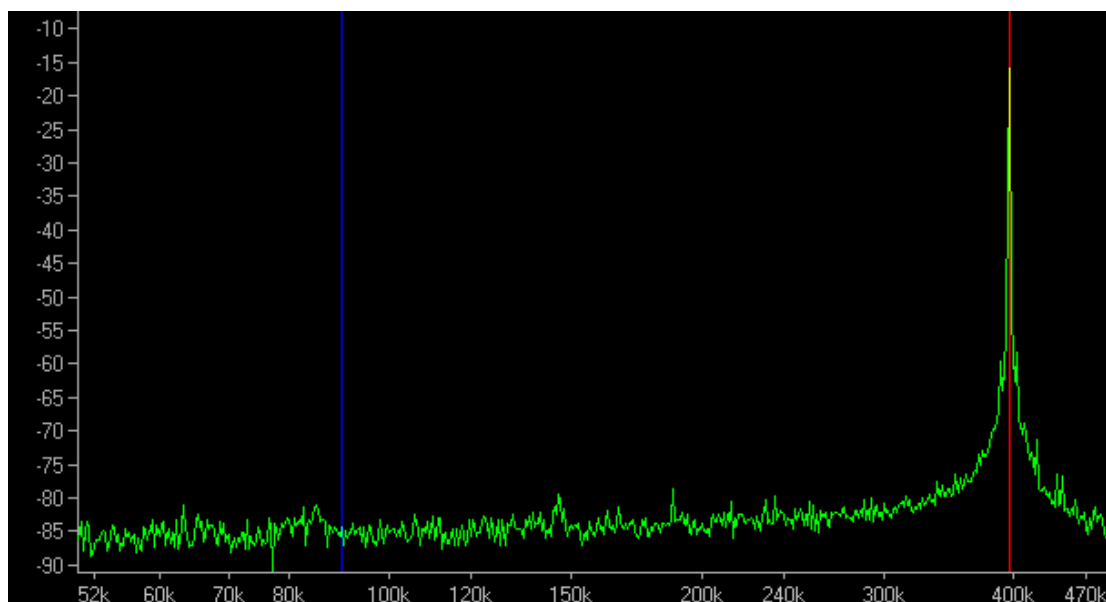
*Fig. 3.1.1. – Navigator*

The analyzed band is marked by two vertical lines. Drag any of them to change bandwidth.

The black square marks the position of the main screen in the bandwidth. Drag this square to change spectrum part displayed in the main screen.

### 3.2. Main screen

The main screen is located in the middle of the main window. This screen is used to display the spectrum.



*Fig. 3.2.1. – Main screen*

Spectrum is displayed in the channel color. Both X and Y axis are logarithmic.

Vertical range is adjustable as follows:

- drag top third of the vertical legend to set maximal displayed value
- drag middle of the vertical legend to move waveform vertically (range will remain intact)
- drag bottom third of the vertical legend to set minimal displayed value

The displayed spectrum part can be set using the navigator or dragging the waveform on the screen.

You can zoom data in two ways:

- either click on the “Zoom in” or “Zoom out” button
- or set mouse pointer on the screen and spin the mouse wheel

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**TIP: Spin the mouse wheel on the screen to perform zoom. The frequency below the mouse pointer remain on the same position (if possible).**

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Two vertical and two horizontal cursors are available. In case they are out of the screen, the arrow in the cursor color appears on the side of the screen. Drag this arrow to move cursor back onto the screen.

### 3.3. Channel controls

The channel controls are located in the left of the main window.

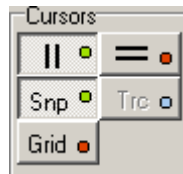


**Fig. 3.3.1. – Channel controls**


Click the button to activate/deactivate respective channel.

### 3.4. Cursor controls


The cursor controls are located in the left of the main window.



**Fig. 3.4.1. – Cursor controls**

Click  to activate/deactivate vertical cursors.


Click  to activate/deactivate horizontal cursors.


Click  to activate/deactivate “Snap” mode. While in this mode the software automatically searches for peaks near the vertical cursors. In case it detects any it automatically sets the cursor position to the peak.

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**TIP: The cursors holds peaks once positioned on them. They remain correctly positioned on the peaks even if the frequency of the peaks changes slightly.**

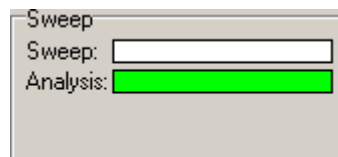
---

Click  to activate/deactivate „Trace“ mode. While in this mode the cursors are automatically set to the waveform level defined by the vertical cursor.

Click  to activate/deactivate grid.

### 3.5. Sweep progress

The progress bars are located in the bottom of the main window.



**Fig. 3.5.1. – Progress bars**

The software performs three tasks: data acquisition, analysis (using fast fourier transformation) and the data display. Data acquisition and analysis are performed in parallel.

The “Sweep” progress bar indicates the data acquisition progress and “Analysis” progress bar indicates the analysis progress. Analysis always works with the data available on its start.

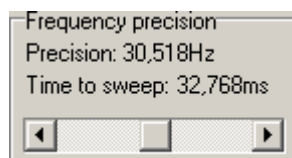
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**WARNING: In case the analysis is much slower than data acquisition the following behavior can occur: when the acquisition parameters change (bandwidth for example), analysis is performed twice on the old data.**

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### 3.6. Frequency precision controls

Depending on the oscilloscope model, the frequency precision controls are available.



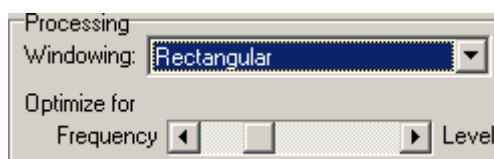
*Fig. 3.6.1. – Frequency precision controls*

Use scrollbar to set frequency precision.

The precision is displayed as “Precision”. Total time required to acquire data with selected precision is displayed as “Time to sweep”.

### 3.7. Processing controls

The processing controls are located in the bottom of the main window.



*Fig. 3.7.1. – Processing controls*

Use combobox “Windowing” to select windowing function. Following windows are available:

- Rectangular
- Triangular
- Blackman
- Hamming
- Hanning

We recommend to use rectangular window to achieve best vertical precision. If you measure the spectrum, where the spaces between harmonics very small, we recommend to use blackman window.

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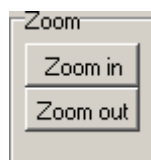
**WARNING: The vertical precision of the harmonics is the best with rectangular window. Other windows very significantly reduce precision.**

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Use bottom scrollbar to change ratio between frequency precision and level precision.

### 3.8. Zoom controls

The zoom controls are located in the bottom of the main window.



**Fig. 3.8.1. – Zoom controls**


Click “Zoom in” button to decrease data amount on the screen, click “Zoom out” to increase it.

### 3.9. Input controls

Input controls are located in the right of the main window.

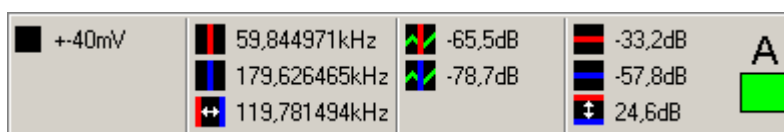


**Fig. 3.9.1. – Input controls**

Click  to set probe attenuation connected to the input. Select vertical units which will be used to display harmonics. In case the power unit is selected (dBmW), it is necessary to enter the value into the impedance edit box.

### 3.10. Information panel

Two information panels (one for channel A, another one for channel B) are located in the top of the main window.



**Fig. 3.10.1. – Information panel**

The information about oscilloscope range is located in the left of the panel. This range is set by the software automatically.

Following information is available:

- primary vertical cursor position
- secondary vertical cursor position
- difference between vertical cursors
- intersection level of the primary vertical cursor with waveform
- intersection level of the secondary vertical cursor with waveform
- primary horizontal cursor position
- secondary horizontal cursor position
- difference between horizontal cursors

### 3.11. Main menu

The main menu is located in the top of the main window. Following items are available:

*File / Exit* – terminates application

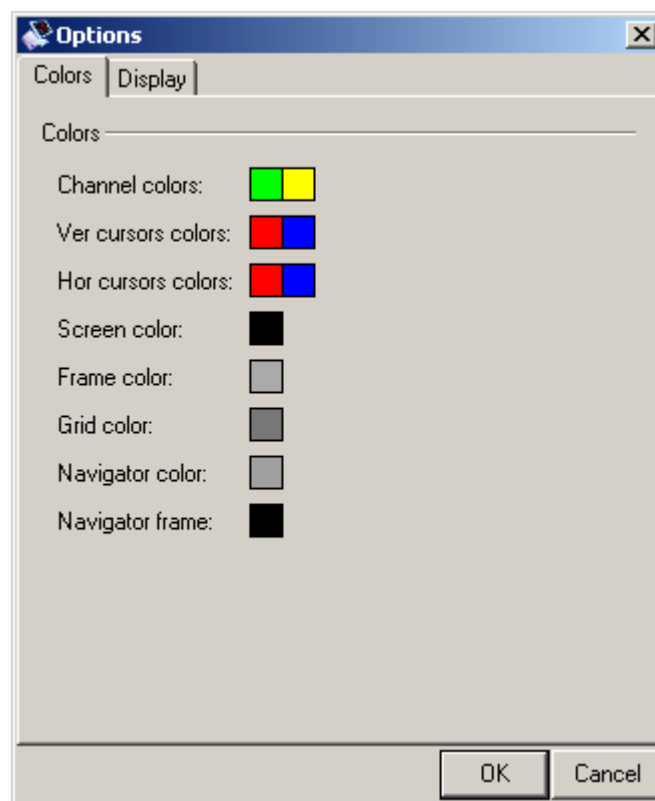
*Settings / Options* – opens window, which allows you to configure software

*Help / Help* – opens user's guide

*Help / About* – displays product information

#### 3.11.1. Options window

Click the item in the main menu to open options window.



*Fig. 3.11.1.1. – Options window*

Following options are available:

*Colors / Colors / Channel colors* – click color of the channel to change it

*Colors / Colors / Ver cursors colors* – click color of the vertical cursor to change it

*Colors / Colors / Hor cursors colors* – click color of the horizontal cursor to change it

*Colors / Colors / Screen color* – click color of the screen to change it

*Colors / Colors / Frame color* – click frame color to change it

*Colors / Colors / Grid color* – click grid color to change it

*Colors / Colors / Navigator color* – click navigator color to change it

*Colors / Colors / Navigator frame* – click navigator frame color to change it



*Display / Main screen / Display waveform in red when outside of the device bandwidth* – if checked the part of the waveform which is outside of the device bandwidth is drawn in red