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NextView®4

Software for Acquisition and Processing of Measuring Data

User Manual

Version 4.6

▶ www.bmcm.de

bavarian measurement company munich

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1.1   INTRODUCTION

Figure 1

NextView®4 is a universal program for the acquisition and analysis of measured data providing for the configuration of data acquisition systems and PC measuring cards, the display of live data, as well as storage and analysis of measured data.

The MS-DOS-version of NextView® had already been a great success for many years and had constantly been improved.

We set our focus on ease of operation, practical relevance and professionalism. **NextView®4** is a powerful tool which allows you to execute a great variety of measurements, completely, reliably and efficiently without a bulk of programming work beforehand being necessary.

In addition, the operation of **NextView®4** follows the Windows® conventions, reducing the lead-in period drastically.

NextView®4 guarantees high-speed processing of almost any number of data sets.

NextView®4 provides various types of DAQ hardware (LAN, USB, PCIe, PCI) to combine with (see "COMPATIBLE HARDWARE", p. 17).

With the add-on module NextView®4 Script (not free of charge), you can control processes and realize individual applications.

1.2   SYSTEM REQUIREMENTS

minimum:

➢ PC with Windows® XP/7/8

➢ Pentium processor, 400MHz

➢ 256MB RAM

➢ hard disc >50MB

➢ graphics card 1024x768, 256 colors

recommended:

➢ PC with Windows® XP/7/8

➢ Pentium processor, 1GHz

➢ 512MB RAM

➢ hard disc >200MB

➢ graphics card 1600x1200, True Color

1.3   BMC MESSSYSTEME GMBH

BMC Messsysteme GmbH stands for innovative measuring technology made in Germany. We provide all components required for the measuring chain, from sensor to software.

Our hardware and software components are perfectly tuned with each other to produce an extremely user-friendly integrated system. We put great emphasis on observing current industrial standards, which facilitate the interaction of many components.

Products by BMC Messsysteme are applied in industrial large-scale enterprises, in research and development and in private applications. We produce in compliance with ISO-9000-standards because standards and reliability are of paramount importance to us - for your profit and success.

Please visit us on the web (http://www.bmcm.de) for detailed information and latest news.

1.4 COPYRIGHTS

The software **NextView®4** has been developed and tested with utmost care. BMC Messsysteme GmbH does not provide any guarantee in respect of this manual, the hard- and software described in it, its quality, its performance or fitness for a particular purpose. BMC Messsysteme GmbH is not liable in any case for direct or indirect damages or consequential damages which may arise from improper operation or any faults whatsoever of the system. The system is subject to changes and alterations which serve the purpose of technical improvement.

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1.5 NEXTVIEW®4 VERSIONS

1.5.1 DIFFERENCES OF THE VERSIONS

You can choose between varying standalone versions of **NextView®4** depending on your specific requirements:

NextView®4 Trial - fully functional 30-day trial version

NextView®4 Lite - the "slim" version of **NextView®4**

NextView®4 Professional - professional data acquisition for all application fields

NextView®4 Analysis - for a well-founded analysis of recorded data by means of the powerful **NextView®4** analysis functions

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- **NextView®4 can be used as a free trial for 30 days. The trial features all functions of a Professional version.**

- **Changing to another version does not require reinstalling (see "LICENSE", p. 219). All projects, measuring files and settings created with the trial version can still be used.**

- **If a chargeable version has not been purchased within the first 30 days, the functional range of NextView®4 will be reduced considerably.**

1.5.2 FEATURES/FUNCTIONS OF THE VERSIONS

function	Lite	Pro, Trial	Analysis
license required	+	+	+
number of DAQ systems	1	unlimited	-
formula channels	-	16	-
storage types	current value, mean value (rate 1:20)	current value, mean value, min, max, RMS	-
trigger	-	+	-
multi-scan	-	+	-
automatic numbering of measuring files	+	+	-
picture	-	+	+
static text	+	+	-
digital multimeter	+	+	-
level indicator	-	+	-
active alarm function	+	+	-
live display	+	+	-
stop, reverse, zoom in live data	-	+	-
graph display	+	+	+
signal representation in panes	-	live and graph displays	graph displays
edit signal parameters	-	+	+
hide, delete signals	+	+	+
x/y-representation	-	+	+
cursors	+	+	+
cursor jumps	-	+	+
calculation of signal key values (e.g. min, max)	-	+	+
file train	-	+	+

function	Lite	Pro	Analysis
export [1]	+	+	+
export signal values	-	+	+
import [2]	-	+	+
calculation of signal values	-	+	+
integration	-	+	+
differentiation	-	+	+
FFT	-	+	+
digital filters	-	+	+
repeat last analysis	-	+	+
setup batch job	-	+	+
message display	+	+	+
button	-	+	+
slider	-	+	-
NextView®4 Script option 3	+	+	+
save project	+	+	+
lock project	+	+	+
print sheet	+	+	+
print active graph display / message display	+	+	+
print preview	+	+	+

[1] export: ASCII, Diadem, TurboLab, NextView®4, NextView®/NT 3.4

[2] import: ASCII, Diadem, ModuLab, NextView®, TurboLab, data base

[3] subjext to a charge

1.6   COMPATIBILITY WITH NVNT 3.X

When developing **NextView®4**, we put an emphasis on highest software compatibility to the previous version **NextView®/NT 3.x**.

The following table shows the usability of project, configuration and measurement files of the two versions.

file	last stored in version	open and use in version
project file (.nvp)*	3.x	3.x, 4.x
	4.x	4.x
configuration file (.nvc)*	3.x	3.x, 4.x
	4.x	4.x
measurement and analysis file	3.x	3.x, 4.x
(.lfx)*	4.x	4.x, export in 3.4

❗

Be careful when saving a project or configuration file in NextView®4 created with version 3.x, because afterwards those cannot be opened by NextView®/NT 3.x anymore!

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1.7 COMPATIBLE HARDWARE
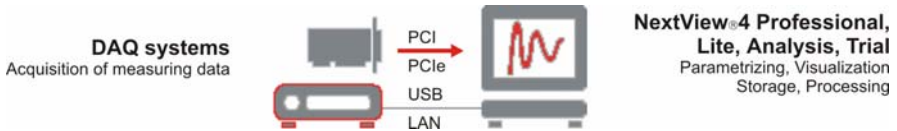
Figure 2

NextView®4 supports the complete product range of the bmcm measuring hardware currently available.

The sampled data are directly recorded, displayed, parameterized and stored to the hard disk by means of a DAQ system externally connected to the PC (USB, LAN) or a PC data acquisition card installed in the PC (PCI, PCIe).

The number of connected hardware in **NextView®4 Professional** is not limited by the software (**NextView®4 Lite**: 1). Even DAQ systems of different type can be installed, and several sensors of a diverse range of sensor technology may be connected to the devices.

The follwing table shows the supported device types. The category "Sampling rate" specifies the maximum scan frequency to be used, if exactly one channel is stored.

The specified performance data only apply together with NextView®4!

For devices sampling asynchronously, the PC time is consistent with the scan time. The other measuring systems provide an integrated microcontroller for high-precision sampling in µ-seconds using its own time base. Because of slightest inaccuracies of the quartz, the times used by the DAQ system and by the PC can diverge.

compatible hardware	analog		digital			resolu-tion	max. sampl. rate / 1 channel	total sampl. rate
	IN	OUT	IN	OUT	C			
LAN-AD16fx	16	2	2×16^3		3^5	16	250kHz	250kHz
LAN-AD16f	16	2	16	16	1^5	16	250kHz	250kHz
iM-AD25(a)	16	-	-	4	-	16	25kHz	25kHz
iM3250(T)	32	-	-			16	25kHz	25kHz
USB-AD16f	16	2	4	4	1	16	250kHz	250kHz
USB-AD14f	16	1	8	8	1	14	20kHz	20kHz
USB-AD12f	16	1	4	4	1^5	12	20kHz	20kHz
USB-AD^1	16	1	4	4	-	12	10Hz	160Hz
USB-OI16^1	-	-	16	16	2	-	10Hz	240^4Hz
USB-PIO^1	-	-	3×8^3		-	-	10Hz	240^4Hz
meM-AD^1	16	-	-	-	-	10	10Hz	160Hz
meM-ADDA^1	16	1	4	4	-	12	10Hz	160Hz
meM-ADf	16	1	4	4	-	12	10kHz	10kHz
meM-ADfo	16	1	8	8	-	12	10kHz	10kHz
meM-INC^1	-	-	-	-	3	-	-	-
meM-PIO^1	-	-	3×8^3		-	-	10Hz	240^4Hz
PCI-BASE300^2	16-32	2-16	16	16	-	12/16	333kHz	333kHz
PCI-BASE1000^2	16-32	2-16	16	16	-	12/16	500kHz	1MHz
PCI-BASEII^2	16-32	2-16	2×16^3		3^5	12/16	500kHz	1MHz
PCI-PIO	-	-	2×16^3		3^5	-	1MHz	1MHz
PCIe-BASE^2	16-32	2-16	2×16^3		3^5	12/16	500kHz	1MHz

[1] asynchronous sampling
[2] depending on the used module plugged on the card
[3] switchable between input and output in groups of 8,
  USB-PIO, meM-PIO: C-port switchable in groups of 4
[4] total sampling rate of all lines
[5] connect counter/incremental encoder at digital input lines

2   FIRST START

2.1   STARTING THE SOFTWARE
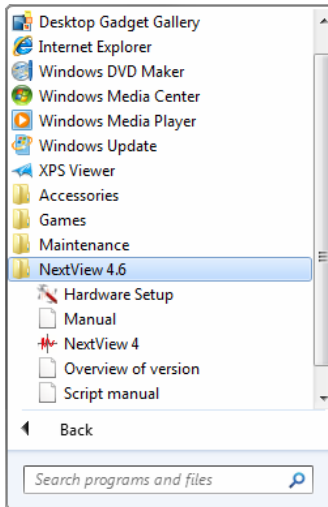
Figure 3

NextView®4 is started via the Windows® Start Menu on the destop or by selecting the program file **nextview.exe** in the installed directory.

Windows®8 provides additional tiles for **NextView®4** and Hardware Setup (see "DEVICE SETUP (PRO, LITE, TRIAL)" on page 23) auf dem Startbildschirm.

If default settings have been used during installation, the software can be reached as follows:

NextView®4	
Windows® Start Menu:	→ "All Programs" → program group "NextView 4.x" → software "NextView 4"
Windows® Explorer:	`C:\Program Files\NextView 4.x\nextview.exe`

- **When starting the software, the DAQ hardware to be used must have been connected and, if necessary, turned on!**

- **Upon the initial start of NextView®4, licensing has to be done first and then the device setup (Pro, Lite, Trial).**

2.2 LICENSING

Upon the initial start, **NextView®4** asks for various user data.
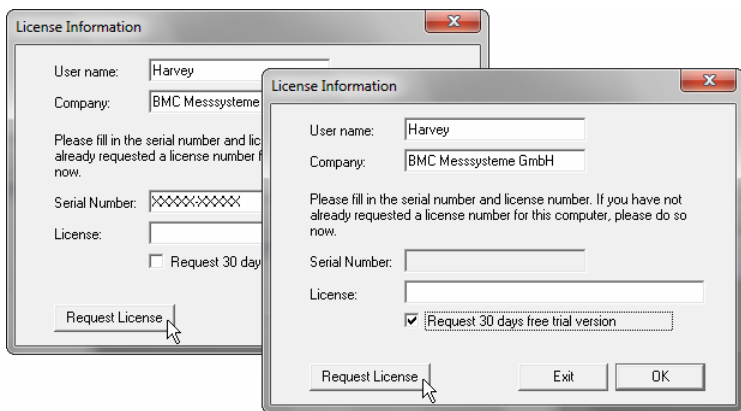
Figure 4

➢ **Holders of NextView®4 Lite, Pro, Analysis:**

Owners of a Lite, Pro, or Analysis version enter the 10-digit serial number received upon purchase of **NextView®4**.

➢ **NextView®4 Trial version:**

If you want to test the 30-day trial version, checkmark the option "30 days free trial version". In this case, entering a serial number is not necessary.

➢ **Update NextView®4.x → NextView®4.6:**

To install a free update of a previous 4.x version, enter the old 4.x license number (20-digit) in the field of the serial number. This also applies to users of the Live! version. The old license number is provided in the "License" dialog (menu "Options") of the previous 4.x version of **NextView®4**.

Click the button "Request License". After accepting the licensing agreement, you can choose if you want to request the license number via e-mail or via our website.
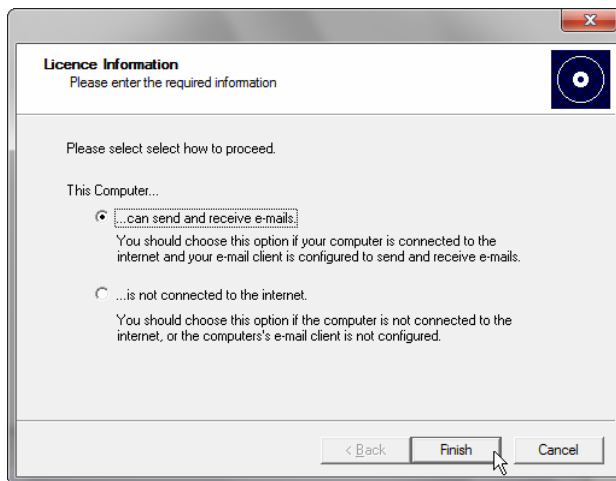
Figure 5

➢ **Request license number via e-mail:**

If selecting this option, your e-mail program will automatically be opened. The e-mail shown contains important data required for licensing and must not be

changed. Send the e-mail (licence@bmcm.de) for the license number to be sent to your e-mail address.

➢ **Request license number via internet:**

The button "Open browser now" automatically starts the default browser and the webpage "NextView® Licensing" (also accessible via: www.nextview.de) will be opened displaying your licensing data. Now enter the e-mail address to which you want the license number to be sent.
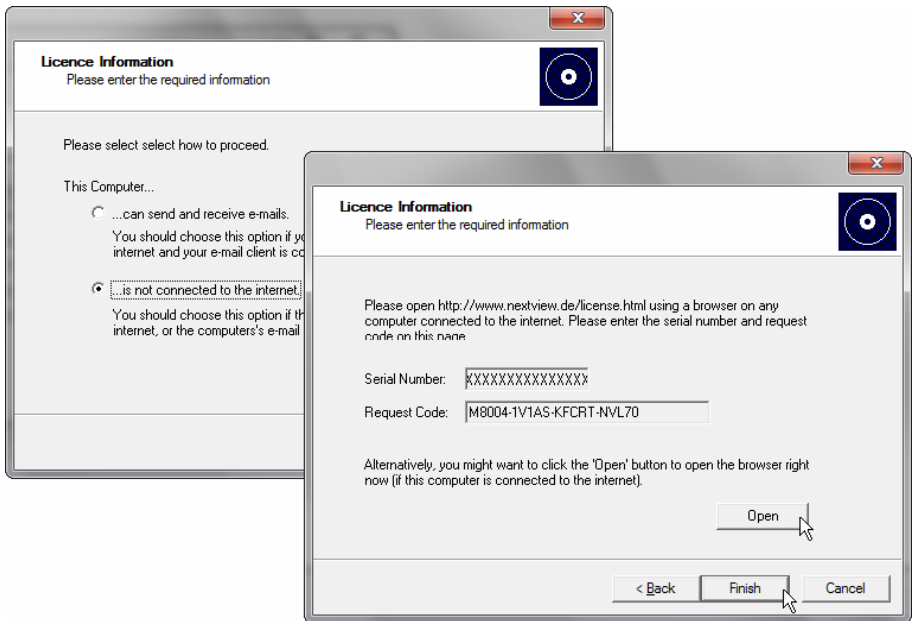
Figure 6

To complete the licensing process, enter the license number (25-digit) received by e-mail in the **NextView®4** dialog "Licensing" and press "OK".

- **The license number decides about the version (Trial, Lite, Pro, Analysis) to be installed. It is only valid on the PC requesting the license number.**

- **The trial is valid for 30 days after requesting the license number. If a license is not purchased within this period, the functional range of NextView®4 will considerably be cut back.**

- **Now proceed with the device setup (Pro, Lite, Trial).**

2.3 DEVICE SETUP (PRO, LITE, TRIAL)
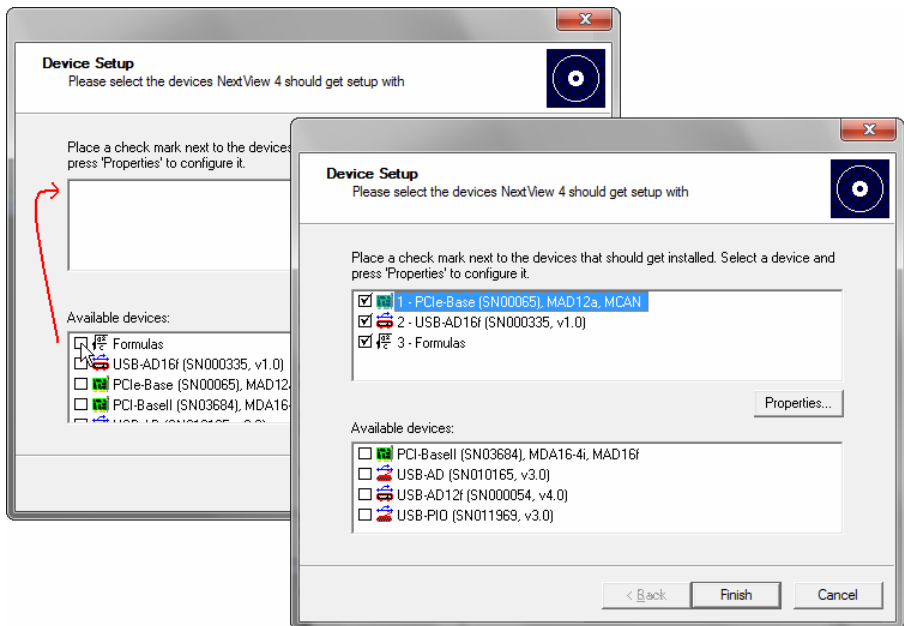
Figure 7

After the licensing process when first starting the program, the measurement hardware is selected and configured. The dialog "Device Setup" (Lite, Pro, Trial) shows all installed and connected data acquisition systems.

Measurement hardware to be used with **NextView®4** is selected by placing a checkmark next to the device in the bottom field. In addition, 16 formula channels can be installed.

With the sound card, audio signals can be displayed, recorded and analyzed in **NextView®4** allowing the use of the 30-day trial license without bmcm measuring hardware.

It is strongly recommended to verify the device-specific properties of some DAQ systems before installation by selecting the device in the top field and pressing the button "Properties…" which is active now.

DAQ system	Setting
LAN data acquisition system (iM series)	Selection of virtual channels 17-19: • temperature sensor (measures internal device temperature) • hot-wired ground channel as 0V reference • clock signal for external synchronization
PCI(e)) data acquisition card (PCI/PCIe series)	To check the module configuration, select the module and press "Properties". • input modules (MAD series): operating mode (single-ended/differential) • output modules (MDA series): output range (±5V/±10V) The settings must correspond to the jumper configuration on the module!

⊗

- **Please note that only one data acquistion can be installed in NextView®4 Lite.**

- **The composition of measurement hardware used with NextView®4 can be changed at any time. The "Device setup" dialog is accessible via the Windows® Start menu by clicking the item "Hardware Setup" in the NextView®4 program group (see Figure 3) or via the correspondent tile on the Windows® 8 start screen.**

3 BASICS

3.1 NEXTVIEW®4 USER INTERFACE
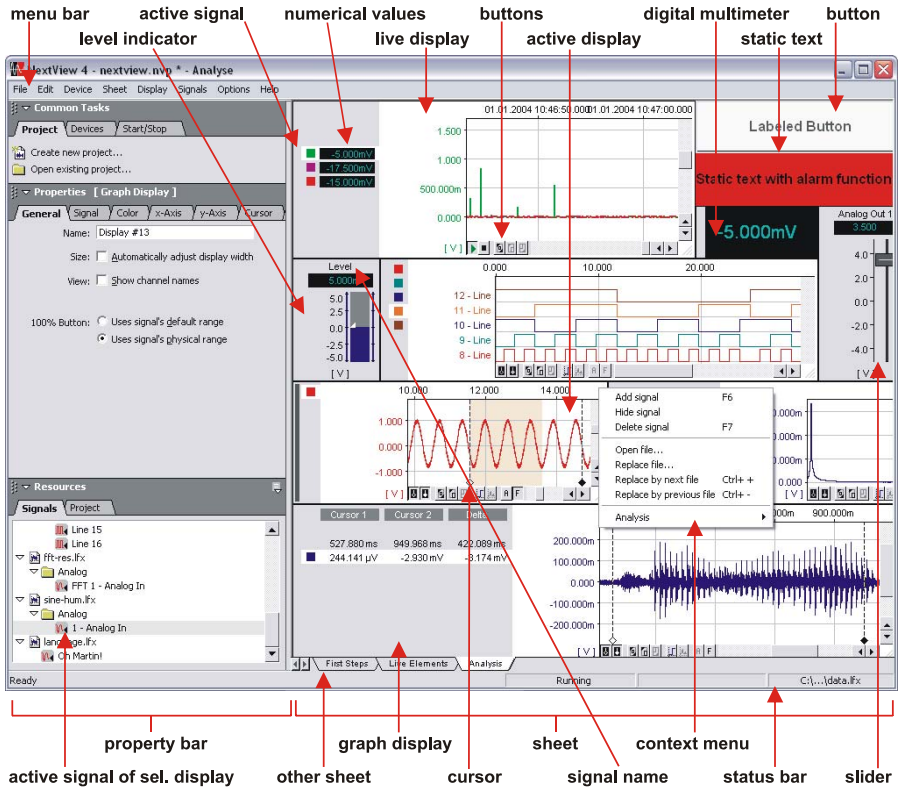
Figure 8

When starting **NextView®4**, the last project you have been working on will be displayed. In the property bar on the left, the settings of the active display and of the active signal are shown and can be modified. User interface and operation of the program follow the Windows® conventions.

3.2   PROGRAM ARCHITECTURE

T I T L E   B A R: NextView®4 - <Project file> - <Sheet>

M E N U   B A R :   Program commands (logically structured)

P R O P E R T Y   B A R

Configuration
 - Hardware
 - Scan
START / STOP

Object related settings
 - Display
 - Signal

Management
 - Channels
 - Signals
 - Project

S H E E T :   Place objects

active object
■ Signal1
■ Signal2
■ Signal3 (active)

(Display types:
 - live display
 - graph display
 - message display
 - digital multimeter
 - static text
 - level indicator
 - button
 - slider
 - picture)

View/change settings

Insert/replace signal (Drag&Drop)

left-click:
Select object

right-click:
Open context menu

Sheet1 Sheet2 Sheet3 ← View other sheet

S T A T U S   B A R :   Information (e.g. current state)

Figure 9

Working object-oriented, **NextView®4** provides various objects, such as the sheet, various types of displays and signals. If you click an object, it is selected and activated. Now, all settings for the active object can be made in the property bar on the left (see "THE PROPERTY BAR AT A GLANCE", p. 39).

The property bar always shows the current settings of the active object and allows for direct and fast changes. For example, you can insert signals by drag&drop from the property bar into the display. Besides that, commands to prepare, start or stop a scan are available.

3.3 STEPS OF THE MEASURING CHAIN

There is more to professional measurement than pressing the start button - it requires thorough preparation, such as configuring the measurement system, displaying signals in a meaningful way, displaying, analyzing and documenting measured data. **NextView®4** leads you through all these steps in an easy and comfortable way.

3.3.1 CONFIGURATION

The entire configuration can be carried out via the dialog box "DEVICE CONFIGURATION" (see p. 85), which is divided into two major parts. Depending on the selected level in the TreeView on the left, one section comprises the settings relating to the entire system (see "CONFIGURING THE ENTIRE SYSTEM", p. 88), the other one the settings for the individual channels (see "CONFIGURING ANALOG / DIGITAL CHANNELS", p. 93, "CONFIGURATION OF THE COUNTER INPUTS", p. 108, "SETTINGS FOR CAN CHANNELS", p. 110, and "SETTINGS FOR FORMULA CHANNELS", p. 116).
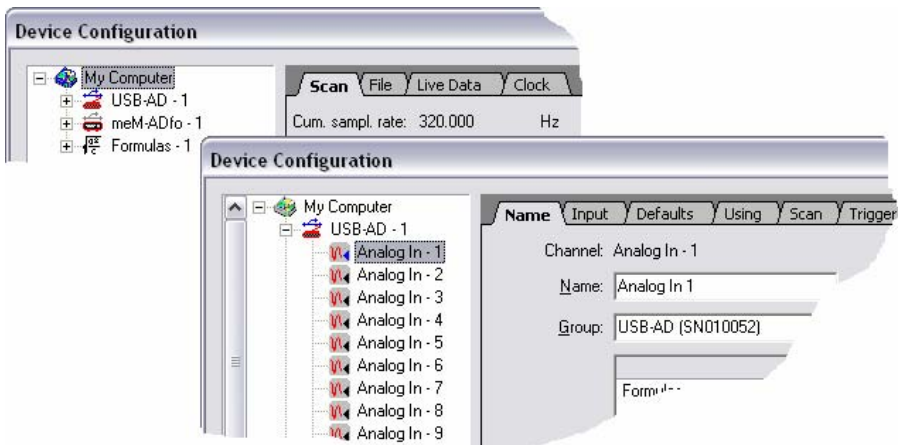
Figure 10

By establishing groups of channels, a multitude of channels can easily be managed without loosing track (see "NAME", p. 95).

By default, channels are classified according to devices so that you can track e.g. an analog channel to its device of origin via the group.

To get an overview of all channel settings, you can either print out the device configuration (see "PRINT CONFIGURATION", p. 124) or open the dialog box "scan configuration" featuring the simultaneous configuration several channels. The selected configuration can either be saved in a file together with the project or in a separate file (see "PROJECT OPTIONS" , p. 218).

3.3.2 ACQUISITION

An unlimited number (min, max, current value, mean value, RMS) of signals can be acquired at various storage rates and types. Different trigger functions can be set with a prehistory of 1..100% for each channel.

The virtual unit of formula channels and comprehensive mathematical functions allow for an unlimited number of channels to be sampled, displayed and recorded in conjunction with each other. Even if they are scanned at various rates, there is no need to save the source signals.

Another important feature is the "multi-scan" (see p. 34), a special type of signal recording, dividing a measurement into several files in chronological order. There is absolutely no data loss between the file limits. The multi-scan allows for long-term measurements and for the detection of malfunction incidents without permanent recording. As soon as an individual scan has been stored, it can be displayed and analyzed even during the scanning process.

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- **You can use as many measuring systems as you like even of different type (except: NextView®4 Lite). Even the sound card of your PC can be installed.**

- **To adjust the hardware in relation to time, an internal or external clock for synchronization can be applied.**

- **The maximum size of the measuring file is 1.8^{19} byte.**

- **Boolean operators can be integrated in formula channels to combine trigger conditions with each other.**
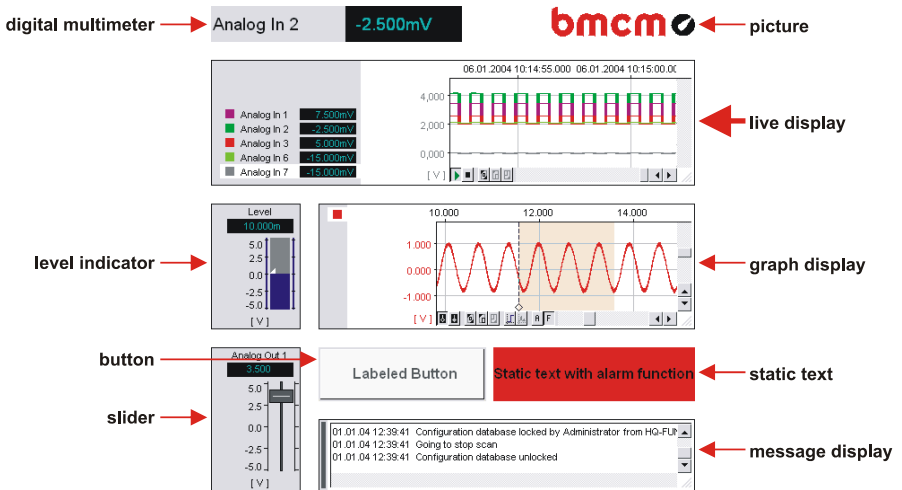
3.3.3 VISUALIZATION

Figure 11

There are various displays for the sampled data.

- **You can name the different displays individually (see tab "GENERAL", p. 44). Especially the selection of displays placed on different sheets becomes much easier this way and allows the direct access to displays for programming purposes.**

- **In a live display or graph display, several signals can optionally be displayed in a "pane view" one above the other (see p. 176). Each partial display uses the y-axis of the signal it shows.**

- **If pressing the mouse wheel in a live display or graph display, you can switch between the zooming function** **(magnify signal, see "ZOOMING IN THE DISPLAY", p. 148) and the "hand"-tool** **(shift signal, see "NAVIGATING THE DISPLAY", p. 146).**

- **Analog and digital outputs can be viewed in a digital multimeter.**

3.3.3.1   LIVE DATA IN CHART RECORDER VIEW

In the live display, the signals are continuously displayed during the measuring process as an envelope curve in a time grid of 0.1 seconds to 2 hours (adjustable). This ensures a peak detection even of fast signals. Live data can be transmitted at a rate of up to 100Hz. It is accompanied by a grid displaying the relative or the absolute time of the sampled signal.

During the scanning process, **NextView®4** is still operable. The live display in particular can be stopped and even past segments of signals can be viewed comfortably by means of the scroll and zoom functions (Professional version).

3.3.3.2   SIGNAL SETTINGS

Signals are either displayed in a single window (max. 256) with the relevant title or in several windows simultaneously. The properties of displays and signals can be set individually in the property bar (e.g. signal color, display size/position, unit/scale of the axes, display range etc). First, however, they have to be selected point-and-click.

⊖

Channels or signals provided by the hardware or the project are inserted in the display by drag&drop from the property bar (section "RESOURCES") to the display.

3.3.3.3   OTHER DISPLAYS

If the numerical value of a signal is of more importance than the curve, the use of a digital multimeter is recommended. By means of static text, additional information can be inserted. In the graph display, previously stored measurement files can be viewed and analyzed. For a graphic presentation, pictures in `*.bmp` file format can be inserted to illustrate the measuring application or as a background image. The message display delivers information about the current status of the system or any other notifications.

⊖

- **Static text and digital multimeter have been provided with an active alarm function, setting off an event if using the optional add-on module NextView®4 Script (for charge).**

- **The new display types slider and button allow the control of analog and digital outputs. The button is available in NextView®4 Analysis, too.**

- **The level indicator visually depicts quantities or levels. You can also use it to view analog outputs.**

3.3.4 ANALYSIS

For a thorough evaluation of the data, **NextView®4** provides a wealth of analysis functions (x/y-representation, calculation of signals (see "CALCULATION", p. 184), simple/multiple FFT, digital filters, differentiation, integration/double integration). In addition, export functions and the copying of signals (see "COPY SELECTED SIGNAL / ALL SIGNALS", p. 177) as table values allow for subsequent processing in other programs (e.g. Excel®). Using the data reduction, signals can be smoothed and disk space be saved.
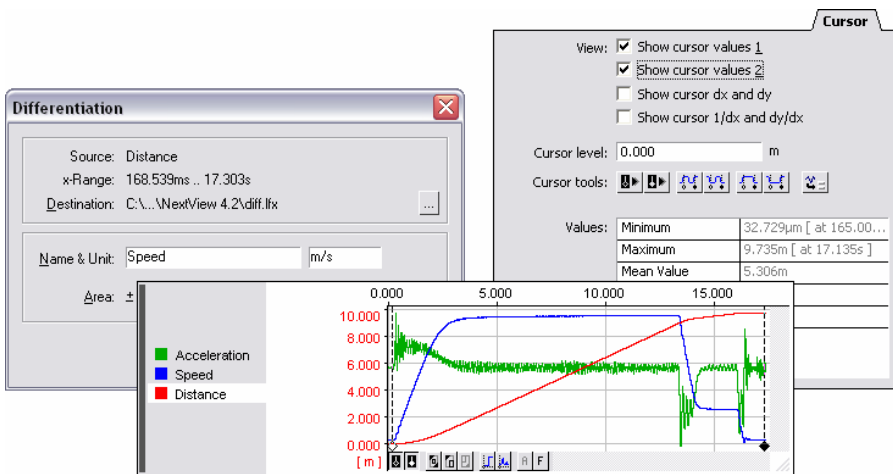
Figure 12

The graph display allows to immediately analyze signal ranges either by displaying the current cursor values or by directly calculating minimum, maximum, standard deviation, mean and RMS value in the cursor range (see tab "CURSOR", p. 60). Cursor functions, like automatic jumps at a predefined level, provide for a comfortable analysis.

Extensive possibilities for the automation of recurring tasks are offered by the functions "REPEAT LAST ANALYSIS" (see page 206) and the batch job (see "SETUP BATCH JOB", p. 208) automatically carrying out an analysis or printing the resulting signals.

If the scale of the x-axis is the same as of the source signal, the result signal will automatically be inserted in the display after calculation.

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- **The tab "SIGNAL" of the property bar shows the key data of the active signal, which were set-up for the scan. These values can be modified ex post (see p. 56). The changes will be updated directly in the display.**

- **With file trains, you can analyze single files of a multi-scan beyond file limits.**

- **Characteristic values of a signal (e.g. minimum) are copied to the clipboard automatically when being calculated (see tab "CURSOR" p. 60). They will be available then as table values for other programs (e.g. Excel®).**

3.3.5 DOCUMENTATION

You can print (see p. 77) entire work sheets or single graph displays and message displays.

A print form is provided, containing user and measurement information. The cursors of a graph display and their current values are printable, too.

The print preview allows viewing the results before printing. Those can also be printed to the clipboard as a scalable bitmap to be used with other programs which can open Windows® Metafiles (`*.wmf`).

- **For each display separately, you can decide if different or one commonly used y-axis for the signals are to be printed.**

- **A legend containing information about the relevant signal can be included in the print-out next to the y-axis.**

3.4   MULTI-SCAN

Multi-scan is a special scanning method. Several measurements with the same settings are automatically executed in series. The number of scans to be taken is set when configuring the entire system in the dialog box "DEVICE CONFIGURA-TION" at the item "Stop" of the tab "SCAN" (see p. 88).

The recordings are seamlessly stored in sequentially numbered files. There is no loss of measured data between the file limits.
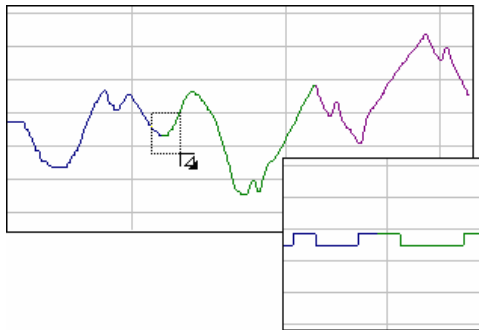
Figure 13

A stored file can even be displayed and analyzed while the multi-scan is still running. In connection with a selected trigger and the relevant prehistory, the multi-scan allows for long-term surveillance and documentation of incidents while recording the essentials only.

- **To minimize negative effects of drift occurrences, you can uncheck the option "Save scan files back to back" (see "FILE", p. 90). In this case, every single scan is automatically restarted and the internal time of the DAQ hardware is reset to the PC time.**

- **With file trains, you can analyze single files of a multi-scan beyond file limits.**

3.5   KEY ASSIGNMENT AND SHORTCUTS

general keyboard commands	
`F1`	open Help menu
`<SHIFT>+F10`	open context menu of the active object
menu handling	
`F10`	activate/deactivate menu bar for keyboard operation
<u><char></u>	open the menu item pressing the key of the underlined character
↑ ↓	move up and down in menus
→ ←	change between menu items or open/close submenu
dialogs	
`<space bar>`	selection of next register card (focus on card)
`<TAB>`	selection of item
`<SHIFT>+<TAB>`	undo selection of item
↵ (`<Enter>`)	confirm the active button of the dialog; if no button is marked, this key closes the dialog (except: dialog "DEVICE CONFIGURA-TION", see "GENERAL OPTIONS", p. 216), changes are applied
`<ALT>+F4`	close dialog, changes are rejected
for graphical representation with selectable items (see dialog "device configuration" and section "resources")	
↑ ↓	select next or previous item
→ ←	open or close the item
project	
`<CTRL>+N`	create a new project file
`<CTRL>+O`	open existing project file
`<CTRL>+S`	save the current settings in a project file
property bar	
`<ALT>+↵`	fold/unfold the object-related property bar on the left
`<TAB>`	confirm changes made in input fields
↵	confirm changes made in input fields, displays are refreshed

sheet	
F9	insert new sheet in the project
<CTRL>+<TAB>	jump to the next sheet of the project
<SHIFT>+<CTRL>+<TAB>	jump to the previous sheet of the project
measurement	
<CTRL>+R	start recording to a measurement file
<CTRL>+T	stop recording to a measurement file
F11	open the dialog "SCAN CONFIGURATION"
F12	open the dialog "DEVICE CONFIGURATION"
display - general commands	
F2	insert digital multimeter
F3	insert live display
F4	insert graph display
<CTRL>+C	copy the active display to the clipboard
<CTRL>+X	remove the active display and copy it to the clipboard
<CTRL>+V	insert a display from the clipboard on the sheet
<TAB>	selection of the display
<CTRL>+P	print active display (graph display or message display only)
static text	
double-click on display	show tab "CHANNELS" of the property bar (section "RE-SOURCES")
<SHIFT>+double-click	open dialog box "DEVICE CONFIGURATION", tab "NAME"
digital multimeter	
double-click on display	show tab "CHANNELS" of the property bar (section "RE-SOURCES")
<SHIFT>+double-click	open dialog box "DEVICE CONFIGURATION", tab "INPUT"

level indicator	
double-click on display	show tab "CHANNELS" of the property bar (section "RE-SOURCES")
<SHIFT>+double-click	open dialog box "DEVICE CONFIGURATION", tab "NAME"
<SHIFT>+**E**	reset the two drag indicators

live display and graph display	
F6	add signal in active display
F7	delete signal (active)
<CTRL>+click on color button	hide signal
<CTRL>+G	show active signal in a new pane
<CTRL>+D	remove the pane of the active signal, signal is inserted in the pane underneath (otherwise the lowest)
<CTRL>+H	turn pane view on (all signals in panes) or off (all signals in one window)
<**space bar**> or mouse-click on horizontal scroll bar	stop signal run in the live display
<CTRL>+<+> or **<CTRL>+<->**	remove the numbered measurement file of the active signal from the project and replace it by the succeeding/previous file (graph display only, use numeric keypad for "+" and "-"!)
↑ ↓	shift all displayed signals downwards/upwards
→ ←	shift all signals to the left/right
<ALT>+scroll or **<ALT>+↓**, **<ALT>+↑**	only shift the active signal on the y-axis
<SHIFT>+zoom (⬛)	y-zoom: the signals are only zoomed on the y-axis
<CTRL>+zoom (⬛)	x-zoom: the signals are only zoomed on the x-axis
<ALT>+zoom (⬛)	y-zoom on the active signal
click mouse wheel in the display	switch between zooming function ⬛ and "hand"-tool ✋
<ALT>+✋	shift active signal by means of the "hand"-tool ✋
<CTRL>+1	toggle white cursor (graph display only, use numeric keys of the standard keyboard)

\<CTRL\>+2	toggle black cursor (graph display only, use numeric keys of the standard keyboard)
\<CTRL\>+→	move white cursor to the right (graph display only)
\<CTRL\>+←	move white cursor to the left (graph display only)
\<CTRL\>+\<SHIFT\>+→	move black cursor to the right (graph display only)
\<CTRL\>+\<SHIFT\>+←	move black cursor to the left (graph display only)
\<**SHIFT**\> + 🖺	adds a new line of characteristic signal values to the clipboard without header, previous content will not be deleted (graph display only)
double-click on color button	shows tab "COLOR" of the property bar (section "PROPERTIES")
double-click on channel name	shows tab "CHANNELS" or tab "SIGNALS" of the property bar (section "RESOURCES")
double-click on y-axis	shows tab "Y-AXIS" of the property bar (section "PROPERTIES")
double-click on x-axis	shows tab "X-AXIS" of the property bar (section "PROPERTIES")
\<SHIFT\>+ double-click on color button, channel name or current value	opens dialog box "DEVICE CONFIGURATION", tab "INPUT" (live display only)
\<ALT\>+C	start a calculation (graph display only)
\<ALT\>+F	start an FFT analysis (graph display only)
\<ALT\>+I	start an integration (graph display only)
\<ALT\>+D	start a differentiation (graph display only)
\<ALT\>+R	start a data reduction of the active signal (graph display only)
\<ALT\>+L	applies a digital filter to the active signal (graph display only)
\<ALT\>+X	exports the signals in the cursor range (graph display only)
\<CTRL\>+A	repeats the last analysis function (graph display only)
\<CTRL\>+B	runs a batch job for the active display (graph display only)
slider	
\<**Page Up**\> or \<**Page Down**\>	shift slider one unit on the axis upwards/downwards
↑ ↓	shift slider 1/5 of a unit on the axis upwards / downwards
\<numeric char\>+↵	directly enter slider position

4   PROPERTY BAR

4.1   THE PROPERTY BAR AT A GLANCE

The property bar is the central operating element of **NextView®4**. Besides the most important commands, it shows the currently used parameters regarding the representation of the marked object (display, signals or sheet).
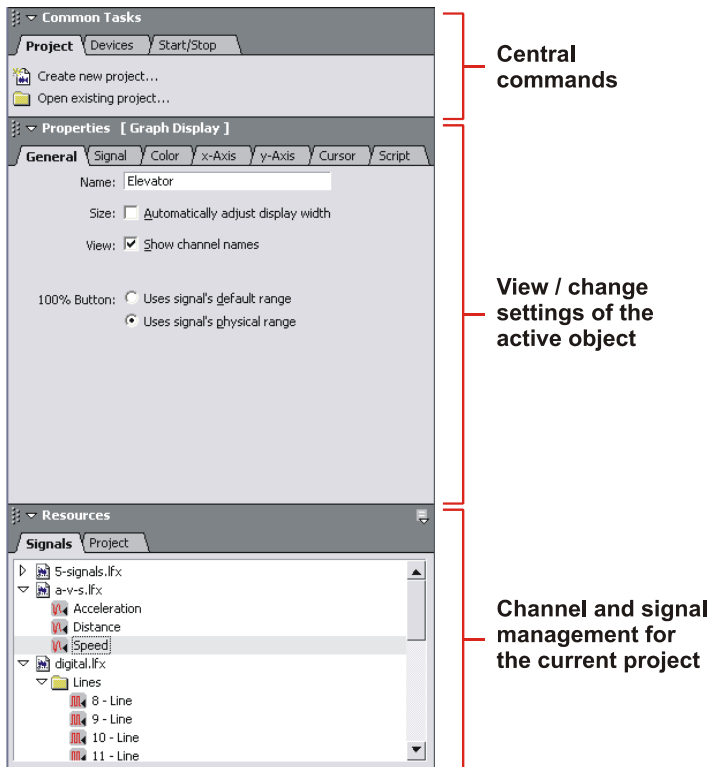

Figure 14

The parameters can be entered directly allowing for an extremely fast configuration.

The different areas of the settings are logically cut and spread on different register cards. As soon as you select another object, the property bar will be refreshed accordingly. In addition, it includes the entire project, channel and signal management of **NextView®4**.

If a project is locked (see "LOCK PROJECT", p. 218), the property bar is hidden. Settings cannot be made.

4.2 OPERATION

The operation of the property bar follows the general Windows® conventions. Jump to another register card, for example, by clicking on it. The sections "COMMON TASKS", "PROPERTIES" and "RESOURCES" can be folded and unfolded at will by clicking the white arrow in front of the entry.

The following table lists the symbols in the property bar and its use. Depending on the position, the mouse pointer indicates different functions.

symbol	function
▷ / ▽	click to unfold/fold entry
🖥	click to open context menu
🖑 (mouse symbol)	click to select command
↔ (mouse symbol)	set width along the vertical bar between property bar and sheet
↕ (mouse symbol)	set height between the sections of the property bar

With the following shortcuts, the property bar can be operated by keyboard:

keyboard	function
\<ALT\>+↵	fold/unfold the object-related property bar on the left
\<TAB\>	confirms the changes made in input fields
↵	confirms the changes made in input fields and refreshes the displays if necessary

Use the command "VIEW PROPERTY BAR" in the menu "OPTIONS" to show or hide the property bar (keyboard: \<ALT\>+↵).

4.3   COMMON TASKS

Spread on various register cards, the upper section of the property bar contains the links to the most frequently used commands and dialog boxes, like creating or opening a project, access to the configuration dialog boxes or the commands to start or stop a scan. This avoids extensive searching especially for beginners.

To choose an item, move the mouse pointer over it. As soon as it is selectable, the mouse symbol changes and the item is underlined.
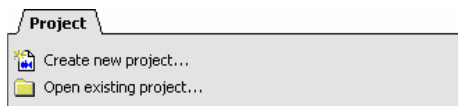
4.3.1 TAB "PROJECT"

Figure 15

In the tab "PROJECT" of the section "COMMON TASKS", you will find direct links to the commands of the menu "FILE" concerning projects.

4.3.2 TAB "DEVICES"

Devices

🎯 Device configuration...
▦ Scan configuration...

Figure 16

The tab "DEVICES" in the section "COMMON TASKS" contains direct links to the configuration dialog boxes, which are accessible via the "DEVICE" menu.

The "DEVICE CONFIGURATION" is used to define parameters for the whole system or to configure single channels. With the "SCAN CONFIGURATION", you can get an overview of the configuration of all cannels and make settings for several channels at the same time.

4.3.3 TAB "START/STOP"

Start/Stop

🔴 Start scan...
⬛ Stop scan...

Figure 17

Via the tab "START/STOP" in the section "COMMON TASKS", a scan is started or stopped (see "START / STOP SCANNING", p. 85). These commands can be reached via the "DEVICE" menu, too.

4.4 PROPERTIES

All settings regarding the view of objects in **NextView®4** are assigned on the various register cards in the section "PROPERTIES". Always the parameters of the currently active object (display, sheet, signals) are displayed. If you click on another object, the tabs are refreshed showing the settings of the recently marked object.
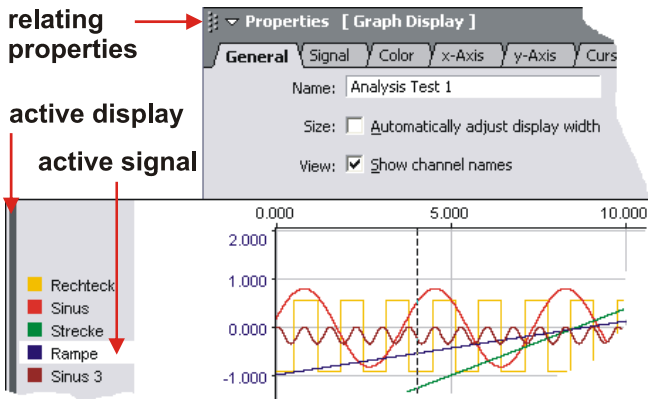
Figure 18

A selected display is recognizable by its selection bar on the left side of the display. Click on the display to activate it.

4.4.1 TAB "GENERAL"

The tab "GENERAL" in the section "PROPERTIES" contains options regarding the view of the display or sheet. Depending on the marked object, different options are provided.

Assigning an individual name to a display faciliates the selection of displays placed on several sheets and allows direct access to the displays for programming purposes.

4.4.1.1   GENERAL SHEET SETTINGS

entry	function
Name:	name sheet (name is displayed at the bottom of the sheet tab)

4.4.1.2   LIVE DISPLAY, GRAPH DISPLAY
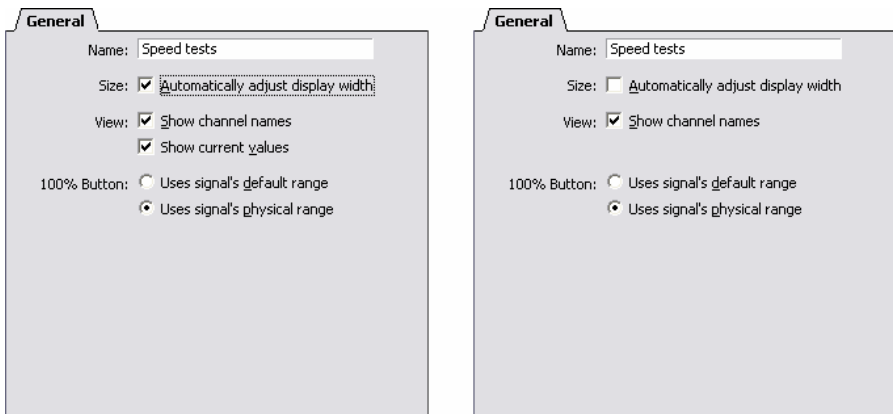
Figure 19

entry	function
Name:	individually name display (name is indicated in the tab "PROJECt", section "RESOURCES" of the property bar)
Size:	automatic adjustment of the display width to full sheet width
View:	select optional display elements: • live display: channel name, current values • graph display: channel name
100% button:	If pressing this button of the live display or graph display, the y-axis is scaled according to the defined default range (default setting) or the physical signal range (see "100% REPRESENTATION", p. 149).

4.4.1.3   STATIC TEXT, DIGITAL MULTIMETER
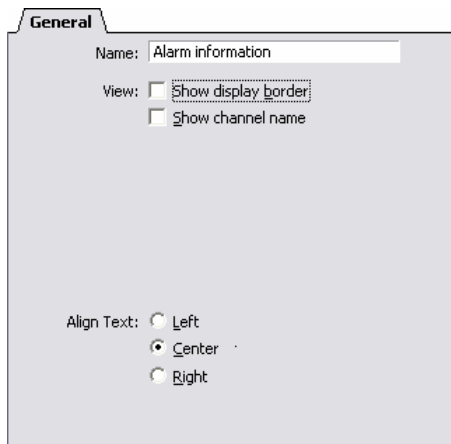
Figure 20

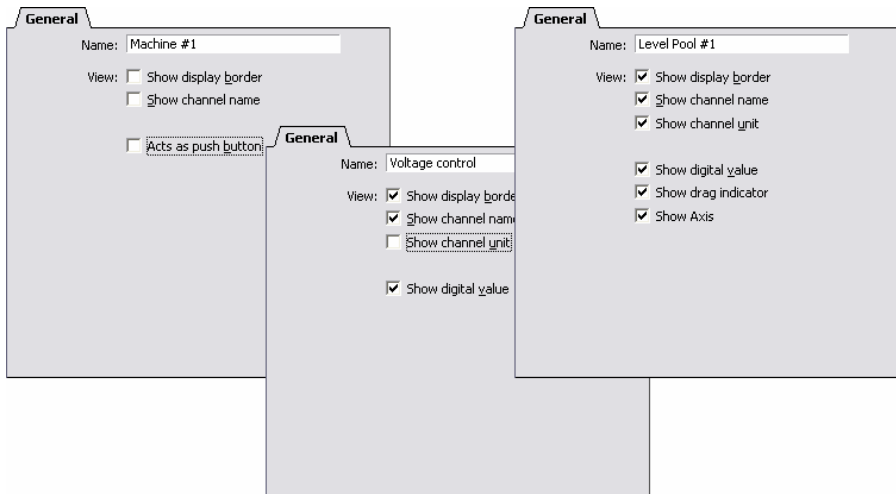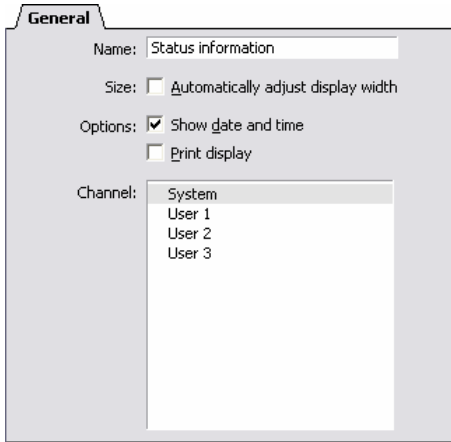| entry	function
Name:	individually name display (name is indicated in the tab "PROJECt", section "resources" of the property bar)
View:	show display frame of the static text or digital multimeter with selection bar and channel name
Align text:	position of text or measuring values

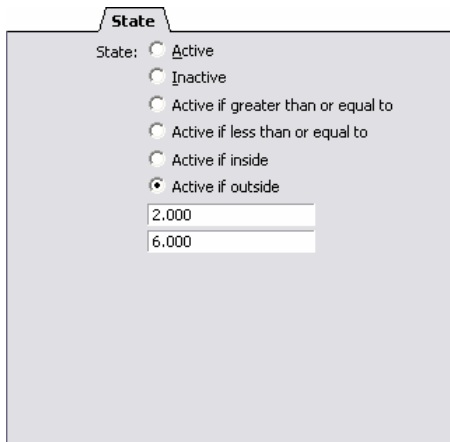## 4.4.1.4   GENERAL PICTURE SETTINGS
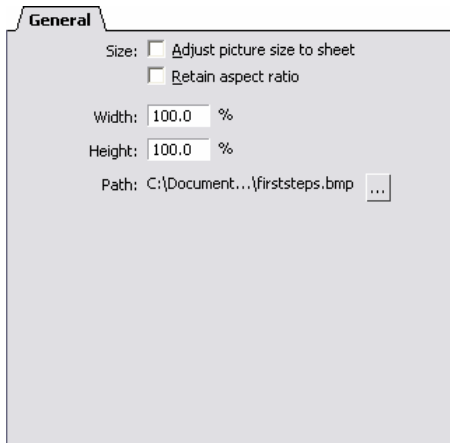
Figure 21

entry	function
Name:	individually name display (name is indicated in the tab "PROJECt", section "RESOURCES" of the property bar)
Size:	show picture in the background adjusted to the full sheet width or with original aspect ratio
Width/Height:	enter dimensions in percent relatively to the original size of the bitmap
Path:	choose directory and file of the `*.bmp` image

4.4.1.5   LEVEL INDICATOR, SLIDER, BUTTON

Figure 22

entry	function
Name:	individually name display (name is indicated in the tab "PROJECt", section "RESOURCES" of the property bar)
View:	show display border with selection bar and channel name; additionally: • level indicator: display unit, digital value, drag indicators and y-axis • button: acts either as a button or a push-button (if option selected) • slider: display of unit, digital value

4.4.1.6 MESSAGE DISPLAYS

Figure 23

entry	function
Name:	individually name display (name is indicated in the tab "PROJECt", section "RESOURCES" of the property bar)
Size:	automatic adjustment of the message display to full sheet width
Options:	add time indication to messages or allow display to be printed
Channel:	change between the display of system information or several user channels (1-3)

4.4.2 TAB "STATE"

In the tab "STATE", you can define a static text, digital multimeter or level indica-tor to be active or inactive. In form and content (static text), these states are indicated in a different way for alarm conditions to be signalized.

Figure 24

entry	function
State:	• active/inactive: display state does not change • active if value ≥/≤: display becomes active when exceeding/falling below a threshold (threshold values included) • active if value inside: display becomes active when reaching the defined range (threshold values included) • active if value outside: display becomes active when leaving the defined range (threshold values not included)

• **The settings in terms of color and content for the active or inactive state are done in the tab "COLOR" (see p. 50).**

• **You can also change the options for the state of the displays via the corresponding context menu (open by right-click).**

4.4.3 TAB "COLOR"

On this tab of the section "PROPERTIES", the default colors are shown **NextView®4** is using in the displays.

4.4.3.1   ADJUST DEFAULT COLORS
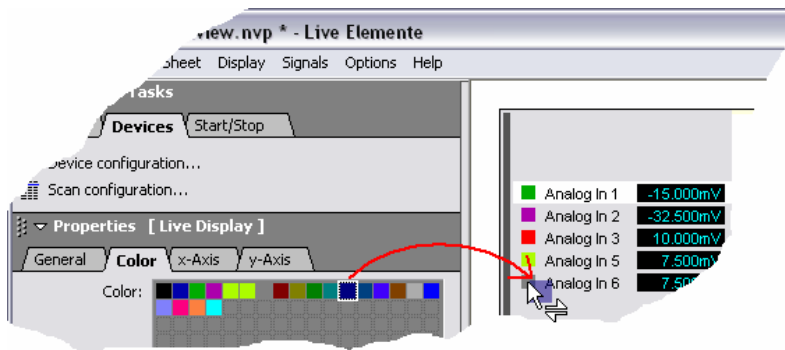

Figure 25

---

256 colors of the halftone palette are provided to adjust or extend the standard palette of the used colors.

The standard colors of **NextView®4** being used for the presentation of displays and signals can be changed or enlarged via the tab "COLOR".

function	procedure
open complete palette:	right-click into gray field of the standard palette
extend / change standard palette:	move a color button with the mouse from the complete palette to the standard palette to a blank space / over the color button to be replaced (drag&drop)
delete color from palette:	move button "No color" ⊠ over the button to be removed

4.4.3.2   LIVE DISPLAY, GRAPH DISPLAY

Figure 26

The default palette with the colors **NextView®4** is using when inserting a signal in a live display or graph display (see "ADD SIGNAL", p. 174) is shown in tab "COLOR". The color of the active signal is focused.

| function	method
change signal color:	move desired color button by drag&drop from the palette over the display or over the color button of a signal to be replaced in the display
change signal color of the selected signal:	double-click color button in the tab "COLOR"

A signal is selected in the display by clicking its color button. The active signal is white highlighted.

If changing the signal color with the mouse, the mouse pointer becomes a double arrow as soon as it is moved over the desired color button.

A right-click on the color palette opens an additional palette with 256 colors to adjust default colors.

4.4.3.3 DIGITAL MULTIMETER, LEVEL INDICATOR
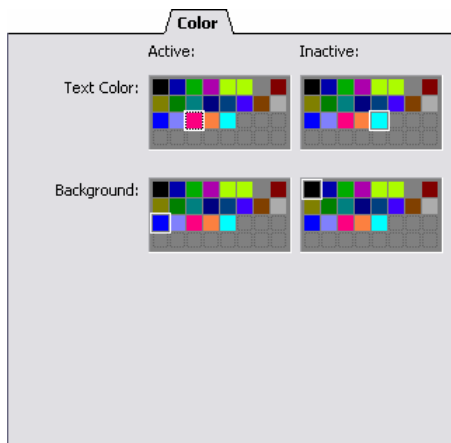
Figure 27

The color settings for the level indicator concerning filling range (foreground) and background in active or inactive state are made in tab "COLOR".

You can assign different text and background colors to the digital multimeter depending on its state.

entry	function
Text color:	digital multimeter: assign color of the displayed digital values
Foreground:	level indicator: assign color of the filling range (bottom)
Background:	assign background color of the display (level indicator: upper range)

The currently set color is changed by drag&drop of a color button from the relevant palette over the display. If the display has been selected before, color assignment is possible directly by double-clicking the desired color button (or click + ↵).

A right-click on the color palette opens an additional palette with 256 colors to adjust default colors.

- **The state of the display is selected in the tab "STATE".**

- **If choosing the option "Active" in the tab "STATE" without entering a threshold value, you can check the settings for a potential case of alarm in advance.**

- **The axes of the level indicator signalize the inactive and the active filling range by their color.**

4.4.3.4   STATIC TEXT, BUTTON
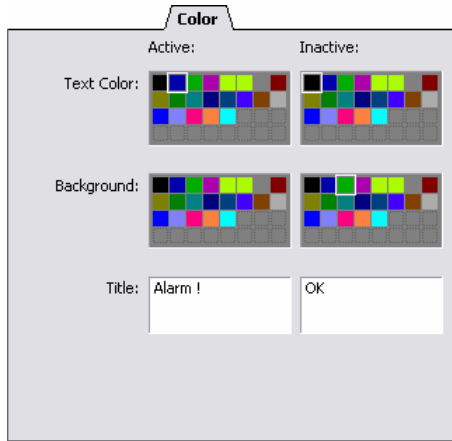
Figure 28

The color settings for the static text concerning text and background in active or inactive state are made in tab "COLOR".

As even a button can have two states, different text and background colors can be assigned, signalizing if it is turned on (active) or off (inactive).

entry	function
Text color:	assign color of the title in active or inactive state
Background:	assign background color of the display
Title:	content of the static text or caption of the button

The current color settings are changed by drag&drop of a color button from the relevant palette over the display. If the display has been selected before, color assignment can be carried out directly by double-clicking the desired color button (or click + ↵).

A right-click on the color palette opens an additional palette with 256 colors to adjust default colors.

⊘

- **The state of the static text is selected in the tab "STATE".**

- **Choose the option "Active" in the tab "STATE" without entering a threshold value to check the settings for a potential alarm case in advance.**

4.4.4 TAB "FONT"
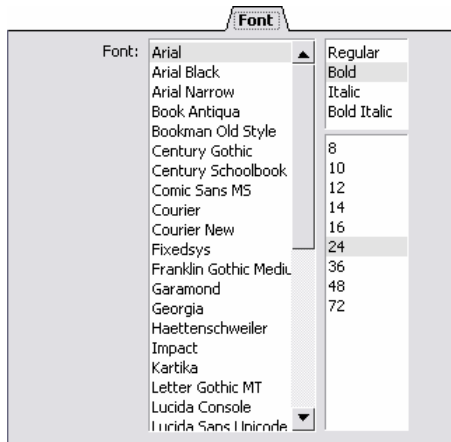
Figure 29

You can define the parameters for titles, text or measuring values used in static text, digital multimeters, sliders, buttons, level indicators or message displays concerning typeface, font style and size on this tab of the section "PROPERTIES".

4.4.5 TAB "SIGNAL"

Signal	
Name	Druck
Group	Drücke
Comment	
File	C:\Documents and Settings\Harvey\My Do...
Type	Analog
Samples	5932
Sample Size	Float (32 Bits)
Timestamp	13.10.1998 09:54:16.556
x-Range	0.000s .. 29.660s
x-Resolution	5.000ms
x-Format	Scientific 10.3
y-Range	-50.00bar .. 50.00bar
y-Default Range	-5.00bar .. 4.00bar
y-Unit	bar
y-Format	Fixed 9.2

Figure 30

Tab "SIGNAL" in the section "PROPERTIES" provided for graph displays contains important configuration data defined when setting up a scan. This information is especially useful if a signal has been created long time ago or by somebody else.

entry	function
Name, *Group*, *Comment:*	signal name, membership to a superordinate group, annotations (see "DEVICE CONFIGURATION", tab "NAME")
File:	name and directory path of the measurement file (see "DEVICE CONFIGURATION", tab "FILE")
Type:	type of signal: analog or digital
Samples:	number of scanned values
Sample size:	storage mode for scanned values
Timestamp:	date and time at scan start
x-Range:	range of x-axis (relative time)
x-Resolution:	spacing between samples
x-Format:	representation of the values of the x-axis (see "DEVICE CONFIGURATION", tab "USING")
y-Range:	physical range resulting from the measuring range of the device after conversion (see "DEVICE CONFIGURATION", tab "INPUT")
y-Default range:	standard range defined to visualize a signal 100% in the display, usually differing from the physical measuring range (see "DEVICE CONFIGURATION", tab "DEFAULTS")
y-Format:	representation of the values of the y-axis (see "DEVICE CONFIGURATION", tab "USING")

All settings not grayed out are editable, i.e. if clicking with the mouse on an item to be modified in the 2nd column, you can directly enter the new settings. Those will be immediately updated in the display when confirming with <**TAB**>-key.

- **In tab "SIGNAL", changed settings are marked bold.**

- **The changes will only be stored in the project so that the original signal itself is kept. If it is opened in another project, the original settings will be used.**

- **Changed signals can be saved with their new settings in separate signal files (see "OPEN / SAVE SIGNAL FILES", p. 67).**

4.4.6 TAB "X-AXIS"
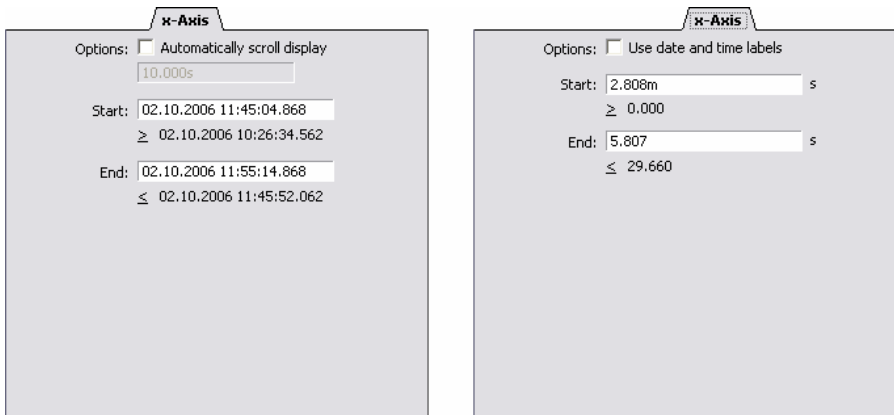
Figure 31

The settings in tab "X-AXIS" of the section "PROPERTIES" relate to the time interval used in a live display or graph display.

entry	function
Options:	• live display: while display is automatically scrolling the incoming measuring vales are visualized within the defined time period • graph display: representation in relative time or absolute time
Start / End:	beginning and end of the time period to be displayed in the format as shown below (live display: uncheck option of automatic scrolling)

If unchecking the option "Automatically scroll display", the live display stops running continuously and the signals are visualized within the defined time range.

There are two time formats possible to present the time in the graph display. Signals in relative time always start at 0 seconds (if prehistory is used: negative value of the prehistory interval) and stop at the end of the scan. The absolute time indicates the time interval with date and time information.

Time settings influence the representation of signals in various ways. Relative time serves to compare signal curves, whereas absolute time focuses on the time component.

⛔

- **For specifications in absolute time, you must keep to certain conventions. Compare your notation to the used format of the time limits indicated below.**

- **Changed settings are updated in the display by pressing the <TAB>-key.**

4.4.7 TAB "Y-AXIS"

Figure 32

In tab "Y-AXIS" (section "PROPERTIES"), the display range of the active signal of a live display, graph display or the scale of a slider or level indicator is defined.

entry	function
Options:	use one y-axis for all signals of a live or graph display
Printing options:	special print settings for graph displays: • legend at y-axis: name, comment, scan start • commonly used y-axis for all signals of the display in the print-out, scaling in percent
Minimum / Maximum:	display range (minimum / maximum signal value)

The specified limits of the default range are shown below the input fields (see "DEFAULTS", p. 99). According to these values, enter minimum and maximum of the y-range or the slider scale to be displayed.

The entry "Physical Range" indicates the measuring or output range of the selected analog input or output defined in the "DEVICE CONFIGURATION" on tab "INPUT" or "OUTPUT".

If using one y-axis for all signals in a live or graph display, the signals can be compared with each other in the display. If each signal has its own y-axis, the signals are visualized with optimum display range. In this case, the specifications apply to the whole display.

Modified settings are confirmed by pressing the <TAB>-key.

4.4.8 TAB "CURSOR"
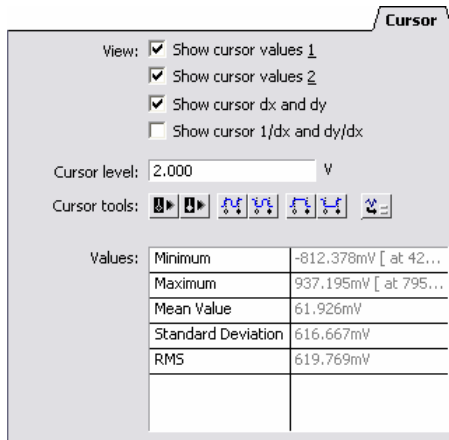
Figure 33

The commands and functions of the cursors in a graph display are provided in tab "CURSOR" of the section "PROPERTIES".

In the bottom part, characteristic values of the active signal can be calculated within the cursor range and be shown directly.

entry	function
View:	show cursor values and other values in the graph display • coordinates of the white cursor no. 1 • coordinates of the black cursor no. 2 • distance between the two x-coordinates ("dx") and their corresponding measuring values ("dy") • frequency, resulting from the time period "dx" (1/dx) and average slope (dy/dx)
Cursor level:	threshold value for cursor jumps
Cursor tools:	• ▣▶ ▣▶: jumps the white or black cursor to the position at which the level value has been exceeded (*positive edge*) • 🔣🔣: jumps both cursors to the next interval in which the level value exceeds (*positive edge*) or falls below (*negative edge*) the cursor level • 🔣🔣: jumps both cursors to the next signal pulse in which the level value exceeds (*positive edge*) or falls below (*negative edge*) the defined level and the other way round • 🔣: calculation of several characteristic values (see below) • <**SHIFT**> + 🔣: adds a new line of characteristic signal values without header (see below) to the clipboard → previous content of the clipboard will not be deleted
Values:	shows calculated characteristic values for the measuring values of the active signal within the cursor range • minimum / maximum • mean value • standard deviation • RMS value

- **Both cursors (see p. 165) must be activated to be able to calculate all values.**

- **By copying the calculated characteristic signal values to the clipboard, they can be used as table values by other programs (e.g. Excel®).**

If you press the buttons, the cursors will jump to the next position where the signal reaches a certain value (cursor level) in the display. As soon as the last level value in the display is reached, the cursors restart at the beginning.

The following figure illustrates how the different cursor values are shown in the graph display. In the first line, the x-values are always displayed and in the following lines the y-values of the relating signals.

Figure 34

PROPERTY BAR - RESOURCES
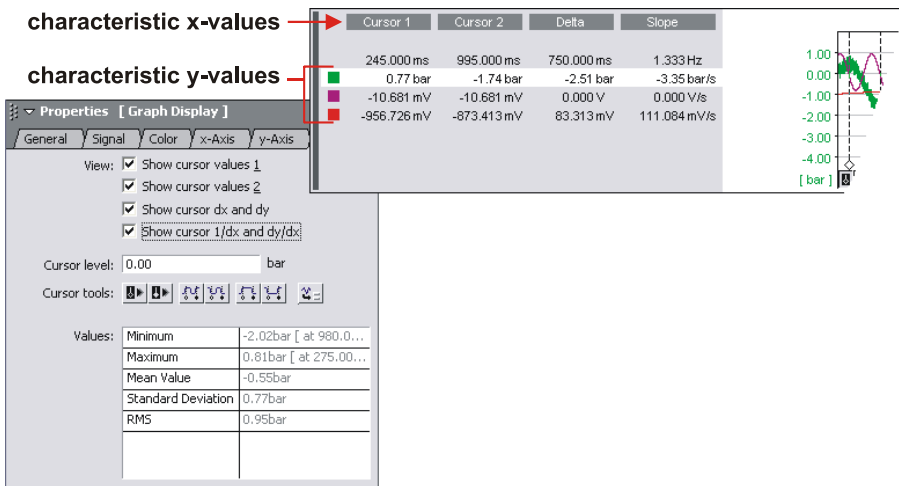
4.4.9 TAB "SCRIPT"
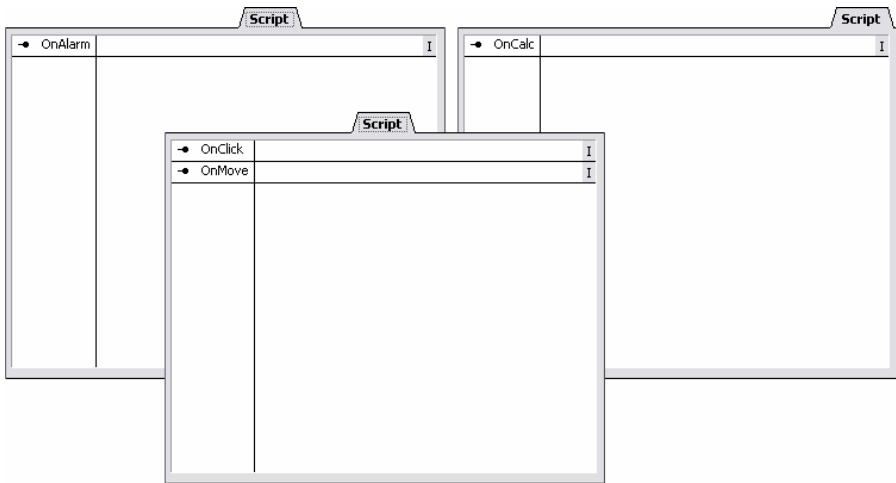
Figure 35

In this tab of the section "PROPERTIES", you can define the action you want to be executed when using the slider or button, when a display (static text, digital multimeter or level indicator) changes its state (active/inactive) or when calculating characteristic signal values (see "tab "CURSOR" ", p. 60) of a graph display. It can only be used together with the add-on module **NextView®4 Script** (for charge).

4.5 RESOURCES

The third section of the property bar gives an overview of the currently opened project, the sheets and displays it contains, as well as the provided channels and signals.

Here, the entire signal management, like adding and replacing signals in the project and in the display, takes place.

In addition, file trains can be created required for analysis across several files.

Like the section "PROPERTIES", this part of the property bar is object-oriented. That means that the displayed register cards always show the settings of the currently marked object.

4.5.1 TAB "CHANNELS"

In the tab "CHANNELS", all channels provided by the hardware are sorted by groups in alphabetical order and listed with their name.

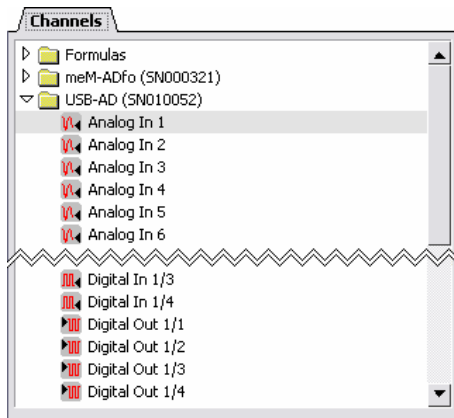If using the Professional version, the virtual unit of the 16 formula channels is included in addition.

Figure 36

If selecting a display on the sheet, the active channel of this display is indicated by a gray marking.

The names of channels and groups are specified in tab "NAME" of the "DEVICE CONFIGURATION". To recognize the channel type, different icons are used.

symbol	type	default name	displays possible
	group	\<hardware\> or "Formulas" for formula channels	-
	analog input digital input formula channel	Analog In \<number\> Digital In \<number\> Formula \<number\>	live display, static text, digital multimeter, level indicator
	analog output	Analog Out \<number\>	slider, digital multimeter, level indicator
	digital output	Digital Out \<number\>	button, digital multimeter

You can directly assign or add one or several channels (live display) to a display by drag&drop from tab "CHANNELS" over the display. If moving the mouse over the color button, channel name or digital value of an already visualized channel in the display, the channel will be replaced. The selection in the tab "CHANNELS" is done as follows:

event	function
mouse click:	selection of a single channel (keyboard: ↑ ↓)
\<**CTRL**\> + mouse click:	selection of several individual channels
\<**SHIFT**\> + mouse click:	selection of all channels, located between two clicked channels
draw a rectangle with mouse button pressed	selection of several adjacent channels ("click&drag")

In addition, the dynamic mouse pointer signalizes the possibility to replace and add channels by using different symbols.

symbol	function
⇕	replace channel
⊹	add channel (live display)
⦸	replacing/adding not possible

4.5.2 TAB "SIGNALS"

The tab "SIGNALS" lists the signal files opened in the project. They contain all recorded signals. Tab "SIGNALS" can be viewed if a graph display has been marked.

If the signal file was created by a scan, the signals are provided in their group. If the file was the result of analysis, the signals are listed directly with their signal name defined in the relevant dialogs for analysis.

Click on a white arrow to open or close a level. Different icons symbolize different levels and functions.
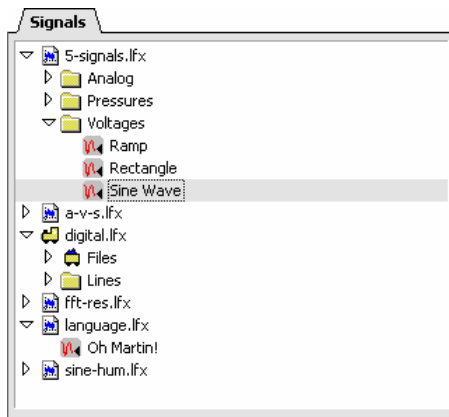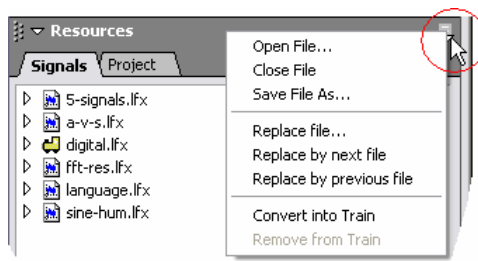

Figure 37

symbol	type
📄	signal file (name see "DEVICE CONFIGURATION", tab "FILE")
📁	group (name see "DEVICE CONFIGURATION", tab "NAME")
〽	analog signal (name see "DEVICE CONFIGURATION", tab "NAME")
〽	digital signal (name see "DEVICE CONFIGURATION", tab "NAME")
🚃 / 🚃	file train

If you select a graph display, the active signal of the display is indicated by a gray marking. The marking is moved if one or several files or signals are selected in the following way:

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event	function
mouse click:	selection of a single item (keyboard: ↑ ↓)
<**CTRL**> + mouse click:	selection of several individual items
<**SHIFT**> + mouse click:	selection of all items, located between two clicked elements
draw a rectangle with mouse button pressed:	selection of several adjacent items

4.5.2.1   OPEN / SAVE SIGNAL FILES

Figure 38

Recorded signals or results of an analysis are available as a measurement file with the extension ***.lfx** in **NextView®4**. To be able to view the signals, you must open the relating measurement file in the project first.

Besides the standard extension ***.lfx** of **NextView®4**, other signal file formats can be opened or created, too.

The commands for signal and file management are available in the menu top right of the tab "SIGNALS" in the section "RESOURCES" of the property bar. Open it by clicking on the small symbol ⬇ with the tab "SIGNALS" being displayed.

entry	function
Open file:	select a signal file to be opened or imported in the project (**`*.lfx`**, **`*.dat`**, **`*.tsf`**, **`*.asc`**, **`*.txt`**, **`*.mdb`**)
Close file:	remove the signal file and all related signals of the gray marked item from the project
Save file as:	save (**`*.lfx`**) or export (**`*.lfx`**, **`*.dat`**, **`*.asc`**, **`*.txt`**) a signal file with another name or extension
Replace file:	remove signal file and all related signals of the gray marked item from the project and replace it by another
Replace by next / previous file:	replace the numbered file of the gray marked item by the subsequent / previous signal file in the project and in the display (keyboard: **`<CTRL>+<+>`** or **`<CTRL>+<->`**)
Convert into train:	convert several selected single files of a multi-scan to a connected file (file train)
Remove from train:	remove the selected signal from the file train and restore it to an independent signal file

Before displaying recorded measurement data, the relevant measurement file must have been opened in the project. With the <**CTRL**>-key pressed, you can select several files simultaneously. With the <**SHIFT**>-key pressed, you can choose several adjacent ones.

- **With the command "SAVE FILE AS", a signal file can be exported directly from here.**

- **You can also open and import signals with the command "OPEN SIGNAL FILE" of the "FILE" menu.**

The signals resulting of an analysis remain open in the project and are shown in the display of the source signal right away (exception: FFT analysis, export). Exported signals must be opened in the project first.

- **Measurement files with sequential numbering are created in a multi-scan, when running a multiple FFT analysis, when setting up a batch job (see "SETUP BATCH JOB", p. 208) or if the relevant option in the "DEVICE CONFIGURATION" dialog box in the tab "FILE" is selected.**

- **The key combinations for replacing numbered signal files allow rapid switching between and the comparing of signals. For "+" and "-" use the keys of the numeric keypad.**

- **The commands to open and replace files are provided in the context menu of the graph display, too.**

4.5.2.2   IMPORT

The import of measurement files, which are not available with the standard extension `*.lfx` of **NextView®4**, takes place just like opening a signal file (see "**OPEN / SAVE SIGNAL FILES**", p. 67) via the tab "SIGNALS" of the property bar.

The relevant menu is opened by clicking on the 🖥 symbol. Then, choose the command "OPEN FILE".
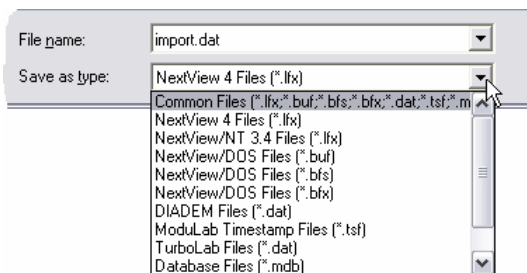
Figure 39

Before selecting the signal file to be imported, open the list of provided "Files of type" in the dialog box "Open" and choose the desired file format. The following types can be imported:

file type	origin
`*.lfx`	**NextView®4** (default extension) or **NextView®/NT 3.4**
`*.buf`, `*.bfs`, `*.bfx`	**NextView® (DOS)**
`*.dat`	DIAdem
`*.dat`	TurboLab DAFF
`*.tsf`	ModuLab
`*.asc`, `*.txt`	e.g. Excel®, WordPad, Notepad
`*.mdb`	database file

4.5.2.3   INSERT A SIGNAL TO A DISPLAY

You can assign or add one or several signals directly to a graph display by drag&drop from tab "SIGNALS" over the display. If moving the mouse over the color button, signal name or cursor value of an already visualized signal in the display, the signal will be replaced. The selection in the tab "SIGNALS" is done as follows:

event	function
mouse click:	selection of a single signal (keyboard: ↑ ↓)
<**CTRL**> + mouse click:	selection of several individual signals
<**SHIFT**> + mouse click:	selection of all signals, located between two clicked signals
draw a rectangle with mouse button pressed	selection of several adjacent signals ("click&drag")

In addition, the dynamic mouse pointer signalizes the possibility to replace and add signals by using different symbols.

Symbol	function
⇲	replace signal
✛	add signal
∅	replacing/adding not possible

4.5.2.4 FILE TRAIN

A "file train" converts single signal files of a multi-scan into one big file.

This allows for analysis beyond file limits. You can still create single files in shorter periods to keep your amount of data manageable and to minimize the risk of any loss of large data amounts.

On the other hand, you can now analyze your signals over a long period of time or calculate characteristic values of a signal (see "tab "CURSOR" ", p. 60). Up to now, this had to be done for each file separately, which then had to be compared with each other.

The file train commands are provided in the context menu of the tab "SIGNALS" in the property bar.
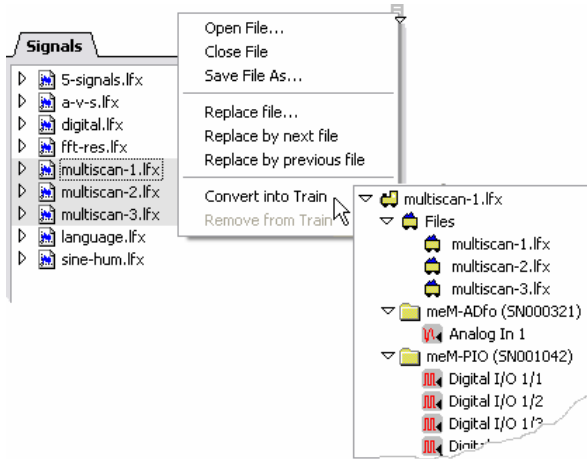
Only partial files of the same (overall) scan can be connected.

4.5.2.4.1 CREATE FILE TRAIN

1. In the tab "SIGNALS", select partial files of a multi-scan (e.g. <**CTRL**> + mouse-click on **lfx**-files).

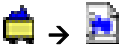2. In the context menu (click), choose command "CONVERT INTO TRAIN".

Figure 40

The file trains are always named after their first signal file. If opening the train by clicking on the white arrow, first the included single files are listed and then the stored signals grouped according to the devices, which are no longer identifiable as signals of different files. Like any other signal, they can now be visualized and analyzed in a graph display.

You can add additional single files of the same multi-scan to an already existing file train by drag and drop over the locomotive.

4.5.2.4.2 REMOVE FILES FROM TRAIN

 →

1. In the file train, select single file(s).
2. In the relevant context menu (click), choose the command "REMOVE FROM TRAIN".
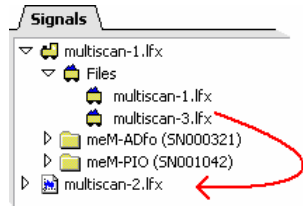

Figure 41

A file that has been removed from the file train is listed as an individual signal file in the tab "SIGNALS". The part of the removed file(s) in the graph display showing a file train signal is deleted accordingly.
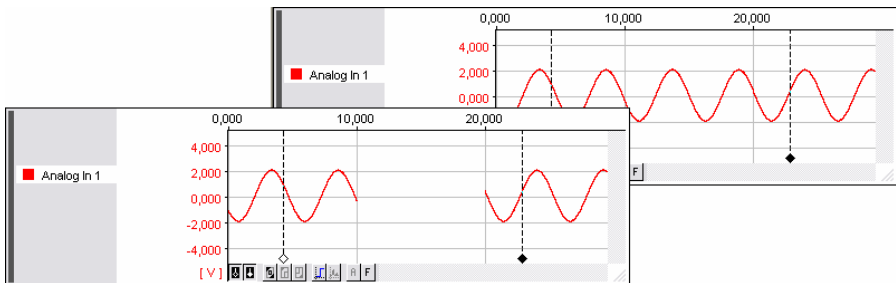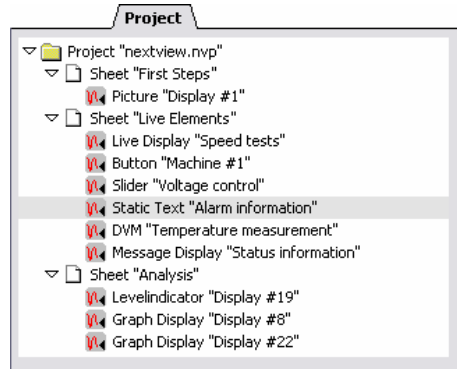

Figure 42

4.5.3 TAB "PROJECT"

To get an overview of the opened project, jump to tab "PROJECT". The highest level indicates the file name of the current project.

Click on the white arrows to fold or unfold a level.

Figure 43

The subordinate level lists the names of the included sheets in alphabetical order and the third level the used display types with the display names (see "tab "GENERAL" ", p. 44) on the relevant sheet. The selected display has a gray marking.

If you click on another listed display, it will be activated. **NextView®4** changes directly to the relating sheet and shows the selected display.

5   MENU BAR

5.1   FILE

The "FILE" menu provides commands for the management of projects and the printing of measured data.
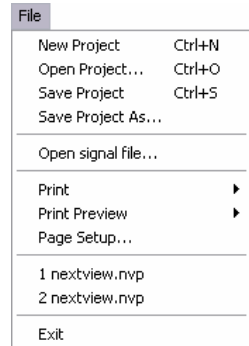
Figure 44

5.1.1 COMMANDS OF THE MENU "FILE"

command	function
new project	creates a new project with a blank sheet; keyboard: <**CTRL**>+**N**
open project	opens an existing project file (***.nvp**); keyboard: <**CTRL**>+**O**
save project	stores the current project; keyboard: <**CTRL**>+**S**
save project as	stores the current project with a new name or in another directory
open signal file	opens or imports a measurement file in the project
print	prints the displayed sheet or the active graph display or message display (keyboard: <**CTRL**>+**P**)
print preview	preview of the display or sheet to be printed, also print into clipboard
page setup	settings for the page format, the form print, selection and configuration of the printer
direct start of projects	direct selection of the recently stored projects (max. 9)
exit	closes the current project file

5.1.2 PROJECT

command	key combination	function
new project	**<CTRL>+N**	creates a new project with a blank sheet
open project	**<CTRL>+O**	opens an existing project
save project	**<CTRL>+S**	stores the current project
save project as	**-**	stores the current project with a new name or path

The menu item "FILE" as well as tab "PROJECT" in the section "RESOURCES" of the property bar contains the commands for the project management.

A project file ***.nvp** includes all the information about the screen setup and the representation of the signals. Therefore, all sheets with displays and relating signals which have been created during a project and stored, are loaded when a project is opened.

- **When NextView®4 is started, the most recently edited and stored project is opened.**

- **You can get an overview of the project structure in the tab "PROJECt" under the section "RESOURCES" of the property bar.**

- **If the configuration is linked with the project (see p. 218), the related device configuration is loaded automatically. Otherwise, the settings of another recent project are opened (even of another project).**

- **The command "LOCK PROJECT" (see p. 218) prevents unauthorized access to project settings.**

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5.1.3 OPEN SIGNAL FILE

With this command of the menu "FILE", you can load previously recorded signals (extension: ***.lfx**) into the current project or import measurement files of other file formats (extension: ***.lfx**, ***.dat**, ***.tsf**, ***.asc**, ***.txt**, ***.mdb**).

You can also **open / save signal files** via the ▼ menu of the **tab "SIGNALS"** under the section **"RESOURCES"** of the property bar.
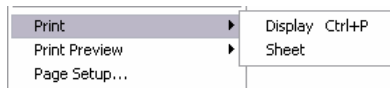
5.1.4 PRINT

Figure 45

This menu item allows for the configuration of the printer and the output of measurement data to the printer.

command	key combination	function
Print / Display	**<CTRL>+P**	prints the active display (graph display or message display)
Print / Sheet	**–**	prints all graph displays or message displays of the entire displayed sheet

If the print preview is selected, the items to be printed can be viewed. A print form is provided (see "PAGE SETUP", p. 81). For individual presentation an **emf**-graphics can be included in the print-out as a frame (see "PRINTING OPTIONS", p. 217).

⚠

- **A display is selected by mouse click. The active display is recognizable by the selection bar on the left side of the display.**

- **Only signals and cursors which are visible in the display are printed. If necessary, the desired signal segment must be minimized, maximized or shifted to the relevant position (see "NAVIGATING THE DISPLAY", p. 146).**

- **Printing options relating to the y-axis can be specified in tab "Y-AXIS" (see p. 59) of the property bar for each graph display individually.**

- **Automatic printing at the end of a scan or after an analysis step can be done with the batch job function (see "PRINT BATCH JOB", p. 212).**

5.1.4.1 PRINT SETTINGS

The command "PRINT" leads to a dialog box, indicating the default printer and printer interface and providing for setting the print options. The used printer is indicated.
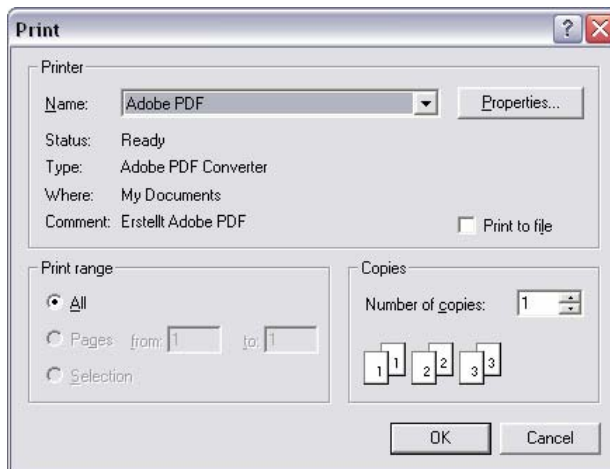

Figure 46

If the option "Print to File" is activated, the print command is sent to a file instead to be printed any time later. Name and path of this file can be entered in the subsequent dialog field "Print to File".

A click on the "Properties" button opens a dialog box providing all printer settings, such as paper size, format (portrait or landscape), and color or black&white print.

The field "Copies" allows you to define the number of desired copies.

5.1.4.2 PRINT PREVIEW

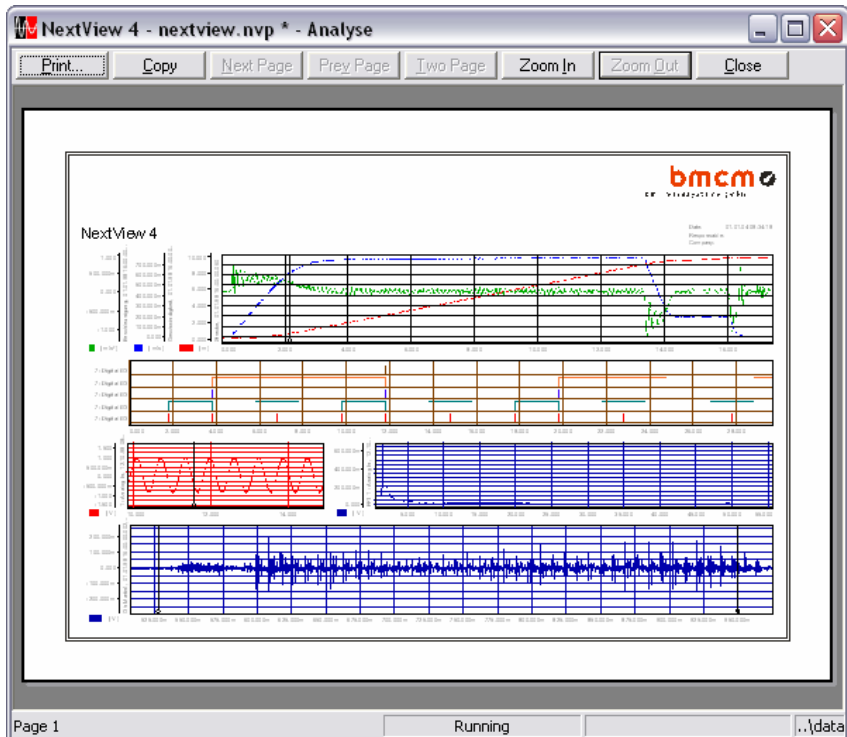The print preview allows viewing the sheet or display to be printed in the form they will appear when printed.

Figure 47

button	function
Print	changes to the standard dialog for the print settings
Copy	copies the print preview to the clipboard (see "PRINT INTO CLIPBOARD", p. 80)
Next / Prev. Page	browses one page further / back if printing on several pages (see "PAGE SETUP", p. 81)
One / Two Page	displays the selected number of pages in the preview
Zoom In / Zoom Out	maximizes / minimizes the representation in two steps
Close	closes print preview and switches to the standard view

5.1.4.3   PRINT INTO CLIPBOARD

When pressing the button "Copy", the displayed print preview will be copied to the clipboard so that it can be used by all programs which can display scalable graphics in Windows Metafile format (`*.wmf`).

Labels, legends, etc. will always be printed in Arial, 6pt regardless of the current paper size of the printer. Therefore, minimizing of the wmf-graphics in the processing program should be avoided. If necessary, choose a smaller paper size in the printer settings (button "Properties").

Example:

Your printer uses the paper size DIN A4, landscape, which is usually the most suitable setting for the arrangement of signal displays and the display format of your measuring application. Pressing the button "Copy" transfers the sheet to the clipboard now.

The print form (in DIN A4, landscape) is to be inserted in a text document written in DIN A4, Portrait, in full page width. That means that it has to be minimized at least to 30%, resulting that the legends might become illegible.

Therefore, we recommend setting your printer's paper size to DIN A5 and then printing to the clipboard. Now, the print form will be displayed in original size in your text document.

5.1.4.4   PAGE SETUP

The command "PAGE SETUP" allows you to define the format of the print-out.
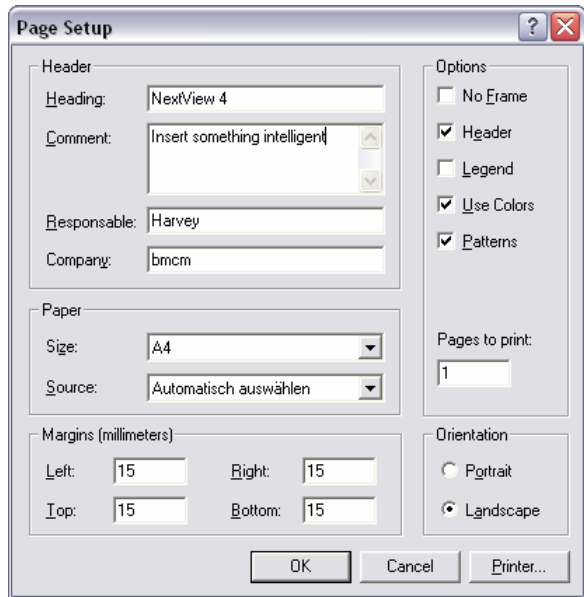
Figure 48

In the "Page header", you can enter additional information such as heading, comment (also multiline), name of the responsible person and company name, which is printed as a header of the file.

Under "Options", several elements can be selected concerning the layout of the page to be printed:

entry	function
No frame:	page is printed without frame
Headline:	page is printed with header
Legend:	contains information about the signals shown (e.g. directory path of signal file, sample rate, number of signal values, signal information, cursor values)
Colors:	colored print-out
Patterns:	signals are printed as a pattern and not with a solid line (improved differentiation in black and white print-outs)

In the fields "Paper" and "Orientation", the page size and format (portrait or landscape) are set. Under "Margins", the page margins are defined.

For "long" signals, we recommend to print on several pages. Therefore, set the number of pages which the print-out of the signals is spread on.

The "Printer" button leads you to the printer settings (see "PRINT SETTINGS", p. 78).

- **Instead of a simple double-lined frame, you can also load an individually designed frame (see "PRINTING OPTIONS", p. 217).**

- **The print preview (see p. 79) illustrates how the print-out would look like according to the settings you made.**

- **The options for the y-axis and for inserting a legend next to the y-axis can be set for each graph display separately. They are included in tab "Y-AXIS" (see p. 59) of the property bar.**

5.1.5 DIRECT START OF PROJECTS

The "FILE" menu contains a list of recent projects (up to 9). If you click on one of these projects, it will be opened directly.

5.1.6 EXIT

This command closes the current project. If not saved so far, an alarm message is displayed, asking you if you want to save the modifications.

5.2 EDIT

This menu contains functions for editing and parameterizing objects in **NextView®4** (e.g. displays, sheets).

Figure 49

These commands relate specifically to the selected display. As these commands are standard Windows® functions, they will only be shortly mentioned in the following table.

command	function
cut	removes the marked display from the sheet and copies it to the clipboard; keyboard: <**CTRL**>+**X**
copy	copies the active display to the clipboard; keyboard: <**CTRL**>+**C**
paste	inserts the content of the clipboard (display) into the sheet; keyboard: <**CTRL**>+**V**
delete	deletes the selected display

- **A selected display is recognizable by its selection bar on the left side of the display. Click on a display to activate it.**

- **A deleted display cannot be restored!**

5.3   DEVICE

The items in the "DEVICE" menu allow for the preparation of a scan and contain the commands needed to execute and finish a scan.

A **scan** is a measurement based on the defined "DEVICE CONFIGURATION", which - in contrast to live-data transmission - is stored in a measurement file (***.lfx**).
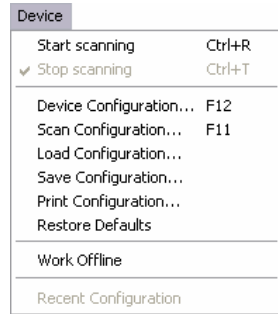
Figure 50

5.3.1 COMMANDS OF THE MENU "DEVICE"

command	function
start / stop scanning	starts or stops the storing of data to a measurement file (***.lfx**); keyboard: <**CTRL**>+**R** or <**CTRL**>+**T**
device configuration	dialog for configuring the entire system and configuring analog / digital channels, counters, CAN channels, formula channels; keyboard: **F12**
scan configuration	overview of the settings of available channels and parameterization of individual or several channels; keyboard: **F11**
load / save configuration	loads a previously stored configuration file (***.nvc**) or stores the configuration data of the measurement system in a file (***.nvc**)
print configuration	prints an overview of the device configuration
restore defaults	restores the default configuration of the system
recent configuration	lists the previously stored configuration files (max. 9), which can also be opened from here

5.3.2 START / STOP SCANNING

A measurement to be recorded with the parameters preset in the "DEVICE CONFIGURATION" is started by choosing the command "START SCANNING" (keyboard: <**CTRL**>+**R**). The incoming signals are stored to a file (***.lfx**) in the indicated directory (see "FILE", p. 90).

The command "STOP SCANNING" (keyboard: <**CTRL**>+**T**) aborts the current scan and the data recorded before are provided in the created file.

- **These commands can also be executed via the relevant entries in the tab "START/STOP" under the section "COMMON TASKS" of the property bar.**

- **During a running scan, the access to the configuration dialogs "DEVICE CONFIGURATION" and "SCAN CONFIGURATION" is not possible.**

- **The status bar shows the current state of the scan.**

5.3.3 DEVICE CONFIGURATION

keyboard	function
F12	open dialog box "DEVICE CONFIGURATION"
↵	close dialog box "DEVICE CONFIGURATION" (if option checked in the "GENERAL OPTIONS" under "OPTIONS / PREFERENCES"!), changes are applied
<**ALT**>+**F4**	quit "DEVICE CONFIGURATION" dialog box without accepting changes

All devices installed with **NextView®4** are parameterized via the "DEVICE CONFIGURATION" dialog box. The configuration procedure is divided into two major parts: the configuration of the system (see "CONFIGURING THE ENTIRE SYSTEM", p. 88) and the configuration of the individual channels (see "CONFIGURING ANALOG / DIGITAL CHANNELS", p. 94, "CONFIGURATION OF THE COUNTER INPUTS", p. 108, "SETTINGS FOR CAN CHANNELS", p. 110, "SETTINGS FOR FORMULA CHANNELS", p. 116).

- **During a running, scan the access to the configuration dialogs is not possible.**

- **This command can also be executed by means of the relevant entry of tab "DEVICES" in the section "COMMON TASKS" of the property bar.**

- **All parameters set in this dialog can be saved in a configuration file (*.nvc) and be printed.**

5.3.3.1 OPERATING THE DEVICE CONFIGURATION

The TreeView on the left side of the dialog box "DEVICE CONFIGURATION" illustrates the structure of the data acquisition system with its different levels. To open or close a level, click on the symbols ⊞ or ⊟.
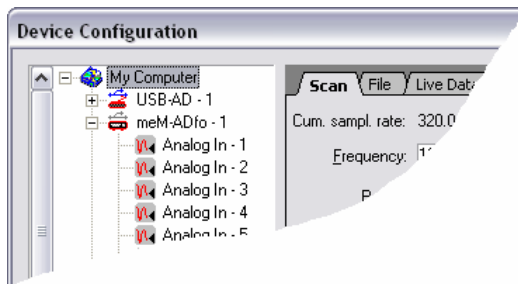
Figure 51

If an element of the TreeView is marked, the register cards on the right adjust accordingly and show the current settings. The parameters for the selected element can be entered now.

A click on the button "Apply" causes the program to accept and store the selected settings. The dialog remains open. If you select "OK", the configuration is also accepted but the dialog box is closed. "Cancel" closes the dialog but changes are not accepted or stored.

Modifications made in the "DEVICE CONFIGURATION" dialog box are not stored automatically in a configuration file (*.nvc). This can be done with the relevant command (see "LOAD / SAVE CONFIGURATION", p. 124) of the menu item "DEVICE".

⊘

- **In the TreeView on the left, you have to select a component (e.g. channel) of the DAQ system first before you can parameterize it.**

- **The configuration will be saved automatically in a file together with saving the project if this option is checked in the project options (see p. 218).**

5.3.3.2 ILLUSTRATING THE MEASUREMENT SETUP

The chart (TreeView) shows all measurement systems with a physical connection that have been indicated upon program installation.

Depending on the hardware used, various channels are available (see "COMPATIBLE HARDWARE", p. 17). They are listed under the individual device and numbered accordingly.

In addition, the virtual formula channels (Professional version, see "SETTINGS FOR FOR-MULA CHANNELS", p. 116) are listed below the measurement hardware. They are generated by calculating analog signals using a given formula.
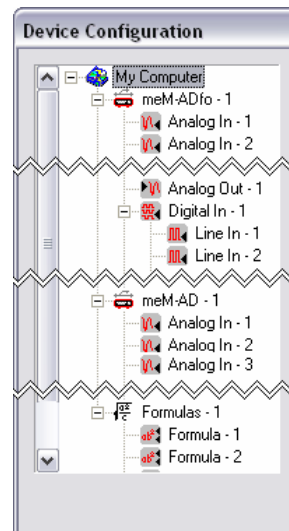
Figure 52

⛔

- **The devices are listed in the same order as indicated upon installation.**

- **To distinguish devices of the same type, they are assigned with consecutive numbers.**

5.3.3.3　CONFIGURING THE ENTIRE SYSTEM

🌐 My Computer

To make settings that apply to the whole measurement system and not only to individual devices or channels, select the first level in the TreeView on the left. The register cards on the right side are refreshed accordingly and indicate the current configuration.

5.3.3.3.1　SCAN

🌐 My Computer

All settings relating to global parameters of a scan are defined under the tab "SCAN".

The ranges are determined by the measurement hardware which is used (see "COMPATIBLE HARDWARE", p. 17) and the memory capacity.

Figure 53

---

entry	function
Cum. sampl. rate:	results of the product of measuring frequency (per channel) and the number of sampled channels
Frequency / Period:	sample rate in Hertz or seconds each channel is scanned with; limits depend on the hardware used
Duration:	recording time (prehistory + posthistory).
Prehistory:	time before scan start, indicated as time or in percent (in single measurements up to 100%)
Stop:	termination of the scan "manually" (see "START / STOP SCANNING", p. 84) or automatically after to the preset number of partial scans (multi-scan)
Save last:	number of multi-scan measurements to be stored (see p. 34): if more scans are taken, the previously created files are overwritten
Required / Free space:	indicates the disk space required for the scan according to the current settings and the available disk space

The scanned channels are all channels to be saved and channels serving as a source for formula channels but which are not saved themselves. Storage type and rate can be specified for each channel separately (see "SCAN", p. 101).

- **If using different measurement systems, the maximum scan frequency depends on the hardware (see "COMPATIBLE HARDWARE", p. 17).**

- **The scan rate of the hardware is distributed among the number of channels to be stored, producing the maximum scan frequency for a channel. If less channels are stored (see "SCAN", p. 101 or "SCAN CON-FIGURATION", p. 120), the scan frequency can be increased (does not apply to the USB-AD and USB-PIO, because their scan frequency is fixed to 10Hz per channel).**

- **NextView®4 only uses the value set in the prehistory for a measurement if a trigger is set.**

- **If running a multi-scan or using several measurement devices, you have to enter at least 10 seconds for the posthistory.**

5.3.3.3.2　　　FILE

 My Computer

In the "FILE" register card, the information to create a measurement file is entered.

Here, several additional options are provided which are particularly interesting for multi-scan applications.
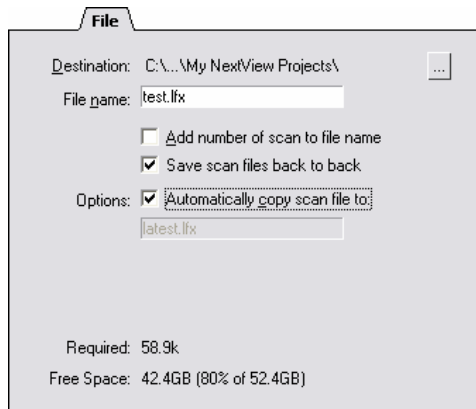

Figure 54

entry	function
Destination:	The displayed directory path, indicating where measuring data are to be stored, can be changed with the button on the right.
File name:	name of measurement file with the extension ***.lfx**. • add number of scan to file name: recommended to prevent overwriting • save scan files back-to-back: default option of the multi-scan, no loss of measurement data between file limits of the partial scans
Options:	the last created measurement file is optionally copied into the file **latest.lfx**
Required / *Free space:*	indicates the disk space required for the scan according to the current settings and the available disk space

Attaching a number to the measurement file is recommended when a series of scans is to be executed without great efforts. If changing the file name, the numbering restarts from the beginning.

The graph display also benefits from this option allowing to display signals from numbered measurement files in a row by means of a command or key combination without needing to define the channel source for each signal (see "OPEN / SAVE SIGNAL FILES", p. 67).

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⚠️

In a multi-scan, the files are numbered according to a predetermined pattern, e.g. data-1.lfx, data-2.lfx, etc. If you additionally select the sequential numbering, two numbers will be attached to the files, e.g. data-1-1.lfx, data-1-2.lfx, etc., the first number indicating the total amount of scans, and the second the number of partial measurements of the multi-scan.

Slightest measuring inaccuracies of quartz oscillators integrated in DAQ systems, can lead to a time offset in case of long-term measurements with the multi-scan. In this case, uncheck the option of saving the scan files back-to-back. The scan is then stopped at the end of each partial scan and restarted so that the time is reset at the beginning of every single scan.

Creating a `latest.lfx` file is useful, if you want to automatically visualize the last recording of a multi-scan in the graph display, for example.

5.3.3.3.3   LIVE DATA

🌐 My Computer

In this tab, the settings about the transmission of live data are made.

These parameters only relate to the visualization in the live display and do not affect the acquisition of data in any way.
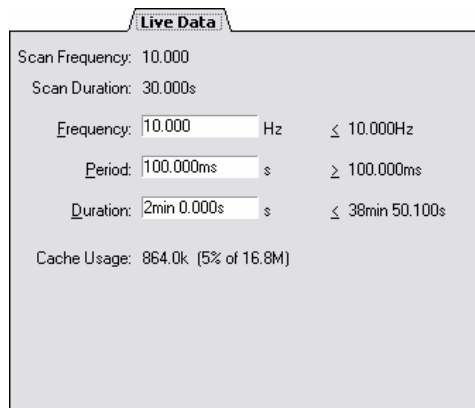
Figure 55

entry	function
Scan frequency / Scan duration:	scan parameters specified in tab "SCAN"
Frequency / Period:	transmission rate for live data in Hertz or in seconds. The limits are restricted by the hardware and the preset scan frequency (see above).
Duration:	defines the time period in a live display in which you can scroll back
Cache usage:	indicates the disk space required in the RAM according to the current settings

Live data are displayed as an envelope curve (see "ENVELOPE CURVE", p. 145) providing for enhanced visualization and, in particular, transmission of fast signals.

Reducing the frequency extends the maximum time range for the signals to be stored in the live-data cache.

5.3.3.3.4 CLOCK

🌐 My Computer

All DAQ systems have an internal clock periodically sending a signal to sample another measuring value while scanning.

In addition, some devices can be synchronized (see "COMPATI-BLE HARDWARE", p. 17) so that - if using several devices - they can be adjusted in time to each other.
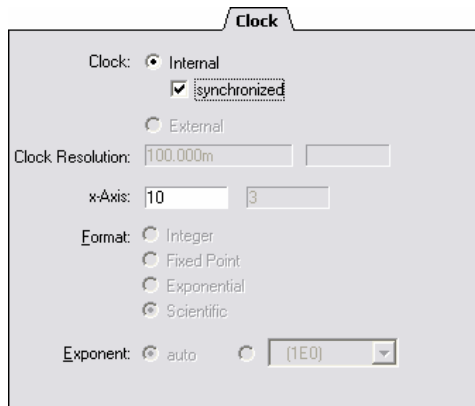
Figure 56

Besides that, some hardware can be equipped with an external clock signal, which is necessary for scans which are not referenced on time but on another quantity

(e.g. rotation angles). In this case, the time intervals between the single samples are not the same but sampling is done e.g. when a shaft has performed a 360° rotation.

If using an external clock, additional information about the notation of the x-axis is required.

entry	function
Clock:	choose internal or external clock
Clock resolution:	space between the external clock pulses and unit (depends on the clock signal)
x-axis:	notation of the x-axis: max. number of characters (one place reserved for sign and decimal point each) and places behind the decimal point
Format:	select representation of the numbers (see "SCAN", p. 101)
Exponent:	in case of scientific representation the conversion to another unit is either done automatically or the specified unit (k, M, G) is used if necessary

5.3.3.4 CONFIGURING ANALOG / DIGITAL CHANNELS

A click on ⊞ opens the measurement hardware in the TreeView of the "DEVICE CONFIGURATION" dialog box and gives an overview of the channels available for a scan (see "OPERATING THE DEVICE CONFIGURATION", p. 86).
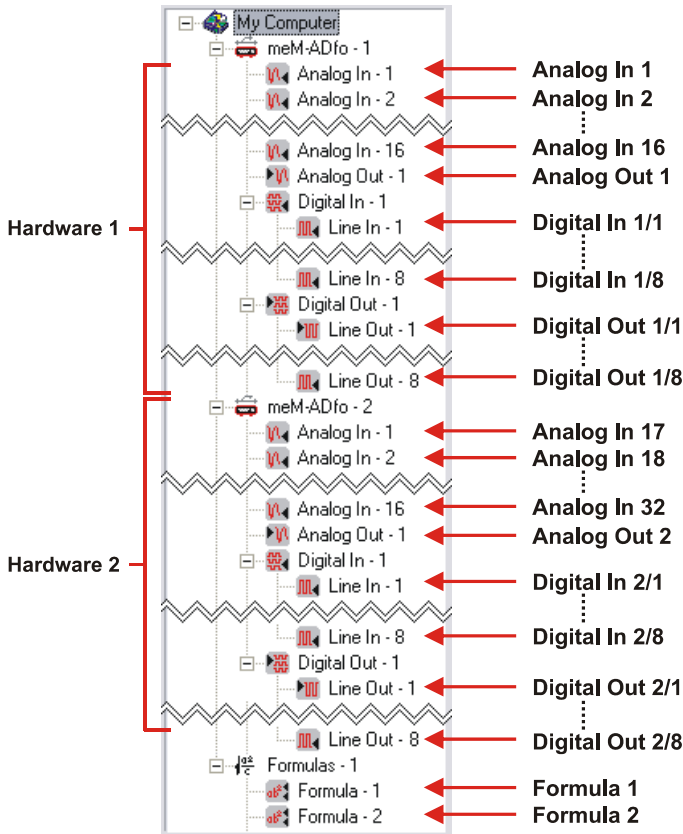
Figure 57

The channels are listed by their physical names (e.g. "Analog In", "Digital Out") and by device, like they physically exist. For example, device no. 1 provides a channel "Analog In - 1" as well as device no. 2.

Digital channels are numbered by devices, too (e.g. "Digital In - 1") and the included digital lines are numbered for each channel separately (e.g. "Line - 1").

Digital lines with switchable direction are named "Digital I/O".

To avoid any mix-ups in **NextView®4**, the different channels are logically numbered through all DAQ systems (see "NAME", p. 95) so that "Analog In - 1" of the second hardware becomes "Analog In 17", for example if the first hardware provides analog inputs.

To make settings for a channel, make sure it is marked in the TreeView of the "DEVICE CONFIGURATION" dialog box on the left. Depending on whether the settings apply to a channel, a group or individual lines, the configuration of digital channels is executed on different levels.

If marking a channel or any other level, the register cards of the dialog box on the right reflect the changes automatically. The current configuration is indicated and parameters can be entered.

5.3.3.4.1   NAME

In **NextView®4**, the channels are kept under their logical names. It can be indicated in a live display or graph display (see "TAB "GENERAL" ", p. 44), for example.

Assigning channels to a group allows to keep track when many channels are used. Channels are always member of a group.

Figure 58

entry	function
Channel:	displays selected channel (physical name)
Name:	enter logical channel name (e.g. "Temperature")
Group:	allocate channel to a group
Comment:	add additional information (optional)

By default, channels are always assigned to their DAQ system. For example, to insert a channel in a display, just look under its group (see "TAB "CHANNELS", p. 64).

A list shows the already existing groups and the number of channels they contain. Double-click one group name listed to assign the actual channel directly to this group.

The sequential numbering of the channels through the hardware guarantees the uniqueness of the channels names (see "CONFIGURING ANALOG / DIGITAL CHANNELS", p. 94).

- **Names can have up to 20 characters (spaces included) and must be unique.**

- **For a detailed description of a channel, you can use the comment.**

- **By default, the physical name is used (e.g. "Analog In") with a sequential number throughout the different channel (e.g. analog inputs, digital outputs) and measurement systems.**

- **These settings can also be made simultaneously for several channels in the "SCAN CONFIGURATION" dialog box.**

5.3.3.4.2   INPUT

Tab "INPUT" of the "DEVICE CONFIGURATION" allows for the configuration of the physical measurement variable.

By means of an offset tool, a connected measuring amplifier can be calibrated. Two known measuring values are necessary to calculate the conversion factors defining how the value to be displayed is generated from the measured voltage.

Figure 59

entry	function
Input range:	select the voltage range of the input (depends on hardware!)
Sample:	shows online the incoming measuring values of the analog input
Offset:	scaling of the zero point: at zero reset applied voltage
Take sample or *Take sample 2:*	enter unit and reference values to convert the sampled voltages into the represented physical variable

If you short-circuit the channel and press the "Offset" button, the just measured value at 0V will always be subducted from all incoming voltage values.

Then, two known signals are connected and the measured values are accepted one after the other via the buttons "Take Sample" (and "Take Sample 2"). Enter the corresponding physical desired value and unit in the adjoining fields on the right. Confirm your changes with the <**TAB**>-key.

- **To define the conversion factors, up to 8 measuring values can be used. If checking this option in the "GENERAL OPTIONS" under the menu item "OPTIONS / PREFERENCES", tab "INPUT" will be extended (see p. 216).**

- **If no data are being transmitted or if not connected to the DAQ system, the "Offset" and "Take Sample" buttons are grayed out. No running measuring samples are displayed.**

If using more than two reference points, **NextView®4** creates a regression line. The button "New" allows to add another support tag for calculating the regression line. "Del." removes the selected tag.

Adding a reference point is done as described before. Press the <**TAB**>-key to accept and transfer the reference point. Only the selected item in the list is modified. Other items can be configured in the same way by selecting them.
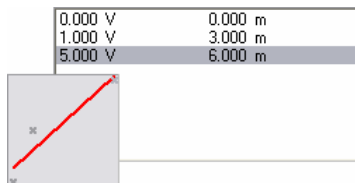
Figure 60

The resulting regression line is displayed in a small window on the left side of the table. Each support tag will be represented by a gray X. The support tag selected in the table will be displayed in the default selection color in the figure.

5.3.3.4.3 DEFAULTS

The display range specified in the "DEVICE CONFIGURATION" defines the default range of the y-axis. It is different from the physical measuring range and can be used in a live display or graph display for the 100% represen-tation of a signal.

This setting allows the display of the signal in its optimum size. It is a visual tool without any conse-quences to the signal itself.
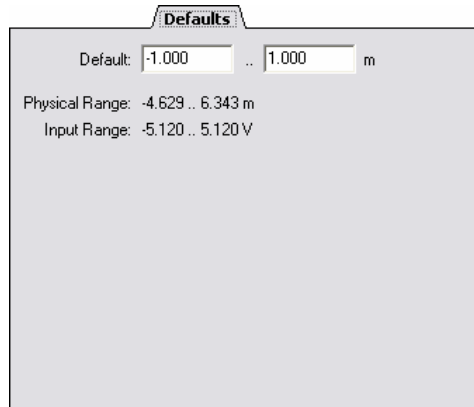
Figure 61

entry	function
Default:	enter minimum and maximum for the 100% representation in the live display or graph display
Physical range:	display of the physical measuring range, resulting from the input range after conversion
Input range:	display of the input range specified in tab "INPUT"

In the property bar on tab "GENERAL" of a live or graph display, you can choose if the set default range is used for the 100% representation of a signal in the display (see p. 149).
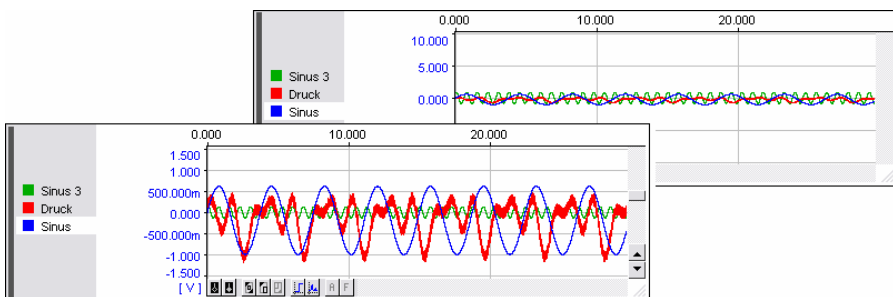
Figure 62

This is particularly suitable if a signal always stays within a certain range, which happens, for example if the input range of the measuring hardware is not identical with the output range of the sensor.

5.3.3.4.4 USING

In this card of the "DEVICE CONFIGURATION", the output format for measured values of analog inputs is set.
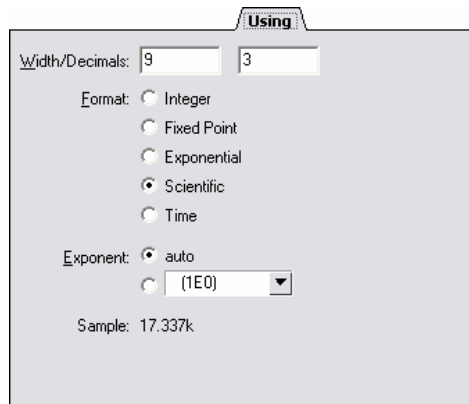
Figure 63

entry	function
Width / Decimals:	max. number of characters (one point for sign and decimal point reserved) before and after the decimal point
Format:	select representation of the numbers (see below)
Exponent:	in case of scientific representation the conversion to another unit is either done automatically or the specified unit (k, M, G) is used, if necessary
Sample:	indicates the representation of a value with the current settings

For example, the number 12345.6789 with a width of 15 characters and 5 decimals would be edited in the following way:

format	representation	output
Integer:	rounded to a whole-number value (without decimals)	12346
Fixed point:	full display of the decimals, if necessary filled with succeeding zeros	12345.67890
Exponential:	decimal number (1 digit before the decimal point + number of decimals) + exponent (E±decimal power)	1.23457E+004
Scientific:	optimize representation of values by using units (e.g. m, k, M, G)	12.34568k
Time:	displayed values are times (base unit: seconds)	3h 25min 45.68s

5.3.3.4.5 SCAN

All storage parameters of the selected measurement channel relating to the scan settings are defined in the "SCAN" register card of the "DEVICE CONFIGU-RATION".

A 1:1 storage ratio means that every incoming value is stored.

Figure 64

entry	function
Store:	(multiple) choice of storage type (x = value entered at "Storage ratio"), if no option is checked, the channel will not be saved during a scan • "current value": storage of every x sampled value • "average": storage of the mean of x sampled values each • "minimum": storage of the minimum of x sampled values each • "maximum": storage of the maximum of x sampled values each • "RMS": storage of the root-mean-square value x sampled values each based on the following formula: $$RMS = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(y_i^2)}$$ **N = number of measured values (here: x) per interval** **y$_I$ = i-th measured values of the relevant interval**
Scan time:	indicates frequency and period specified in tab "scan" when configuring the entire system
Storage ratio:	define ratio of stored value : sampled value
Required / Free space:	indicates the disk space required for the scan with its current settings and how much disk space is available

If recording signals with very different characteristics, like high-frequency vibrations and slowly changing temperatures, we recommend to define the frequency in tab "SCAN" (see p. 88) for the entire system so that the fastest signal is recorded adequately and to reduce the number of stored values for the slow signal in this dialog by setting an appropriate high storage ratio.

If other than current values (analog channels only) are to be stored, a suffix ("Avg", "Min", "Max" or "RMS") is added to the channel name specified in tab "NAME".
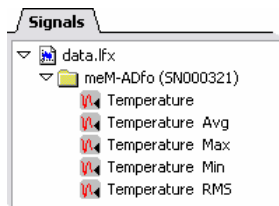
Figure 65

If several storage types have been selected, only one of these signals is displayed in the live display. The signal values appear in the following order: "RMS", "Average", "Current value", "Minimum" and "Maximum". If the RMS and current values are to be stored simultaneously, the RMS values appear as live data.
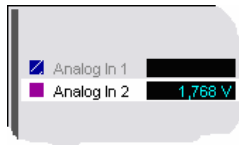
Figure 66

Channels that are not recorded appear grayed out in the live display during recording.

- **In order to save disk space, we recommend saving only channels which are actually required for the scan.**

- **If storing current values with a high storage ratio, peaks in the signal might not be detected.**

- **These settings can also be made simultaneously for several channels in the "SCAN CONFIGURATION" dialog box.**

5.3.3.4.6 TRIGGER
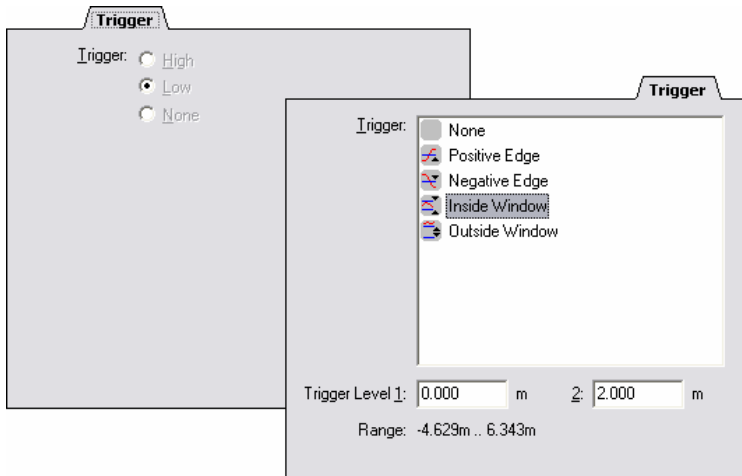
Figure 67

The trigger condition defines the start of the actual scan. Only when the trigger event occurs, i.e. an incoming measuring value of a channel meets the given condition, the scan is started.

entry	function
Trigger:	**Analog In** • "None": no trigger has been set • "Positive / Negative Edge": The scan triggers when the measured value surpasses / falls below the value defined by "Trigger level 1". • "Inside /Outside Window": The scan triggers when the measured value is within / outside the range defined by "Trigger level 1" (minimum) and "Trigger level 2" (maximum). **Digital In** • "1": scan triggers as soon as the line is "high" • "0": scan triggers as soon as the line is "low" • "None": no trigger has been set
Trigger Level 1 /2:	enter the threshold within the physical range
Range:	display of the physical range, resulting from the input range after conversion (see p. 97)

If no trigger has been set, the scan is started by selecting "START SCAN" (see "START / STOP SCANNING", p. 85). If triggers are set to more than one channel, the scan starts as soon as the trigger condition of one channel is met.

The measuring values are stored from the point of time of the prehistory, set when configuring the entire system in the tab "SCAN". The current state of the scan is indicated in the status bar.

If several storage types have been set in the tab "SCAN", the trigger condition is set according to the priority of "RMS", "average", "current value", "minimum" and "maximum". If RMS and minimum values are to be stored simultaneously, the recording is started as soon as the trigger condition for the RMS values is met.

- **In the case of edge triggering, e.g. "Positive edge", the channel must be below the trigger level before the surpassing of the level trips the trigger. In the case of a window trigger, only the current value is of importance.**

- **These settings can also be made simultaneously for several channels in the "SCAN CONFIGURATION" dialog box (see p. 120).**

- **Complex trigger conditions can be defined as logic operations in formula channels.**

5.3.3.4.7 OUTPUT

The tab "OUTPUT" of the device configuration allows to define a voltage value for an output channel, which is available at the relevant pin of this channel.

For measurement hardware featuring a function generator (e.g. output module MDA16-2i/-4i/-8i for PCI(e) cards) the type of output signal and its frequency is set in addition.
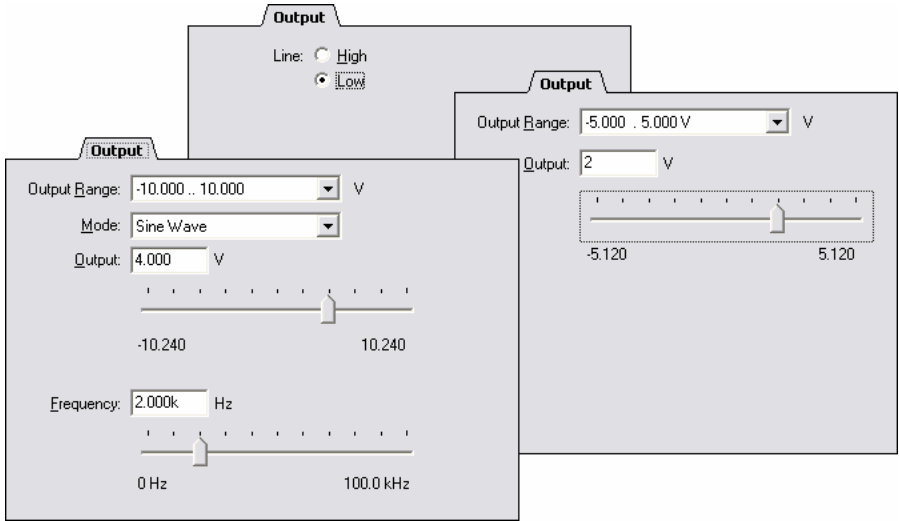
Figure 68

entry	function
Output range:	select the voltage range of the output allowed by the hardware
Output:	enter the output value as numerical value or use the slider control to set it within the selected analog output range
Line:	set digital output to "0" (low) or "1" (high)
Mode:	if provided: type of output signal "Discrete" (constant output value), "Sine Wave", "Ramp", "Rectangle"
Frequency:	set signal frequency for the generated functions "Sine Wave", "Ramp", "Rectangle" (0..100kHz)

Please ensure that the hardware settings comply with those of the software!

5.3.3.4.8 LINES
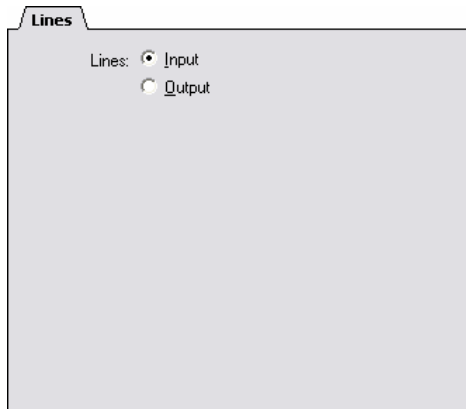
Figure 69

A digital channel named "Digital I/O" is not hard-wired but its direction can be defined in the "DEVICE CONFIGURATION".

The digital channels are set to input or output group-by-group.

5.3.3.5 CONFIGURATION OF THE COUNTER INPUTS

🔧 Counter - 1

NextView®4 allows the display of counter channels to connect a counter or incremental encoder. Various DAQ hardware of bmcm (see "COMPATIBLE HARDWARE", p. 17) provides counter channels. Their possible settings are explained in the following.

The settings of the tabs "NAME", "DEFAULTS", "USING", "SCAN", and "TRIGGER" are the same as if CONFIGURING ANALOG / DIGITAL CHANNELS (see page 94) and are described in the relating chapters.

5.3.3.5.1 RANGE

🔧 meM-INC - 1

The settings in the tab "Range" refer to the incremental encoder measuring system meM-INC only, which must have been selected before in the treeview.

Here the operating mode - counting mode or frequency measurement (the latter in dependance on the gate) - is selected.
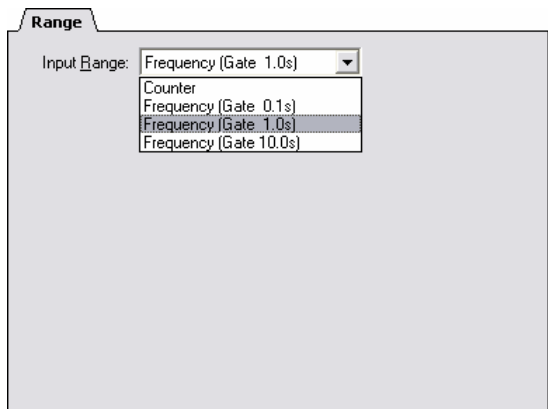
Figure 70

5.3.3.5.2 COUNTER

🔧 Counter - 1

Counter channels are calibrated in the tab "Counter" of the device configuration.

Depending on the selected operation mode, you can choose at which digital lines the connetors of the counter or incremental encoder can be reached.

Figure 71

entry	function
Mode:	select the connected counter or incremental encoder • "Counter": "simple" counter without counting direction • "Up/Down Counter": counter with counting direction • "Quad Decoder": quadrature decoder, incremental encoder • "Period": Pulse time measurement
Sample:	shows online the incoming values of the counter input
Offset:	scaling of the zero point: at zero reset applied voltage
Take sample or *Take sample 2:*	enter unit and reference values to convert the sampled voltages into the represented physical variable
Port or Input A, B, Reset:	select digital port (A/B) and line (1..16) of the DAQ system, to which the signals of the counter / incremental encoder (Input A, B, Reset) are to be connected • option "Invert.": reverses the input signal • option "Enable": turns on the counter reset

By means of an offset tool, a connected counter or incremental encoder can be calibrated. Two known measuring values are necessary to calculate the conversion factors defining how the value to be displayed is generated from the measured voltage.

If you short-circuit the channel and press the "Offset" button, the just measured value at 0V will always be subducted from all incoming voltage values.

5.3.3.6   SETTINGS FOR CAN CHANNELS
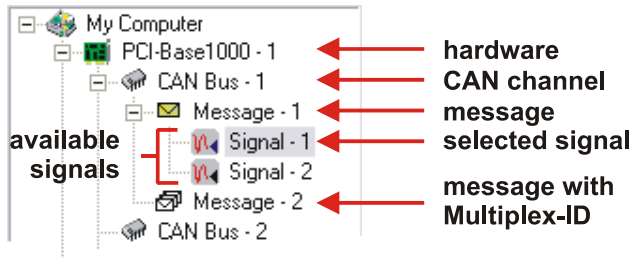
Figure 72

If using measurement hardware sending measuring data via the CAN bus (Controller Area Network, e.g. PCI-BASE1000 with MCAN), special settings are required in the "DEVICE CONFIGURATION" dialog, concerning the CAN bus itself, the sent messages and the signals.

The configuration is executed on different levels (see "OPERATING THE DEVICE CONFIGURATION ", p. 86). To open a level in the TreeView, click on the ⊞ sign. If an element is marked in the chart, the register cards on the right adjust accordingly and show the current settings. The parameters for the selected element can now be entered.

The settings in the tabs "NAME", "USING", "SCAN" and "TRIGGER" are the same as if configuring analog / digital channels (see p. 93).

🛑

- **For detailed information about the CAN bus system, please visit www.can.bosch.com.**

- **If the PCI-BASE1000, PCI-BASEII or PCIe-BASE is used with the MCAN module, at least one CAN channel must be installed by adding a message or importing a `*.dbc` file (see "MESSAGES", p. 111) to display any signals (also analog channels) in NextView®4.**

5.3.3.6.1 MESSAGES

 CAN Bus - 1

Data packages are sent via the CAN bus as messages. The tab "MESSAGES" of the device configuration shows all existing messages with their name and ID (and Multiplex-ID if existing).
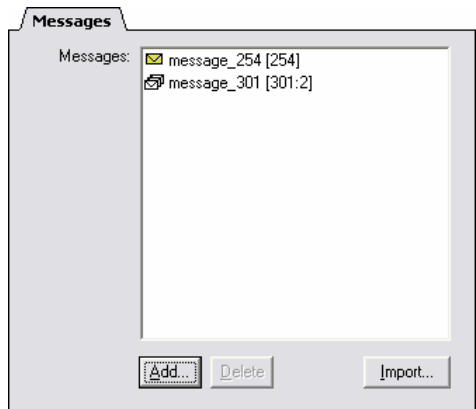
Figure 73

button	function
Add:	create a new message on the CAN bus
Delete:	delete message
Import:	import all existing messages of a `*.dbc` file

A `*.dbc` file defines several CAN messages and its structure. It does not contain any information about measuring values.

If you create a new message by pressing the button "Add", the following specifications must be entered in the dialog "CAN MESSAGE":
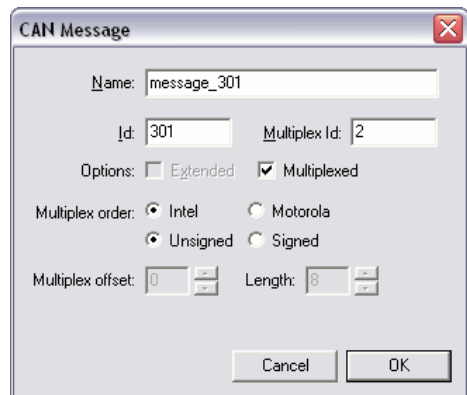
Figure 74

entry	function
Name:	name of the message
Id:	identification number for messages (normal: 0..11 bit, extended: 0..29 bit)
Multiplex Id:	additional ID, saved within the 64-bit data package
Options:	select frame format (no selection → ID 0..11 bit): • "Extended": ID 0..29 bit • "Multiplexed": ID with Multiplex ID
Multiplex order:	• "Intel" / "Motorola": order of the sent data bits depend. on manufacturer • "Unsigned" / "Signed": Multiplex ID without / with negative sign
Multiplex offset:	shift of the Multiplex ID in the data field (Offset= 0 → Multiplex ID at the beginning of data field)
Length:	length of the Multiplex ID in bit (length=8 → Multiplex ID: 0..255)

To identify the different message formats directly, they are displayed differently in the tab "MESSAGES" of **NextView®4**.

message format	icon	name
with Multiplex ID:	🗗	`<Name> [<ID>:<Multiplex Id>]`
without Multiplex ID:	✉	`<Name> [<ID>]`
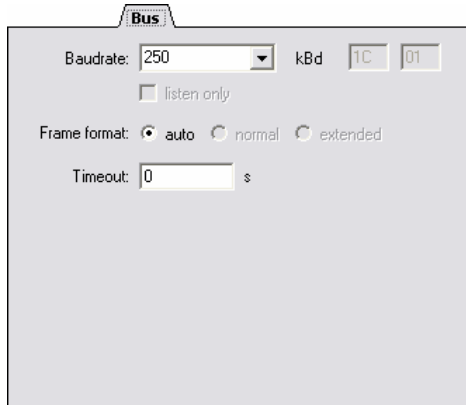
5.3.3.6.2　　BUS

CAN Bus - 1

You can enter the parameters for the CAN channel in tab "BUS" of the "DEVICE CONFIGURATION".

entry	function
Baudrate:	enter transmission rate in kBd
"listen only":	if option is checked, the CAN bus only receives; no data polling or confirmation that data packages have been received
Frame format:	CAN controller receives messages either in normal (ID: 0..11 bit) or extended (ID: 0..29 bit) format or switches automatically
Timeout:	set time for how long the last sent value is to be kept
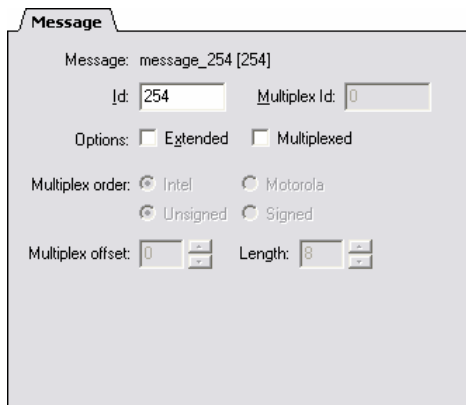
Figure 75

5.3.3.6.3 MESSAGE

To verify or change the format of a message, first mark the relevant message in the TreeView on the left side of the "DEVICE CONFIGURATION" dialog and then carry out your modifications in tab "MESSAGE".

Figure 76

The entry "Message" indicates the current name with ID and Multiplex ID if existing.

The settings are the same as when adding a message to the CAN bus (see Figure 74).

5.3.3.6.4 SIGNALS

The signals contained in a message (in normal or extended format) are listed in tab "SIGNALS" of the "DEVICE CONFIGURATION".
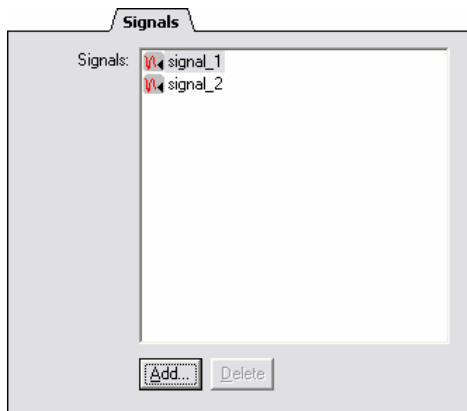
Figure 77

Press the "Delete" button to remove the marked signal from the message. With "Add", a new signal can be included. The settings for the new signal are entered in the dialog box "CAN Signal".

Figure 78

entry	function
Message:	name and ID of the superordinate message
Signal Name:	signal name
Bitfield ordering:	• "Intel" / "Motorola": order of the sent data bits depending on manufacturer • "Unsigned" / "Signed": values without / with negative sign
Bitfield offset:	shift of the bit fields in the data field (Offset= 0 → bit field at the beginning of data field)
Length:	length of the bit field in bit (length=8 → bit field: 0..255)
Offset:	zero point adjustment
Factor:	conversion factor
Min / Max:	minimum / maximum output value with related unit as the result of conversion and offset adjustment

5.3.3.6.5   CAN

 Signal - 1

To test or change signal settings, first mark the relevant CAN signal in the TreeView on the left side of the "DEVICE CONFIGURATION" dialog box and then enter your modifications in tab "CAN".

Figure 79

The entry "Message" indicates the current name with ID and Multiplex ID, if existing, the item "Signal Name" the name of the signal itself.

The settings are the same as when adding a signal to a message (see Figure 78).

5.3.3.7   SETTINGS FOR FORMULA CHANNELS

 Formula - 1

Unlike the analog and digital channels, formula channels are virtual. The signals of the formula channels are generated by computation of signals.

With logic operations (Boolean operators) in formulas, trigger conditions can be combined with each other.

5.3.3.7.1   FORMULA CHANNELS

In addition to the analog and digital channels provided by the hardware, 16 formula channels are installed. With formula channels, analog inputs or other formula channels created before can be computed and be displayed in the live display.

If, for example, only the product of two signals is of major interest in a measurement, the thing to do would be to compute the result of these signals by using the formula "Signal 1 * Signal 2". The source signals do not have to be stored.
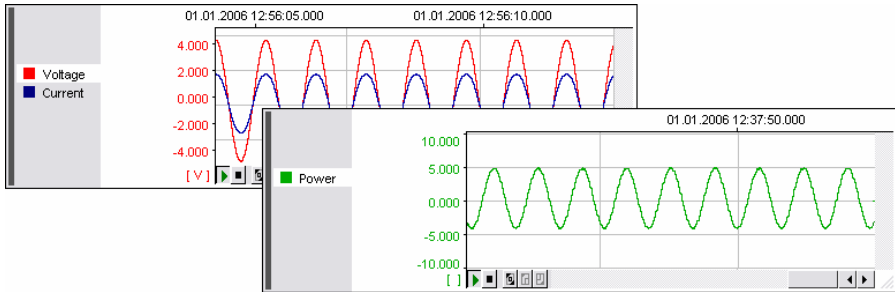
Figure 80

The configuration is carried out in the "DEVICE CONFIGURATION" dialog box by selecting the relevant formula channel in the TreeView on the left. The current parameters will be displayed and can be modified now.

Settings in the tabs "NAME", "DEFAULTS", "USING", "SCAN" and "TRIGGER" are executed in the same way as configuring analog / digital channels.

- **If the hardware only features digital channels or analog outputs, the option for formula channels is not installed, as they cannot be used in this measurement set-up.**

- **As there is no physical range for formula channels, the live display always uses the interval for the 100% representation set in the tab "DEFAULTS" (see p. 149), the graph display the range of the result signal.**

5.3.3.7.2 FORMULA

In the input field of this tab, the formula for calculating the selected formula channel as well as the unit of the result signal is entered.

This dialog is designed and operated in the same way like a pocket calculator. If pressing a button, the relevant input is displayed in the white field above. If you click in the input field, the formula can also be entered directly via the keyboard.
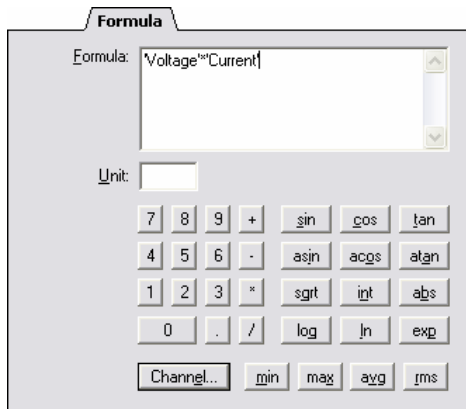
Figure 81

The buttons have the following functions:

buttons	function
0,1,2,3,4,5,6,7,8,9	numerical keys (can also be entered via keyboard)
+, -, *, /	operators (can also be entered via keyboard)
sin, cos, tan, asin, acos, atan	trigonometric functions (sine, cosine, tangent, arc sine, arc cosine, arc tangent)
sqrt, abs, int	square root, absolute value, integer
exp, log, ln	10^x, 10er-logarithm, natural logarithm
min, max, avg, rms	minimum, maximum, average value, RMS
channel	channel selection (analog input or formula channel)

The following functions have to be entered via keyboard:

keyboard	function
`sqr (x)`	x squared
`pow (x,y)`	power, x^y (for all $y \geq 0$)
`poly(x,a,b,...)`	4 grade (max.) polynomial: $ax^4+bx^3+cx^2+dx+e$ (a, b, c, d, e: coefficients); example: $2x^2-7x+5{,}2 =$ `poly(x,2,-7,5.2)`
`<, >, AND, OR`	Boolean operators: "less than", "greater than", "and", "or" example: 'Analog In 1' > 5 AND 'Analog In 2' < 'Analog In 1'

- **If using numbers in decimal notation, always use a point (not a comma) to separate the decimals below 1 from the rest of the number.**

- **Use radian measure for indicating angles. Type "Pi" for the Greek letter "π".**

- **2 or 3 grade polynomials are recognized automatically.**

The "Channel" button leads you to the "Select channel" dialog box where all channels available for computing are listed in groups. If you select a channel and confirm via "OK", it will be inserted into the formula.

With the Boolean operators, you can combine events with each other. If defining a trigger for these formula channels (e.g. Positive Edge = 1), the scan will be started as soon as the whole condition in the formula becomes "true" and the formula channel changes from "0" to "1".

A right-click in the formula entry field opens a context menu with familiar Windows® functions (see "EDIT", p. 83).

5.3.4 SCAN CONFIGURATION

keyboard	function
`F11`	open dialog box "SCAN CONFIGURATION"
`↵`	close dialog box "SCAN CONFIGURATION", changes are applied
`<ALT>+F4`	quit dialog box "SCAN CONFIGURATION" without accepting changes

The dialog box "SCAN CONFIGURATION" displays an overview of all available measurement channels and their current configuration.

- **During a running scan, the access to the configuration dialogs is not possible.**

- **This command can also be executed by means of the relevant entry on the tab "DEVICES" in the section "COMMON TASKS" of the property bar.**

5.3.4.1   NOTES TO THE "SCAN CONFIGURATION"

In the "SCAN CONFIGURATION", all channels which can be scanned are listed, i.e. all analog and digital inputs and formula channels.
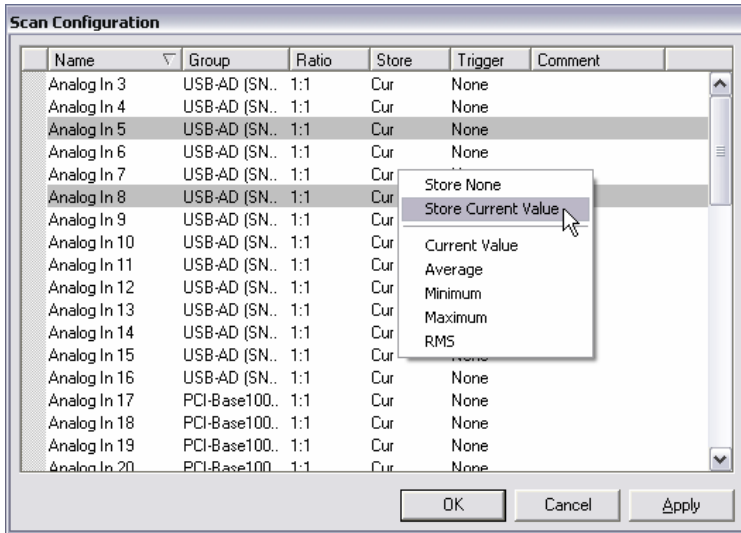
Figure 82

The dialog box shows the current settings in relation to the individual name of the measurement channels, its group name, a comment (if entered), if and which trigger has been set, storage rateio and storage type.

If you click on one of the generic terms in the upper bar (e.g. "Group"), the measurement channels are listed in alphabetical order according to the selected generic term. This allows for the listing of all channels of a kind (such as "Group"), even if the signals are sent by different DAQ devices. A second click reverses the order.

If selecting several channels, settings that are usually done in the tabs "NAME" and "SCAN" of the "DEVICE CONFIGURATION" (see p. 85), can be made in one go - a feature which considerably accelerates configuration.

The single digital lines are not listed in the "SCAN CONFIGURATION" but always the ports. Therefore, only storage parameters can be set here, which can also be done for each channel in tab "SCAN" of the "DEVICE CONFIGURATION".

A click on the button "Apply" causes **NextView®4** to accept and store the selected settings. The dialog remains open. If you select "OK", the configuration is also accepted but the dialog box is closed. "Cancel" closes the dialog but changes are not accepted or stored.

5.3.4.2   OPERATION
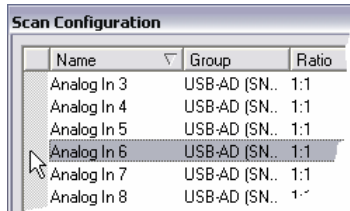
Figure 83

If the settings of a channel are to be modified, the channel must be selected first. This is done by clicking on the vertical, gray and hatched bar on the left side of the channel.

event	function
mouse click:	selection of a single channel (keyboard: ↑ ↓)
<CTRL> + mouse click:	selection of several individual channels
<SHIFT> + mouse click:	selection of all channels, located between two clicked channels
click&drag along the gray bar:	selection of several adjacent channels
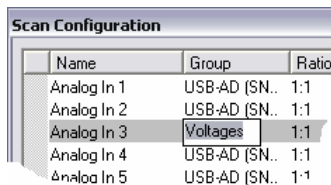
Figure 84

You can change a parameter of a selected channel by a right click. This opens either an entry field or a selection menu where the changes can be made. The new setting will then be applied to all selected channels.

The "Store" column allows the selection of several storage types (see "SCAN", p. 101) by repeatedly opening the selection with the right mouse button and choosing an item of the list.

Figure 85

- **If a storage type other than "current value" is selected for a channel, the storage ratio ("Ratio") is automatically set to 1:10, because the 1:1 ratio would make no sense here. The ratio can be changed to another value (1:2 .. 1:10,000) except 1:1.**

- **In order to save disk space or to increase the maximum sampling rate, we recommend storing only those channels actually required for the measurement task.**

5.3.5 CONFIGURATION FILE (*.NVC)

All parameters defined in the "DEVICE CONFIGURATION" dialog box can be stored in a configuration file with the extension ***.nvc** separately from the project.

🛑

Changing the configuration in the "DEVICE CONFIGURATION" does not mean that these changes are automatically transmitted to the configuration file!

5.3.5.1   LOAD / SAVE CONFIGURATION

The command "LOAD CONFIGURATION" allows to open a previously stored device configuration in the current project. It is a file with the extension ***.nvc**.

Choose "SAVE CONFIGURATION" to write all parameters defined in the "DEVICE CONFIGURATION" dialog into a file with the extension ***.nvc**. Before saving, file name and path have to be entered.

🛑

Checking the first two configuration options in the project options (see p. 218) will save/load all settings in a configuration file with the same name and directory always when saving/opening a project file.

5.3.5.2   PRINT CONFIGURATION

In order to keep track of the device configuration, you can make a print-out. The current settings when configuring the entire system and configuring analog / digital channels, CAN channels and formula channels are shown and the dialog box "PRINT" opens.
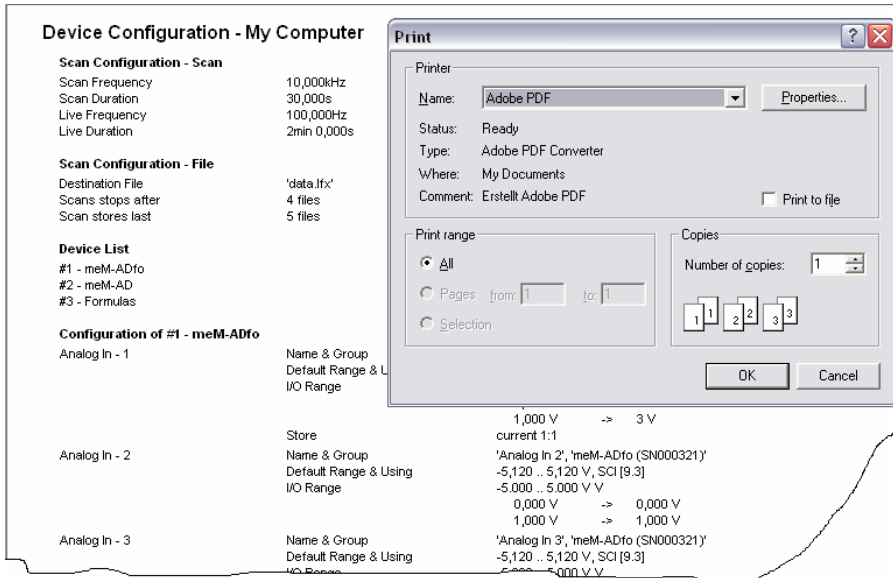
Figure 86

5.3.6 RESTORE DEFAULTS

This command resets the measurement setup to the standard configuration. For an overview you can also make a print-out of the default settings (see "PRINT CONFIGURATION", p. 124).

5.3.7 RECENT CONFIGURATION

The configuration files previously stored (max. 9) are listed and can be opened directly from here.

5.4   SHEET

A sheet is a page in a project, in which the various types of displays for visualizing, analyzing and documenting a measurement application (e.g. live display, static text etc.) can be inserted.

```
Sheet
  New Sheet      F9
  Delete Sheet

  1 First Steps
✔ 2 Live data
  3 Analysis
```
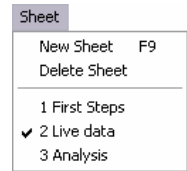
Figure 87

command	function
new sheet	adds a new worksheet to the project (keyboard: **F9**)
delete sheet	removes the current foremost window

All sheets of a project are listed in the lower section of the menu "SHEET" together with their page number and name. The currently displayed sheet is provided with a check mark ✔. The sheet name is also displayed on the sheet register card on the lower edge and in the status bar.

other functions	command / dialog
switch between sheets	• menu "SHEET": click sheet name in the list of existing sheets • click on sheet tab at the lower edge • keyboard: **<CTRL>+<TAB>**
open context menu	• right-click on empty space in the sheet • keyboard: **<SHIFT>+F10**
name sheet	property bar: tab "GENERAL"
show/hide sheet tab	menu "OPTIONS": "VIEW SHEET TABS" (see "VIEW...", p. 220)
select sheet	click on blank space in the sheet

You can insert displays on the sheet via the context menu of the sheet.
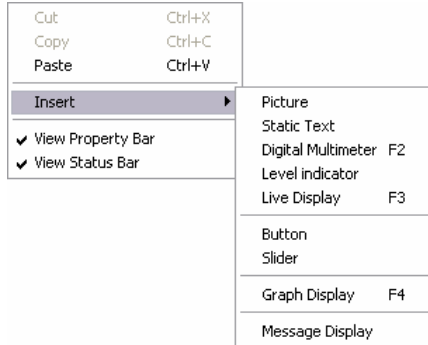
Figure 88

The section **"PROPERTIES"** of the property bar on the left will show the sheet settings if it has been selected before.

5.5 DISPLAY

NextView®4 provides for several ways to display signals and information.

The "DISPLAY" menu (also context menu of the sheet or function key) contains all available display types.

By selecting an item, the relevant display is inserted in the current sheet of the opened project.

Display	
Picture	
Static Text	
Digital Multimeter	F2
Level indicator	
Live Display	F3
Button	
Slider	
Graph Display	F4
Message Display	

Figure 89

Settings for the selected display relating to channel selection, scaling of the x- and y-axis, signal color, display name etc., are mainly done on various tabs in the section "PROPERTIES" of the property bar.

For most displays a right-click on a display opens a context menu providing the most important commands concerning the displays.

Use the standard Windows® editing functions (see "EDIT", p. 83) to copy, cut, paste or delete the selected display.

- **Make sure the option "LOCK PROJECT" (see p. 218) is deactivated!**

- **A display is selected by a mouse-click (keyboard: <TAB>-key). The active display can be identified by the selection bar on the left.**

5.5.1 COMMANDS OF THE MENU "DISPLAY"

command	function
picture	display of a picture in bitmap file format `*.bmp`, display as background image possible
static text	opens a text box for additional information or warning messages; states of alarm can be signalized optically
digital multimeter	displays the incoming numerical values of an input channel; states of alarm can be signalized optically (keyboard: `F2`)
level indicator	display with drag indicator to visualize levels e.g.; states of alarm can be signalized optically
live display	opens a display in which online-data are represented in chart recorder view as an envelope curve (keyboard: `F3`)
button	inserts the button operating control
slider	inserts the slider operating control
graph display	view and analysis of signals in a measurement file (keyboard: `F4`)
message display	displays information in a list provided by the system or other users

5.5.2 POSITION AND SIZE
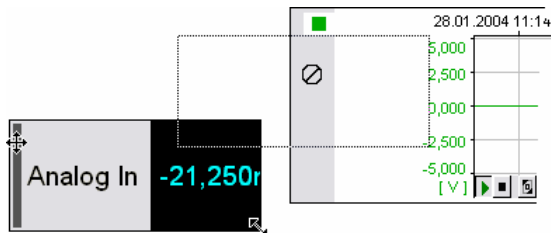
Figure 90

You can position or resize a display at will by click&drag of the selection bar on the left or of the bottom right corner of the display.

mouse symbol	function
✛	move display on the sheet
↘	adjust display size on the right-hand edge of the display
Ø	display cannot be moved, because it overlaps another display (exception: picture) or is not within in the sheet

If the option "Automatically adjust display width" is activated in tab "GENERAL" of the property bar, the display width of the live display, graph display or message display is always adjusted to the sheet width. Pictures, in this case, are displayed as a background image.

5.5.3 PICTURE

For the graphic illustration of measuring applications, pictures in bitmap format `*.bmp` can be inserted on the sheet.

function	command / dialog
insert empty frame for picture:	• menu "DISPLAY": command "PICTURE" • context menu of sheet: command "INSERT / PICTURE"
name picture:	property bar: tab "GENERAL"
open bitmap:	property bar: tab "GENERAL"
activate display:	mouse-click on display
size settings:	property bar: tab "GENERAL"
display as background image:	property bar: tab "GENERAL"

First, an empty frame is placed on an empty space on the sheet. If the sheet is active, you can assign a bitmap and enter the required settings in tab "GENERAL" of the property bar.

If the picture size automatically adjusts to full sheet width, it acts like a background image. If the aspect ratio is to be retained, only the width can be modified. The resulting height is automatically resized. Press the **<RETURN>-** or **<TAB>**-key so that the changes of the section "PROPERTIES" are effective.
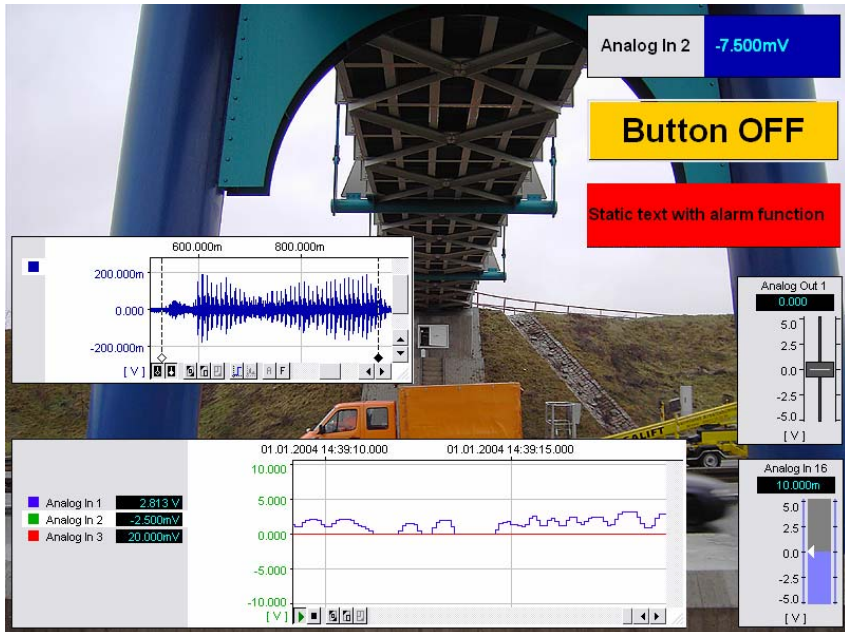
Figure 91

In addition, the common Windows® conventions relating to position and size of an object apply to the display type "picture" (see p. 129).

Unlike all other displays, a picture may overlap with another display. The picture then will always stay in the background. So when inserting a picture the frame might be covered by another display, if there is not enough space on the sheet.

5.5.4 STATIC TEXT

The "STATIC TEXT" option in the "DISPLAY" menu allows to enter additional information for the measurement application or warning messages in the case of incidents.
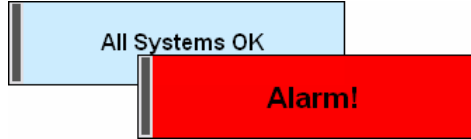
Figure 92

function	command / dialog
insert static text:	• menu "DISPLAY": command "STATIC TEXT" • context menu of sheet: command "INSERT / STATIC TEXT"
select static text:	• mouse-click on the display (selection bar is shown) • keyboard: <**TAB**>
remove static text:	• menu "EDIT": command "DELETE" • keyboard: **<CTRL>+X**
name static text:	property bar: tab "GENERAL"
show display border / selection bar:	property bar: tab "GENERAL"
text alignment:	property bar: tab "GENERAL"
character format:	property bar: tab "FONT"
define state (active / inactive):	• property bar: tab "STATE" • context menu of static text
set limits for changing state:	property bar: tab "STATE"
insert text:	property bar: tab "COLOR"
text color / background color:	property bar: tab "COLOR"
static text: assign channel:	property bar: tab "CHANNELS" (section "RE-SOURCES")
show channel name:	property bar: tab "GENERAL"
check channel settings:	• context menu of static text: command "CHANNEL SETTINGS" • keyboard: **<SHIFT>**+double-click on the display
write script instructions:	property bar: tab "SCRIPT" (with **NextView®4 Script** only)

The static text is placed on an empty space on the sheet. The common Windows[®] conventions relating to position and size of an object apply (see p. 129).

A right-click on the static text box opens a context menu containing commands frequently used in this type of display. The settings for the active static text box, which must have been previously selected by mouse-click (selection bar is displayed), are defined in the related tabs "GENERAL", "STATE", "COLOR", and "FONT" under the section "PROPERTIES" of the property bar on the left.

Like the digital multimeter and the level indicator, the static text box can distinguish between an active or and inactive state (see "STATIC TEXT: ACTIVE AND INACTIVE STATE", p. 133). This allows for signaling various alarm states. If the indicated level of the assigned channel (see "STATIC TEXT: ASSIGN CHANNEL", p. 134) is exceeded, it will be displayed in the static text box through a warning and different background color.

If using the add-on module NextView®4 Script (for charge), you can program script instructions in tab "SCRIPT" which are executed in case of incidents.

5.5.4.1   STATIC TEXT: ACTIVE AND INACTIVE STATE
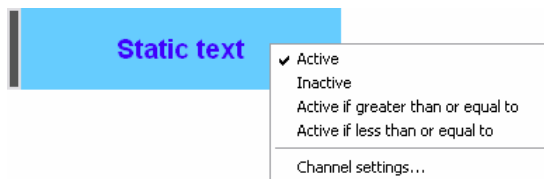
Figure 93

The state of the static text box is set in tab "STATE" under the section "PROPER-TIES" of the property bar. This definition can also be made in the context menu by clicking this option. The current state is check-marked.

The relating color and title information for the active and inactive state are entered in tab "COLOR".

⊘

If selecting the option "Active" without a threshold value, the settings in case of an alarm can be checked in advance.

5.5.4.2   STATIC TEXT: ASSIGN CHANNEL

If the static text is to switch between the "inactive" and "active" state (see "STATIC TEXT: ACTIVE AND INACTIVE STATE", p. 133) when a signal value is exceeded, it has to be related to a channel (input or formula channel).

⊘

This setting is only useful if the state of the display is set to "active" and if one or two threshold values have been defined.

The relevant signal is selected in the tab "CHANNELS" under the section "RESOURCES" of the property bar. The presently related channel has a gray marking.
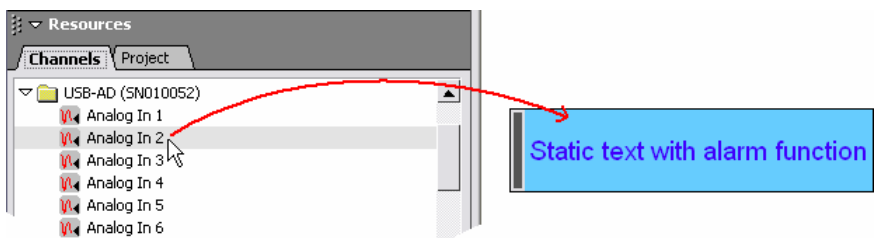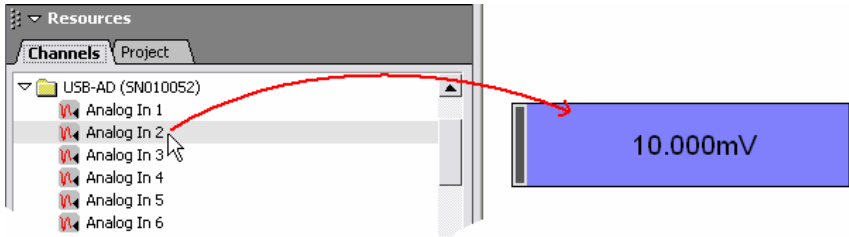

Figure 94

To assign a channel, it has to be moved by drag&drop over the display, which does not necessarily have to be selected before. A double-click on a channel listed in the selection on the left replaces the signal of the active display.

To look over the parameter settings of the selected channel, open the "DEVICE CONFIGURATION", which can be reached directly with the command

"CHANNEL SETTINGS" in the context menu of the display (also: **<SHIFT>**+double-click on the display).

5.5.5 DIGITAL MULTIMETER
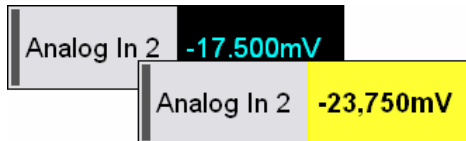
Figure 95

A signal with fairly constant values and of which the curve shape is of no major interest, is preferably displayed by means of a digital multimeter (DVM).

function	command / dialog
insert digital multimeter:	• menu "DISPLAY": command "DIGITAL MULTIMETER" • context menu of sheet: command "INSERT / DIGITAL MULTIMETER" • keyboard: **F2**
select digital multimeter:	• mouse-click on the display (selection bar is shown) • keyboard: <**TAB**>
remove digital multimeter:	• menu "Edit": command "DELETE" • keyboard: **<CTRL>+X**
name digital multimeter:	property bar: tab "GENERAL"
show display border / selection bar:	property bar: tab "GENERAL"
text alignment:	property bar: tab "GENERAL"
character format:	property bar: tab "FONT"
define state (active / inactive):	• property bar: tab "STATE" • context menu of digital multimeter
set limits for changing state:	property bar: tab "STATE"
text color / background color:	property bar: tab "COLOR"

function	command / dialog
DVM: assign channel:	property bar: tab "CHANNELS" (section "RE-SOURCES")
show channel name:	property bar: tab "GENERAL"
check channel settings:	• context menu of digital multimeter: command "CHANNEL SETTINGS" • keyboard: **<SHIFT>**+double-click on the display
write script instructions:	property bar: tab "SCRIPT" (with **NextView®4 Script** only)

The digital multimeter is placed on an empty space on the sheet. The common Windows® conventions relating to position and size of an object apply (see p. 129).

You can adjust the width of the channel-name field (if shown) and the display field by clicking on the border between both. As soon as the mouse cursor has turned into the ⬌ symbol, you can resize the fields as desired.

A right-click on the digital multimeter opens a context menu containing commands frequently used in this type of display. The settings for the active digital multimeter, which must have been previously selected by mouse-click (selection bar is displayed), are defined in the related tabs "GENERAL", "STATE", "COLOR", and "FONT" under the section "PROPERTIES" of the property bar on the left.

Like the static text and the level indicator, the digital multimeter can distinguish between an active or and inactive state (see "DVM: ACTIVE AND INACTIVE STATE", p. 137). This allows for signaling various alarm states. If the indicated level of the assigned channel (see "DVM: ASSIGN CHANNEL", p. 137) is exceeded, it will be displayed in the digital multimeter through a warning and different background color.

• **If using the add-on module NextView®4 Script (for charge), you can program script instructions in tab "SCRIPT" which are executed in case of incidents.**

• **The digital multimeter can display analog and digital outputs.**

5.5.5.1   DVM: ACTIVE AND INACTIVE STATE
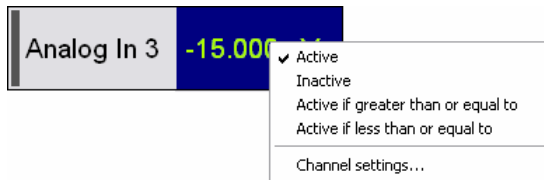
Figure 96

The state of the digital multimeter is set in tab "STATE" under the section "PROP-ERTIES" of the property bar. This definition can also be made in the context menu by clicking and option. The current state is check-marked.

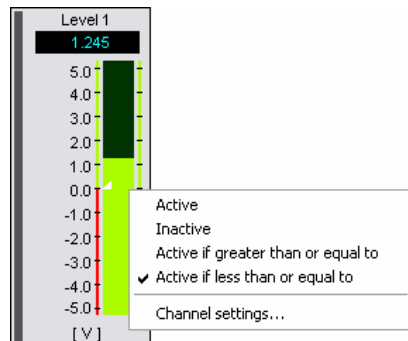The relating color and title information for the active and inactive state are entered in tab "COLOR".

If selecting the option "Active" without a threshold value, the settings in case of an alarm can be checked in advance.

5.5.5.2   DVM: ASSIGN CHANNEL

If the digital multimeter is to switch between the "inactive" and "active" state (see "DVM: ACTIVE AND INACTIVE STATE", p. 137) when a signal value is exceeded, it has to be related to a channel (input or formula channel).

The relevant signal is selected in the tab "CHANNELS" under the section "RE-SOURCES" of the property bar. The presently related channel has a gray marking.
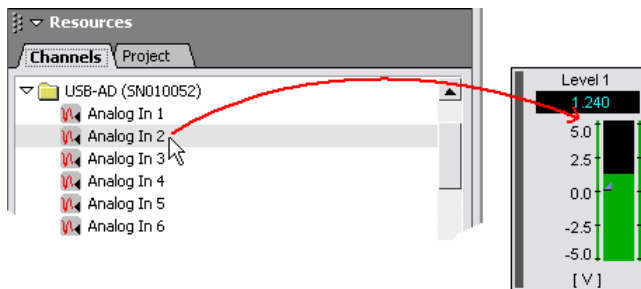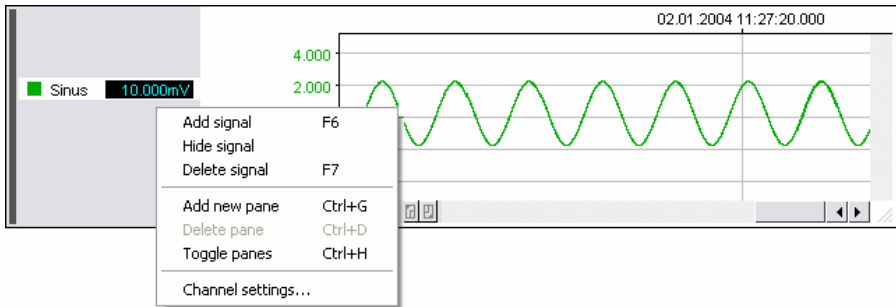
Figure 97

To assign a channel, it has to be moved by drag&drop over the display, which does not necessarily have to be selected before. A double-click on a channel listed in the selection on the left replaces the signal of the active display.

To look over the parameter settings of the selected channel, open the "DEVICE CONFIGURATION", which can be reached directly with the command "CHANNEL SETTINGS" in the context menu of the display (also: `<SHIFT>`+double-click on the display).

5.5.6 LEVEL INDICATOR
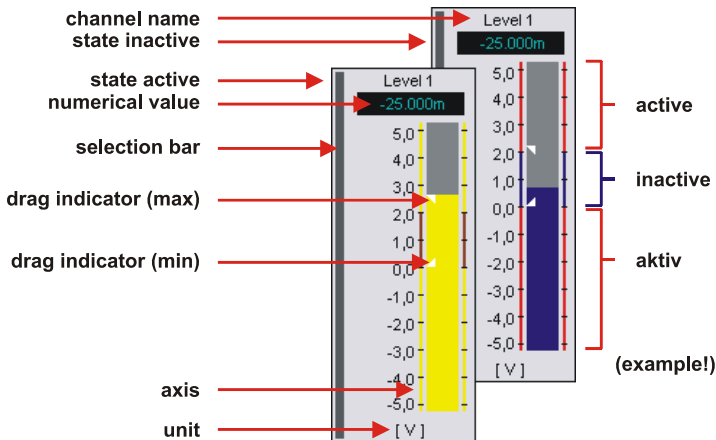
Figure 98

Use a level indicator to depict the quantity of measurement data, like e.g. water levels, filling quantities etc. Two drag indicators show minimum and maximum of the signal values reached up to now.

function	command / dialog
insert level indicator:	• menu "DISPLAY": command "LEVEL INDICATOR" • context menu of sheet: command "INSERT / LEVEL INDICATOR"
select level indicator:	• mouse-click on the display (selection bar is shown) • keyboard: <**TAB**>
remove level indicator:	• menu "EDIT": command "DELETE" • keyboard: **<CTRL>+X**
name level indicator:	property bar: tab "GENERAL"
show unit, numerical value:	property bar: tab "GENERAL"
show channel name:	property bar: tab "GENERAL"
show display border / selection bar:	property bar: tab "GENERAL"
show y-axis:	property bar: tab "GENERAL"
scaling of the y-axis:	property bar: tab "Y-AXIS"
turn on drag indicator:	property bar: tab "GENERAL"
reset drag indicators:	press **<SHIFT>**+**E**
character format:	property bar: tab "FONT"
define state (active / inactive):	• property bar: tab "STATE" • context menu of level indicator
set limits for changing state:	property bar: tab "STATE"
text color / background color:	property bar: tab "COLOR"
level indicator: assign channel:	property bar: tab "CHANNELS" (section "RESOURCES")
check channel settings:	• context menu of level indicator: command "CHANNEL SETTINGS" • keyboard: **<SHIFT>**+double-click on the display
write script instructions:	property bar: tab "SCRIPT" (with **NextView®4 Script** only)

The level indicator is placed on an empty space on the sheet. The common Windows® conventions relating to position and size of an object apply (see p. 129).

A right-click on the level indicator opens a context menu containing commands often used in this type of display. The settings for the active level indicator, which must have been previously selected by mouse-click (selection bar is displayed), are defined in the related tabs "GENERAL", "STATE", "COLOR", "FONT", and "Y-AXIS" under the section "PROPERTIES" of the property bar on the left.

Like the static text and the digital multimeter, the level indicator can distinguish between an active or and inactive state (see "LEVEL INDICATOR: ACTIVE / IN-ACTIVE", p. 140). This allows for signaling various alarm states. If the indicated level of the assigned channel (see "LEVEL INDICATOR: ASSIGN CHANNEL", p. 141) is exceeded, it will be displayed in the level indicator through a warning and different background color.

- **With the add-on module NextView®4 Script (for charge), you can program script instructions in tab "SCRIPT" executed in case of incidents.**
- **Analog outputs are displayed by the level indicator.**

5.5.6.1   LEVEL INDICATOR: ACTIVE / INACTIVE

The state of the level indicator is set in tab "STATE" under the section "PROPERTIES" of the property bar.

This definition can also be made in the context menu by selecting an option. The current state is check-marked.

The relating color and title information for the active and inactive state are entered in tab "COLOR".

The axis of the level indicator illustrates the color settings of the active and inactive state (see Figure 98).

Figure 99

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If selecting the option "Active" without a threshold value, the settings in case of an alarm can be checked in advance.

5.5.6.2   LEVEL INDICATOR: ASSIGN CHANNEL

If the level indicator is to switch between the "inactive" and "active" state (see "LEVEL INDICATOR: ACTIVE / INACTIVE", p. 140) when a signal value is exceeded, it has to be related to a channel (input or formula channel).

The relevant signal is selected in the tab "CHANNELS" under the section "RE-SOURCES" of the property bar. The presently related channel has a gray marking.

Figure 100

To assign a channel, it has to be moved by drag&drop over the display, which does not necessarily have to be selected before. A double-click on a channel listed in the selection on the left replaces the signal of the active display.

To look over the parameter settings of the selected channel, open the "DEVICE CONFIGURATION", which can be reached directly with the command "CHAN-NEL SETTINGS" in the context menu of the display (also: **<SHIFT>**+double-click on the display).

5.5.7 LIVE DISPLAY

Figure 101

This type of display shows the incoming measurement data online in chart recorder view as an envelope curve (see p. 145).

function	command / dialog
insert live display:	• menu "DISPLAY": command "LIVE DISPLAY" • context menu of sheet: command "INSERT / LIVE DISPLAY" • keyboard: **F3**
select live display:	• mouse-click on the display (selection bar is shown) • keyboard: <**TAB**>
remove live display:	• menu "EDIT": command "DELETE" • keyboard: **<CTRL>+X**
name live display:	property bar: tab "GENERAL"
adjust to full sheet width:	property bar: tab "GENERAL"
turn pane view on/off	• menu "SIGNALS": command "Toggle panes" • keyboard: <**CTRL**>+**H**
insert signal:	• menu "SIGNALS": command "ADD SIGNAL" • context menu of live display: command "ADD SIGNAL" • keyboard: **F6** • move channel from tab "CHANNELS" (section: RESOURCES of the property bar) over the display (*drag&drop*)
replace signal:	move channel from tab "CHANNELS" (section: "RESOURCES" of the property bar) over the colored signal button (*drag&drop*)

function	command / dialog
select signal:	click related color button or channel name
hide signal:	• menu "SIGNALS": command "HIDE SIGNAL" • context menu of live display: command "HIDE SIGNAL" • keyboard: <**CTRL**>+click signal button
delete signal:	• menu "SIGNALS": command "DELETE SIGNAL" • context menu of live display: command "DELETE SIGNAL" • keyboard: **F7**
display other channel:	property bar: tab "CHANNELS" (section "RESOURCES", see "LIVE DISPLAY: ASSIGN CHANNEL", p. 150)
change signal order:	move color button to another position (*drag&drop*)
show channel name:	property bar: tab "GENERAL"
show numerical values:	property bar: tab "GENERAL"
check channel settings:	• context menu of live display: command "CHANNEL SETTINGS" • keyboard: **<SHIFT>**+double-click on the display
change signal color:	property bar: tab "COLOR"
shift signals:	• shift slider (vertically/horizontally) (see "NAVIGATING THE DISPLAY", p. 146) • keyboard: →, ← or ↓, ↑ • use "hand" tool ✋ (stop automatic scrolling of display (see below) and press mouse wheel to turn on, see "NAVIGATING THE DISPLAY", p. 146)
use one y-axis for all signals:	property bar: tab "Y-AXIS"
zoom 🔍:	stop automatic scrolling of display (see below) and draw a rectangle over the signal segment with mouse button pressed (press mouse wheel to turn on zooming function, see "ZOOMING IN THE DISPLAY", p. 148)
show in full signal range (100%):	press button 🔲 (see "LIVE DISPLAY: BUTTONS", p. 147)
define range of 100% representation:	property bar: tab "GENERAL" (enter display range in the "DEVICE CONFIGURATION" dialog, tab "DEFAULTS")
scaling the axis:	property bar: tab "X-AXIS" and tab "Y-AXIS"
stop/start automatic scrolling:	press buttons ▶, ■ (see "LIVE DISPLAY: BUTTONS", p. 147, keyboard: <**space bar**>)

function	command / dialog
transmission rate of live data:	"DEVICE CONFIGURATION" dialog box: tab "LIVE DATA"
size of live data cache:	"DEVICE CONFIGURATION" dialog box: tab "LIVE DATA"

The live display is placed on an empty space on the sheet. The common Windows® conventions relating to position and size of an object apply (see p. 129).

The settings of the live display, which must have been previously selected by mouse-click (selection bar is displayed), are defined in the related tabs "GENERAL", "COLOR", "X-AXIS", and "Y-AXIS" under the section "PROPER-TIES" of the property bar on the left.

🛑

Use the pane view to display several signals of a display in separate windows one below the other with individual y-axes (see p. 176).

5.5.7.1 TRANSMISSION OF LIVE DATA
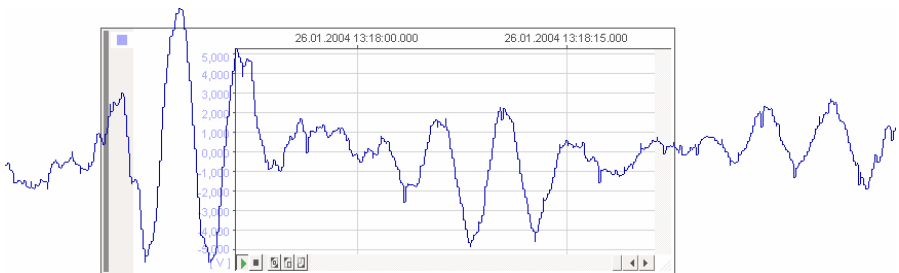
Figure 102

The signals of the connected analog and digital inputs and formula channels can be viewed in a live display. Without necessarily having to be saved, the signals are continuously displayed in a curve. The live display is accompanied by a grid displaying the data in real time.

The live data are stored in a live-data cache for a configurable time, which allows the signal to be shifted to an earlier point of time during a transmission or scan (see "NAVIGATING THE DISPLAY", p. 146), to be stopped (see "LIVE DISPLAY: BUTTONS", p. 147) or be zoomed in for a closer view (see "ZOOMING IN THE DISPLAY", p. 148).

Parameters for setting the live-data transmission are carried out in tab "LIVE DATA" (see p. 91) of the "DEVICE CONFIGURATION".

🛑

If the configuration in the "DEVICE CONFIGURATION" or "SCAN CONFIGURATION" dialog boxes is modified, the live-data transmission is stopped. The new configuration is adopted by the system and the content of the live data cache is deleted. If then the transmission continues, the previous live data are no longer available.

5.5.7.2   ENVELOPE CURVE

In the live display, the transmitted signal is displayed as an envelope curve formed from the measured values to be stored. The transmission frequency can be set in the "DEVICE CONFIGURATION" dialog box in the tab "LIVE DATA". The envelope curve provides for a better observation of the signal response and the transmission is faster, as less data have to be conveyed.

If the scan frequency was 100Hz, all scanned values were stored, and the live data was transmitted at a rate of 10Hz, then for all 10 scan values a rectangle would be drawn between minimum and maximum in this range. This is clearly visible if magnifying the signal (see "ZOOMING IN THE DISPLAY", p. 148).

If comparing a signal in the live display with the graph display (after storage), the envelope representation can easily be recognized.

Figure 103 illustrates how a frequency reduction by factor 10 affects the live display. The waveform structure of the stored signal is noticeably more precise. 10 storage values are equivalent to one square of the envelope curve.
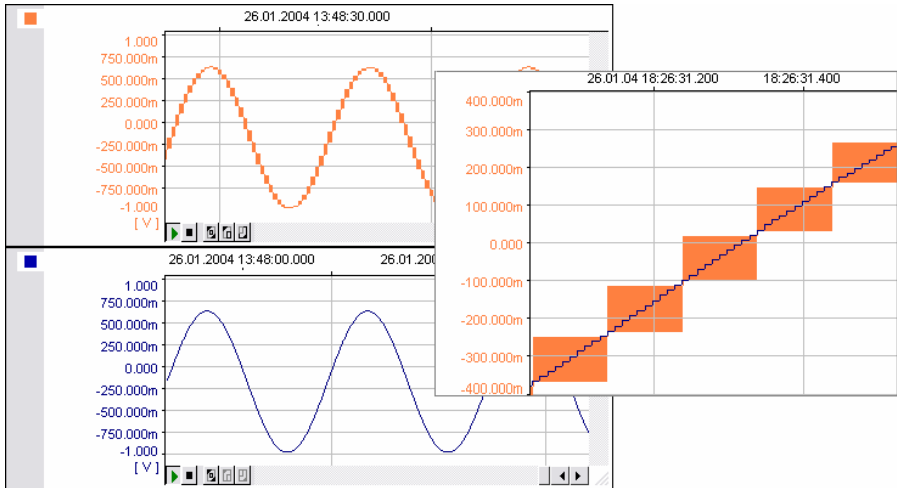
Figure 103

5.5.7.3   NAVIGATING THE DISPLAY

Navigating the live display (also: graph display) is done by means of slider controls or the "hand"-tool.

The "hand"-tool features horizontal and vertical shifting of signals in the display. The live display must have been stopped before.

The slider is either moved with the mouse (fast, flowing move), by means of a click on one of the arrows at either side of the slider (fine move), or by clicking directly on the bar (large move).

Move the mouse over the display (stop live display first!) and press the mouse wheel to switch between the zooming function (see "ZOOMING IN THE DISPLAY", p. 148) and the "hand"-tool . This will be indicated by the relevant mouse pointer. Now, with the (left) mouse key pressed, you can shift signals in any direction you like.

In the case of a vertical shift and by simultaneously pressing the **<ALT>-**key, only the active signal (click colored signal button) is moved. If only one y-axis is used for all signals (see "tab "Y-AXIS" ", p. 59), the above is not possible.

In the case of a slider shift along the time axis, the live display stops automatically and has to be reactivated by clicking on the button "Start automatic scrolling" (see "LIVE DISPLAY: BUTTONS", p. 147).

Shifting signals in the display can also be done by means of the keyboard:

keyboard	function
↑	downward shift of all signals
↓	upward shift of all signals
<ALT>+↑	downward shift of the selected signal
<ALT>+↓	upward shift of the selected signal
←	shifts all signals to an earlier point of time, the live display will be stopped then (see "LIVE DISPLAY: BUTTONS", p. 147)
→	shifts all signals to a later point of time

5.5.7.4 LIVE DISPLAY: BUTTONS

At the bottom of the live display, the buttons to stop, continue and zoom the signals are located.
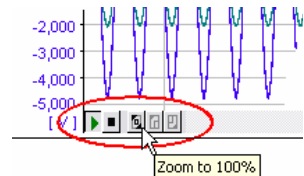
Figure 104

If you move your mouse cursor across one of these buttons, a tiny window appears (tooltip) explaining its function.

button	function
▶ / ■	start/stop automatic scrolling (keyboard: <**space bar**>)
⧉	100% zoom
⧉ / ⧉	previous / next zoom settings (ZoomStack)

A live display which has been stopped is always underlaid with a color. The stop function is useful to zoom a signal (see "ZOOMING IN THE DISPLAY", p. 148). The transmission of live data continues while the display is stopped. If the display is reactivated (press button "Start automatic scrolling"), the display jumps back to the current point of time.

5.5.7.4.1   ZOOMING IN THE DISPLAY

If the live display is stopped by either activating the button "Stop automatic scrolling" (see "LIVE DISPLAY: BUTTONS", p. 147) or by adjusting the horizontal slider, the segments of the signal can be magnified. Move your mouse cursor to the signal and a new sign appears.

Press the mouse wheel to switch between the zooming function ⊡ and the "hand"-tool ✋.

Then, define the range to be magnified by clicking on a certain point and draw a rectangle with the left mouse key depressed. If you release the left key, the segment previously defined by the square is displayed. The zoom remains even while the display continues running.
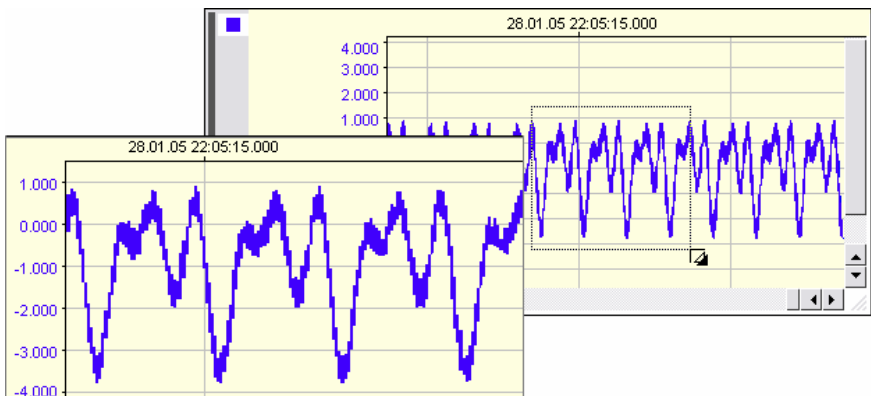
Figure 105

Zooming by means of mouse and keyboard:

command	function
<SHIFT>+zoom	y-zoom: all displayed signals are zoomed along the y-axis
<CTRL>+zoom	x-zoom: all displayed signals are zoomed along the x-axis
<ALT>+zoom	y-zoom on the selected signal; if one y-axis is shared by all signals (see "tab "Y-AXIS" ", p. 59), all signals are magnified

At the bottom of the display, you will find the buttons "Zoom back" and "Zoom forth" (see "LIVE DISPLAY: BUTTONS", p. 147) to undo the last eight zoom levels (ZoomStack). The 100%-button displays the signal in full size (see "100% REPRESENTATION", p. 149)

This chapter applies to the "graph display" in the same degree.

5.5.7.4.2   100% REPRESENTATION

If the "100%-zoom" button is used (see "LIVE DISPLAY: BUTTONS", p. 147), the signal in the live display will be displayed in full length, i.e. the content of the live-data cache (graph display: complete signal of measurement file). The y-axis range which is displayed depends on the physical measurement range or the default display range set in the "DEVICE CONFIGURATION" dialog box in the tab "DEFAULTS". The setting used for the 100%-representation depends on what has been selected in the tab "GENERAL" of the property bar" (presetting: default range, see p. 44).

- **As formula channels have no physical input range (see p. 116), the preset display range is used for their 100%-representation.**

- **If the y-axis is shared by all signals (tab "Y-AXIS"), the 100%-representation always bases on the minimum and maximum value of all signal ranges (also applies for hidden signals!).**

5.5.7.5   LIVE DISPLAY: ASSIGN CHANNEL

If a live display is inserted on the sheet (keyboard: **F3**) or a signal is added to the display (keyboard: **F6**), any analog or digital input or formula channel is displayed.
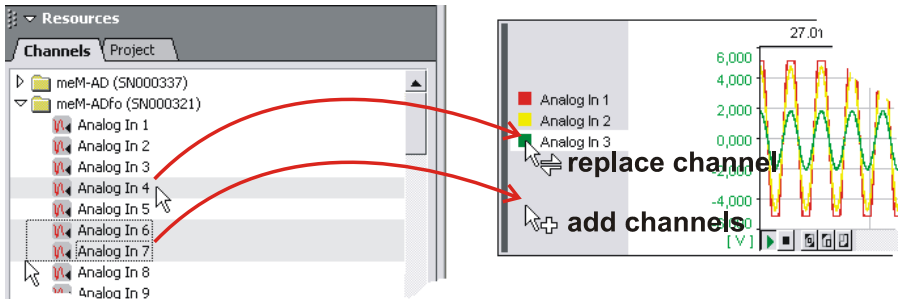
Figure 106

The selection is done in tab "CHANNELS" under the section "RESOURCES" of the property bar. The presently related channel has a gray marking.

To add one (several) channel(s) to the live display, it (they) has (have) to be marked in tab "CHANNELS" and moved by drag&drop over the display, which does not necessarily have to be selected before.

If moving a channel over the color button of a signal in the display, it will be replaced. A double-click on a channel listed in the selection on the left replaces the active signal of the active display.

- **The active display is recognizable by its selection bar on the left side of the display. Color button, name and numerical value of the active signal have a white marking.**

- **Use the pane view to display several signals of a display in separate windows one below the other with individual y-axes (see p. 176).**

To look over the parameter settings of the selected channel, open the "device configuration", which can be reached directly with the command "CHANNEL SETTINGS" in the context menu of the live display (also: **<SHIFT>**+double-click on the display).

The settings of the live display regarding the representation of the display and its signals are made in the following chapter.

5.5.7.6 SETTINGS OF THE LIVE DISPLAY
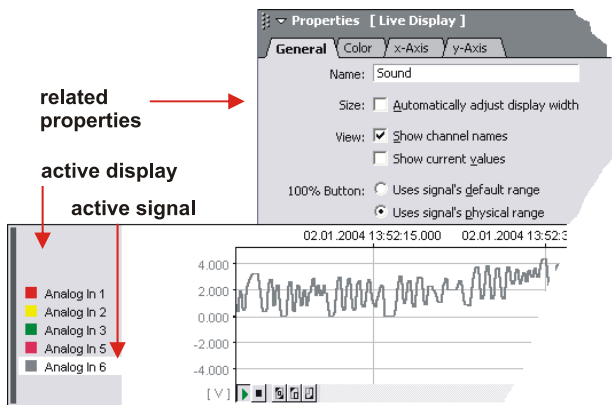
Figure 107

The settings for the active live display or selected signal, which must have been previously selected by mouse-click (display: selection bar is displayed; signal: click color button), are defined in the section "properties" of the properties bar.

The active display is recognizable by its selection bar on the left. Color button, name and numerical value of the active signal have a white marking. In addition, the y-axis of the display is adjusted in color, unit, and scaling to the parameters of the active signal.

Some settings apply to the whole display and all its channels (tab "GENERAL", tab "X-AXIS") or only to the selected signal (tab "COLOR", tab "Y-AXIS").

- **A double-click on the color button of a signal, the x-axis or the y-axis directly opens the related register card under the section "PROPERTIES" of the property bar.**

- **Changed settings in input fields of the "PROPERTIES" are updated in the display by pressing the <TAB>-key.**

5.5.8 BUTTON

Figure 108

With the display control "BUTTON" of the "DISPLAY" menu, you can directly control digital outputs.

function	command / dialog
insert button:	• menu "DISPLAY": command "BUTTON" • context menu of sheet: command "INSERT / BUTTON"
select button:	• mouse-click on the display (selection bar is shown) • keyboard: <**TAB**>
remove button:	• menu "EDIT": command "DELETE" • keyboard: **<CTRL>+X**
name button:	property bar: tab "GENERAL"
button on / off:	mouse-click on button
use as push button:	property bar: tab "GENERAL"
show display border / selection bar:	property bar: tab "GENERAL"
character format:	property bar: tab "FONT"
enter title:	property bar: tab "COLOR"
set limits for changing state:	property bar: tab "STATE"
text color / button color:	property bar: tab "COLOR" (for button on / off respectively)
assign digital output:	property bar: tab "CHANNELS" (section "resources")
show channel name:	property bar: tab "GENERAL"
write script instructions:	property bar: tab "SCRIPT" (with **NextView®4 Script** only)

The button is placed on an empty space on the sheet. The common Windows® conventions relating to position and size of an object apply (see p. 129).

The settings for the active button, which must have been previously selected by mouse-click (selection bar is displayed), are defined in the related tabs "GENERAL", "COLOR", "FONT", and "SCRIPT" under the section "PROPER-TIES" of the property bar on the left.

🛑

If using the add-on module NextView®4 Script (for charge), you can program script instructions in tab "SCRIPT" which are executed when pressing the button.

5.5.8.1   BUTTON: ASSIGN DIGITAL OUTPUT
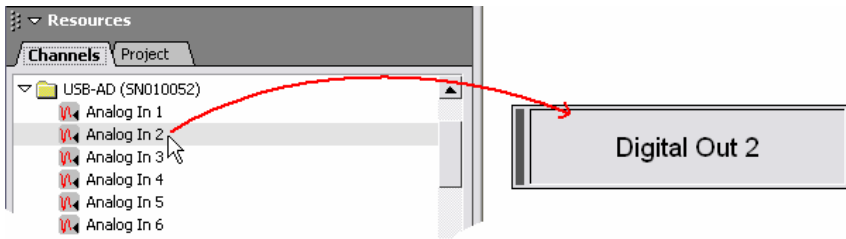
Figure 109

If inserting a button on the sheet, no channel is related to it. The specific selection of a digital output is done in tab "CHANNELS" under the section "RESOURCES" of the property bar on the left. The presently related channel has a gray marking.

🛑

- **Only a digital output can be assigned to a button!**

- **If the button is assigned to a digital channel which direction has been changed to "input" the button will be faded out.**

To assign a digital output, it has to be moved by drag&drop over the button, which does not necessarily have to be selected before. A double-click on a channel listed in the selection on the left replaces the signal of the active display.

To look over the parameter settings of the selected digital output, open the "DEVICE CONFIGURATION", which can be accessed directly with the **F12** function key.

5.5.8.2   BUTTON: OPERATION

Figure 110

With the button control, you can demonstrate and set the digital states "low" and "high" of a digital output. It is directly switched on and off by mouse-click.

As long as the button is pressed, the related digital output is "1" ("high"). If it is turned off, the digital output is "0" ("low"). These states are illustrated by the non-pressed or pressed switch position. In tab "COLOR", you can define different titles and colors for the active (button ON) and inactive state (button OFF) in addition.

The button acts like a push button if this option is activated in tab "GENERAL" of the property bar on the left. In this case, the button is ON only as long as the mouse button is pressed. When you release the button, the related digital output is reset to "0".

If using the add-on module **NextView®4 Script** (for charge), you can program script instructions in tab "SCRIPT" which are executed when pressing the button (ON or OFF).

The current state of a digital output can be viewed and set in tab "OUTPUT" of the "DEVICE CONFIGURATION" dialog box, also.

5.5.9 SLIDER

To display and control analog output channels, you can use the slider. The output voltage can be adjusted with the slider control or be entered directly in the field displaying the numerical value of the output voltage.
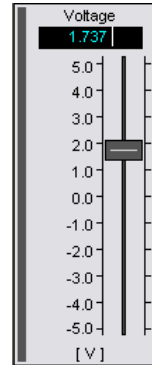
Figure 111

function	command / dialog
insert slider:	• menu "DISPLAY": command "SLIDER" • context menu of sheet: command "INSERT / SLIDER"
select slider:	• mouse-click on the display (selection bar is shown) • keyboard: <**TAB**>
remove slider:	• menu "EDIT": command "DELETE" • keyboard: <**CTRL**>+**X**
name slider:	property bar: tab "GENERAL"
show name, unit, numerical value:	property bar: tab "GENERAL"
show display border / selection bar:	property bar: tab "GENERAL"
scaling of the axis:	property bar: tab "Y-AXIS"
set slider value:	• shift slider handle with the mouse • keyboard: <**Page Up**>, <**Page Down**> or ↑, ↓ • enter numerical value input into field of output values
character format:	property bar: tab "FONT"
assign analog output:	property bar: tab "CHANNELS" (section "RESOURCES")
write script instructions:	property bar: tab "SCRIPT" (with **NextView®4 Script** only)

The slider is placed on an empty space on the sheet. The common Windows® conventions relating to position and size of an object apply (see p. 129).

The settings for the active slider, which must have been previously selected by mouse-click (selection bar is displayed), are defined in the related tabs "GENERAL", "FONT", and "Y-AXIS" under the section "PROPERTIES" of the property bar on the left.

⛔

If using the add-on module NextView®4 Script (for charge), you can program script instructions in tab "SCRIPT" which are executed when you click, release or shift the slider handle.

5.5.9.1 SLIDER: ASSIGN ANALOG OUTPUT
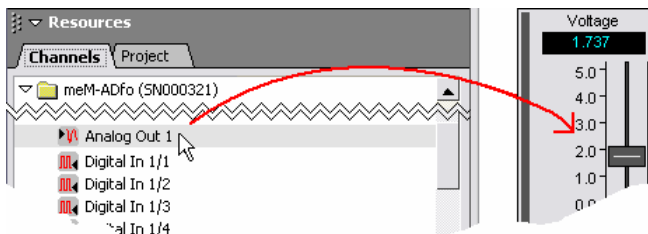
Figure 112

If inserting a slider on the sheet, any channel is related to it. The specific selection of an analog output is done in tab "CHANNELS" under the section "RE-SOURCES" of the property bar on the left. The presently related channel has a gray marking.

⛔   **Only analog outputs can be assigned to a slider!**

To assign an analog output, it has to be moved by drag&drop over the slider, which does not necessarily have to be selected before. A double-click on a channel listed

in the selection on the left replaces the signal of the active display. To look over the parameter settings of the selected analog output, open the "DEVICE CONFIG-URATION", which can be reached directly with the **F12** key.

5.5.9.2   SLIDER: OPERATION

With the slider control, you can demonstrate and set the voltage values of an analog output directly.

It is operated via the slider handle which is shifted with the mouse to the desired position, but you can also enter the exact numerical value in the field of output values. When pressing the <**RETURN**>-key, the slider jumps to the specified position.

The following table shows the operation of the slider via keyboard:

keyboard	function
Page Up	upward shift of the slider handle for one unit of the axis
Page Down	downward shift of the slider handle for one unit of the axis
↑	upward shift of the slider handle for 1/5 unit of the axis
↓	downward shift of the slider handle for 1/5 unit of the axis

In tab "GENERAL" of the property bar, you can select various display elements to be included in the display. The range of the slider scale is defined in tab "Y-AXIS". Default setting is the maximum output range.

If using the add-on module **NextView®4 Script** (for charge), you can program script instructions in tab "SCRIPT" which are executed when you click, release or shift the slider handle.

The displayed name of the analog output is entered in the "DEVICE CONFIGU-RATION" dialog box (keyboard: **F12**).

🛑

The output voltage of an analog output can be viewed and set in tab "OUTPUT" of the "DEVICE CONFIGURATION" dialog box, too.

5.5.10 GRAPH DISPLAY
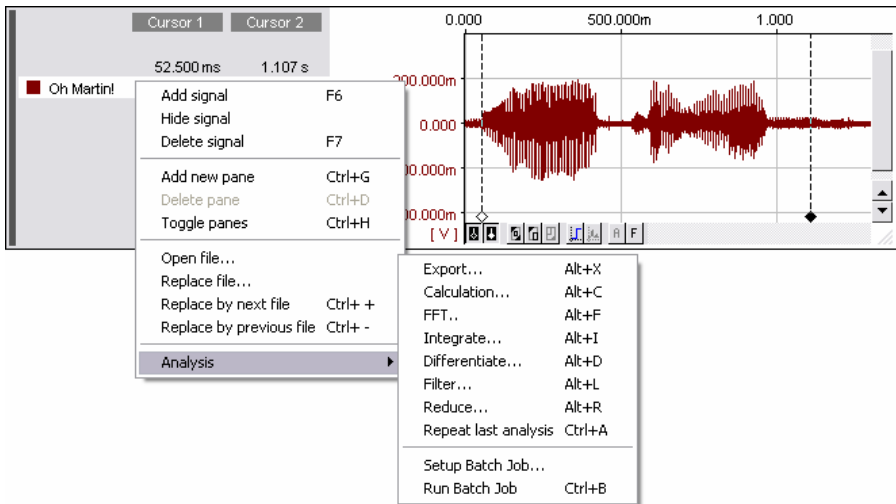
Figure 113

The graph display serves to view stored signals from measurement files, which have been stored by **NextView®4** or a measurement program in a supported file format (see "IMPORT", p. 69), or have been calculated by means of analysis functions.

By means of comprehensive mathematical functions, the signal curves can be analyzed and processed.

function	command / dialog
insert graph display:	• menu "DISPLAY": command "GRAPH DISPLAY" • context menu of sheet: command "INSERT / GRAPH DISPLAY" • keyboard: **F4**
select graph display:	• mouse-click on the display (selection bar is shown) • keyboard: <**TAB**>
remove graph display:	• menu "EDIT": command "DELETE" • keyboard: **<CTRL>+X**

function	command / dialog
name graph display:	property bar: tab "GENERAL"
automatically adjust to full sheet width:	property bar: tab "GENERAL"
turn pane view on/off	• menu "SIGNALS": command "Toggle panes" • keyboard: <**CTRL**>+**H**
open / replace measurement file into the project:	• property bar: tab "SIGNALS" (section: "RESOURCES", open menu , command "OPEN FILE" / "REPLACE FILE" • context menu of graph display: command "OPEN FILE" / "REPLACE FILE"
replace numbered measurement file by next / previous:	• property bar: tab "SIGNALS" (section: "RESOURCES", select command in menu • context menu of graph display: command "REPLACE BY NEXT / PREVIOUS FILE" • keyboard: **CTRL**+<**+**> or **CTRL**+<**−**> (for "**+**", "**−**" use numeric keypad)
insert signal:	• menu "SIGNALS": command "ADD SIGNAL" • context menu of graph display: command "ADD SIGNAL" • keyboard: **F6** • move signal from tab "SIGNALS" (section: "RESOURCES" of the property bar) over the display (*drag&drop*)
replace signal:	move signal from tab "SIGNALS" (section: "RESOURCES" of the property bar) over the colored signal button (*drag&drop*)
hide signal:	• menu "SIGNALS": command "HIDE SIGNAL" • context menu of graph display: command "HIDE SIGNAL" • keyboard: <**CTRL**>+click signal button
delete signal:	• menu "SIGNALS": command "DELETE SIGNAL" • context menu of graph display: command "DELETE SIGNAL" • keyboard: **F7**
select signal:	click related color button or signal name

function	command / dialog
display other signal:	property bar: tab "SIGNALS" (section "RE-SOURCES", see "GRAPH DISPLAY: ASSIGN SIG-NAL", p. 167)
change signal order:	move color button to another position (*drag&drop*)
show signal name:	property bar: tab "GENERAL"
show numerical values:	property bar: tab "GENERAL"
change signal color:	property bar: tab "COLOR"
shift signals:	• shift slider (vertically/horizontally) (see "NAVIGA-TING THE DISPLAY", p. 146) • keyboard: →, ← or ↓, ↑ • use "hand" tool 🖑 (turn on with mouse wheel, see "NAVIGATING THE DISPLAY", p. 146)
view signal information of the active signal:	property bar: tab "SIGNAL" (section "PROPER-TIES")
use one y-axis for all signals:	property bar: tab "Y-AXIS"
cursors on / off:	press buttons 🔳 🔳 (see "GRAPH DISPLAY: BUTTONS", p. 164)
show cursor values:	property bar: tab "CURSOR"
cursor jumps:	property bar: tab "CURSOR"
calculate characteristic signal values:	property bar: tab "CURSOR"
zoom 🔳:	draw a rectangle over the signal segment with mouse button pressed (press mouse wheel to turn on zooming function, see "ZOOMING IN THE DISPLAY", p. 148)
show in full signal range (100%):	press button 🔳 (see "GRAPH DISPLAY: BUTTONS", p. 164)
define range of 100% represen-tation:	property bar: tab "GENERAL"
scaling the axis:	property bar: tab "X-AXIS" and tab "Y-AXIS"
print graph display:	• menu "FILE": command "PRINT / DISPLAY" • keyboard: **<CTRL>+P**
write script instructions:	property bar: tab "SCRIPT" (with **NextView®4 Script** only)

The graph display is placed on an empty space on the sheet. The common Windows® conventions relating to position and size of an object apply (see p. 129). Navigating the display (see p. 146) and zooming in the display (see p. 148) is executed in the same way as in the live display. A right-click on the graph display opens the related context menu.

The settings of the graph display, which must have been previously selected by mouse-click (selection bar is displayed), are displayed in the related tabs "GENERAL", "SIGNAL", "COLOR", "X-AXIS", "Y-AXIS", and "CURSOR", under the section "PROPERTIES" of the property bar on the left.

- **Signals from previously stored files of a multi-scan (see p. 34) can be displayed and analyzed in a graph display while the entire scan still runs.**

- **Before you can view a signal in the graph display, the relevant measurement file in the project must be opened (see "OPEN / SAVE SIGNAL FILES", p. 67).**

- **Use the pane view to display several signals of a display in separate windows one below the other with individual y-axes (see p. 176).**

- **If using the add-on module NextView®4 Script (for charge), you can program script instructions in tab "SCRIPT" which are executed when calculating characteristic signal values (see "CURSORS", p. 165).**

- **Printing options for the y-axis can be defined individually for each display in tab "Y-AXIS" (see p. 59).**

5.5.10.1 REPRESENTATION OF STORED VALUES

How often a channel is scanned and how many of these measured values are stored during a recording, depends on the preset scan frequency and the storage ratio of the channel. These are set in the "DEVICE CONFIGURATION" dialog in the tabs "SCAN" (see p. 88 and p. 101).

The lower the scan frequency and the storage ratio, the lesser are the values which are stored during a recording. As an example, a channel with a preset scan frequency of 100Hz and a storage ratio of 1:10 is scanned 10 times per second and every 10th of theses values is stored, i.e. only one value per second.

⚠

The signal response between two stored measured values is unknown and cannot be gathered from the signal representation!

In order to prevent a signal of the graph display being represented as single dots, two methods of displaying signals in a continuous manner are provided. The stored signals are represented either as a staircase or smoothed ("dot jam").
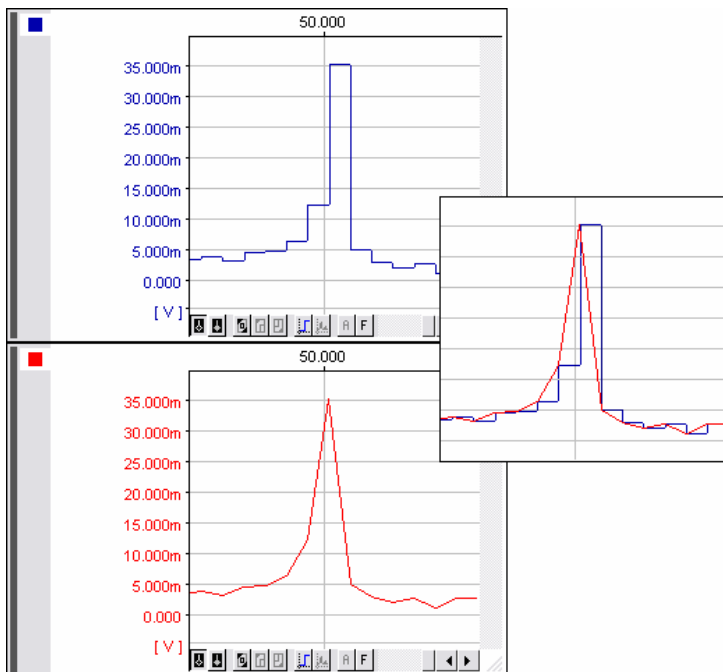
Figure 114

In the first example, the curve is constant after a stored value and jumps to the next value as soon as it is stored. If the ⬚ button ("Toggle dot jam") at the bottom of the display is activated (see "GRAPH DISPLAY: BUTTONS", p. 164), a diagonal line will be drawn between two stored values. This curve appears smoother. This setting also applies to the x/y-representation (see p. 166).

Figure 114 illustrates the different representation of stored signals. The difference will become perfectly clear if the signals are overlaid.

This setting is saved in the project so that signals will be represented as desired (staircase or dot-jam) when reopening the project.

5.5.10.2   GRAPH DISPLAY: BUTTONS

The relevant buttons are located at the bottom of the graph display. They allow to hide/unhide the cursors, zoom, represent signals and to hide/unhide the FFT marker.
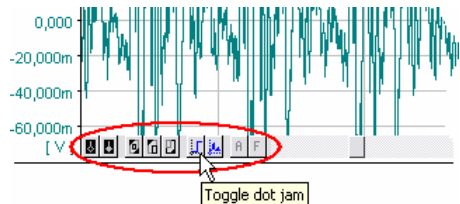
Figure 115

If the mouse cursor is moved across one of these buttons, a tiny window (tooltip) appears describing their function.

button	function
/	activate / deactivate cursors (white/black; keyboard: **<CTRL>+1** or **<CTRL>+2**, see p. 164)
	100% zooming (see "100% REPRESENTATION", p. 149)
/	previous / next zoom (see "ZOOMING IN THE DISPLAY", p. 148)
	activate / deactivate dot jam (see "REPRESENTATION OF STORED VALUES", p. 162)
	activate / deactivate x/y-representation (see p. 166)
	A-button: repeat the last analysis function for the active signal (keyboard: **<CTRL>+A**, see "REPEAT LAST ANALYSIS", p. 206)
	activate / deactivate FFT marker (see p. 167)

The buttons for zooming in the display and the 100% representation have the same function as in the live display and are described in the corresponding chapters.

5.5.10.2.1   CURSORS

NextView®4 provides a white and a black cursor. They serve to define signal ranges to be evaluated and processed by means of the analysis functions.
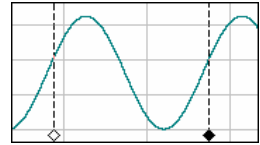
Figure 116

The cursors are activated / deactivated by means of the relevant buttons 🔳 🔳 at the lower edge of the graph display (see "GRAPH DISPLAY: BUTTONS", p. 164). If you move your mouse to the rhombus ◇◆ below the cursor, the mouse cursor turns into a double arrow ⬌⬌. Now you can move the cursor to the desired position by click&drag.

The operation of the cursors via keyboard is listed in the following table:

keyboard	function
<CTRL>+1	activates / deactivates the white cursor (use numeric keys of the standard keyboard)
<CTRL>+2	activates / deactivates the black cursor (use numeric keys of the standard keyboard)
<CTRL>+→	moves white cursor to the right
<CTRL>+←	moves white cursor to the left
<CTRL>+<SHIFT>+→	moves black cursor to the right
<CTRL>+<SHIFT>+←	moves black cursor to the left

The relating signal values at the cursor positions can be displayed next to the signal name (see "tab "CURSOR" ", p. 60; left: signal value of the white cursor (no. 1); right: signal value of the black cursor (no. 2)). The current cursor position at the x-axis is indicated in the first line. If cursors are moved, the values in the display adjust accordingly.

In tab "CURSOR" of the property bar (section "PROPERTIES"), characteristic key data (minimum, maximum, mean value, standard deviation, RMS) of the active signal can be calculated for the defined cursor range and be viewed directly. In addition, these values will be copied to the clipboard automatically (see p. 60).

- **Printing a display or sheet also prints the set cursors. If the option "Legend" in the dialog "PAGE SETUP" (menu "FILE") is activated, cursor values and other characteristic signal data will be printed also.**

- **With NextView®4 Script (for charge), you can program script instructions in tab "SCRIPT" which are executed when calculating characteristic signal values.**

- **By copying the calculated characteristic signal values to the clipboard, they can be used by other programs (e.g. Excel®) as table values.**

5.5.10.2.2   X/Y-REPRESENTATION

In the x/y-representation, two signals of the same x-axis range can be displayed in relation to each other by placing the first signal in the graph display above the second. The color button of the second signal, which has adopted the x-axis values, will be marked in the x/y-representation by a white X.
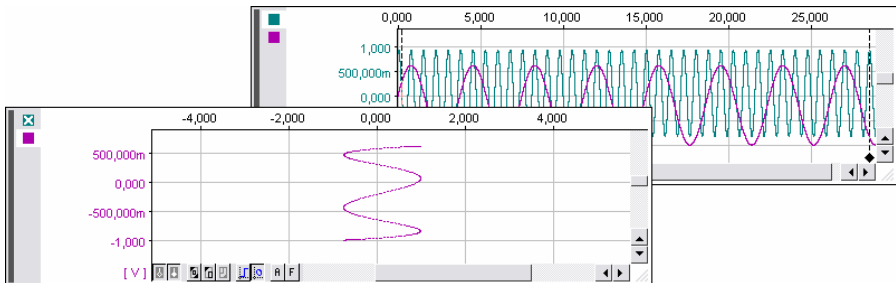
Figure 117

Another click on the x/y-button ⊠ (see "GRAPH DISPLAY: BUTTONS", p. 164) undoes this representation and the signals will be displayed in their original form.

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Depending on the data size, drawing a curve in the x/y-representation might take a long time and cannot be cancelled normally. Therefore, for displaying more than 500,000 measured values, you will be prompted to decide whether you really want to cancel this command.

5.5.10.2.3 FFT MARKER

If you wish to execute an FFT analysis, the "FFT marker" function [F] is quite useful. If the white cursor (see "CURSORS", p. 165) is placed at the beginning of the signal where the calculation of the frequency spectrum is to be started from, the signal range in the graph display to be analyzed by FFT is marked in dark yellow. If the white cursor is moved, the selection is changed accordingly.
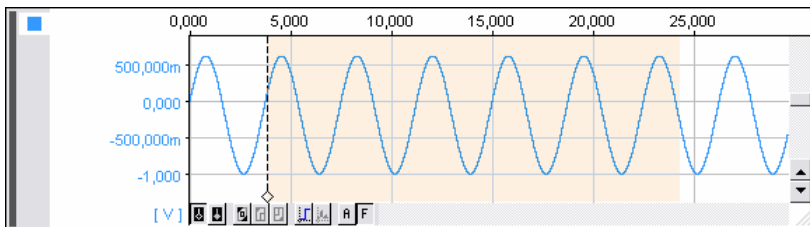
Figure 118

The FFT always uses twice as many points as the indicated number of frequency lines. Therefore the size of signal range to be calculated by FFT depends on the number of frequency lines set in the "FFT" dialog box (see "SETTINGS FOR THE FFT ANALYSIS", p. 189).

5.5.10.3 GRAPH DISPLAY: ASSIGN SIGNAL

If a graph display is inserted on the sheet (keyboard: **F4**) or a signal is added to the display (keyboard: **F6**), any stored signal of a measuring file, opened in the project, will be displayed. The selection is done in tab "SIGNALS" under the section "RESOURCES" of the property bar. The presently related active signal of the graph display has a gray marking.
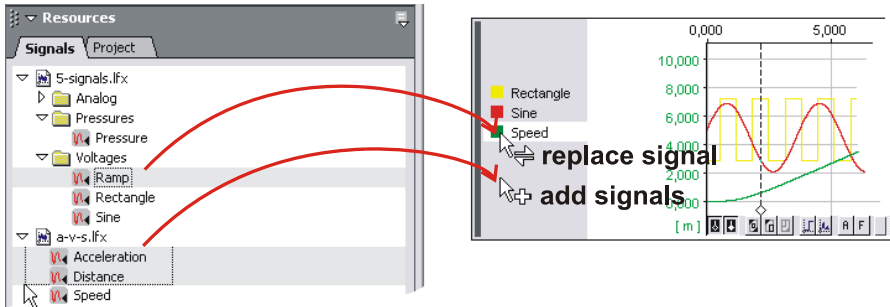
Figure 119

To add one (several) signal(s) to the graph display, it (they) has (have) to be marked in tab "SIGNALS" and moved by drag&drop over the display, which does not necessarily have to be selected before.

If moving a channel over the color button of a signal in the display, it will be replaced. A double-click on a signal listed in the selection on the left replaces the active signal of the active display.

- **The active display is recognizable by its selection bar on the left side of the display. Color button, name and numerical value of the active signal have a white marking.**

- **Before you can display stored measurement data, the relevant measurement file must be opened in the project (see "OPEN / SAVE SIGNAL FILES", p. 67).**

- **Use the pane view to display several signals of a display in separate windows one below the other with individual y-axes (see p. 176).**

For information about the stored signal, see tab "SIGNAL" under the section "PROPERTIES" of the property bar. The settings of the graph display regarding the representation of the display and its signals are made in the following chapter.

5.5.10.4   SETTINGS OF THE GRAPH DISPLAY
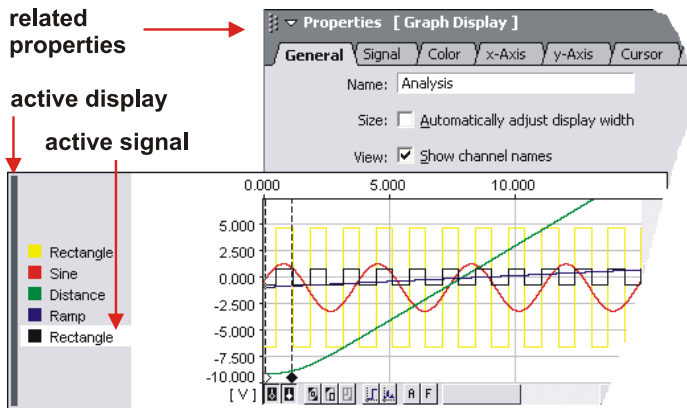
Figure 120

The settings for the active graph display or selected signal, which must have been previously selected by mouse-click (display: selection bar is displayed; signal: click color button), are entered in the section "PROPERTIES" of the properties bar.

The active display is recognizable by its selection bar on the left. Color button, name and numerical value of the active signal have a white marking. In addition, the y-axis of the display is adjusted in color, unit, and scaling to the parameters of the active signal.

Some settings apply to the whole display and all its channels (tab "GENERAL", tab "X-AXIS", tab "SCRIPT") or only to the selected signal (tab "SIGNAL", tab "COLOR", tab "Y-AXIS", tab "CURSOR").

- **A double-click on the color button of a signal, the x-axis, or the y-axis directly opens the related register card under the section "PROPERTIES" of the property bar.**

- **Changed settings in input fields of the "PROPERTIES" are updated in the display by pressing the <TAB>-key.**

5.5.11   MESSAGE DISPLAY
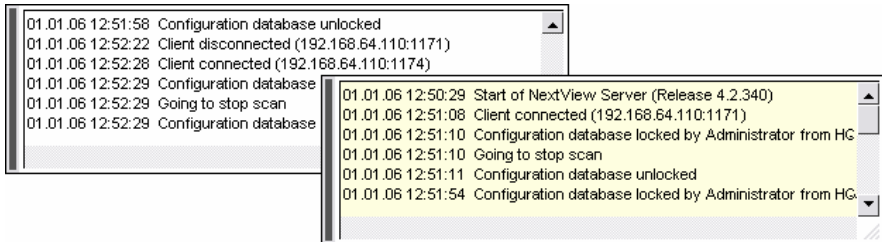
Figure 121

This type of display can show up to 100 messages (e.g. system status information or messages from other users), or serve as an output medium for the add-on module **NextView®4 Script** (for charge).

function	command / dialog
insert message display:	• menu "DISPLAY": command "MESSAGE DISPLAY" • context menu of sheet: command "INSERT / MESSAGE DISPLAY"
select message display:	• mouse-click on the display (selection bar is shown) • keyboard: <**TAB**>
remove message display:	• menu "EDIT": command "DELETE" • keyboard: **<CTRL>+X**
name message display:	property bar: tab "GENERAL"
stop automatic scrolling:	move slider
start automatic scrolling:	move slider to the very bottom
select channel:	property bar: tab "GENERAL"
aut. adjust to full sheet width:	property bar: tab "GENERAL"
show date and time:	messages contain time information, see property bar: tab "GENERAL"
character format:	property bar: tab "FONT"
print message display:	select relevant option in tab "GENERAL" • menu "File": command "PRINT / DISPLAY" • keyboard: **<CTRL>+P**

The message display is placed on an empty space on the sheet. The common Windows[®] conventions relating to position and size of an object apply (see p. 129).

A right-click on the message display opens a context menu containing commands frequently used in this type of display. The settings for the active message display, which must have been previously selected by mouse-click (selection bar is displayed), are defined in the related tabs "GENERAL", and "FONT" under the section "PROPERTIES" of the property bar on the left.

The message display can be scrolled automatically, permanently showing the latest news, or be stopped at a certain position by means of the slider on the right of the display. Even while new messages are sent, the display is not changed. This circumstance can be recognized by means of the pale yellow color. As soon as you go back to the latest message, the display adopts its white color again and starts scrolling (see Figure 121).

- **While a dialog box is open, the message display will not be updated for incoming messages until the dialog has been closed.**

- **A message display will only be printed if the relevant option is checked in tab "GENERAL".**

5.6   SIGNALS

This menu provides all commands required for displaying and analyzing stored signals.

To guarantee the compatibility to NextView®/NT 3.x (see "COMPATIBILITY WITH NVNT 3.X", p. 16), the created signal files can be exported into a file of type "NextView/NT 3.4 files (*.lfx)".

Signals	
Add Signal	F6
Hide signal	
Delete Signal	F7
Add new pane	Ctrl+G
Delete pane	Ctrl+D
Toggle panes	Ctrl+H
Copy selected signal	
Copy all signals	
Export...	Alt+X
Calculation...	Alt+C
FFT..	Alt+F
Integrate...	Alt+I
Differentiate...	Alt+D
Filter...	Alt+L
Reduce...	Alt+R
Repeat last analysis	Ctrl+A
Setup Batch Job...	
Run Batch Job	Ctrl+B

Figure 122

- **The processing of signals always relates to the active signal in the graph display (click color button; except: "EXPORT", p. 179).**

- **The analysis is executed within the cursor range (see "CURSORS", p. 165), which the signal must be entirely available in. The result signal will be presented in the display of the source signal (except: FFT, EXPORT).**

- **All analysis functions can be selected from a context menu which is opened by a right-click on the graph display.**

- **NextView®4 creates a backup file of an existing result file upon calculation of signals. If a calculation is canceled, the original file will be restored but only in case of sufficient storage capacity.**

- **Stored signals are editable (see "TAB "SIGNAL" ", p. 56).**

5.6.1 COMMANDS OF THE MENU "SIGNAL"

command	function
add signal	inserts a new signal in the active live display or graph display (keyboard: **F6**).
hide signal	hides the selected signal of the display
delete signal	removes the selected signal from the display (keyboard: **F7**)
new pane	inserts the active signal to a new partial window of the live display or graph display (keyboard: **<CTRL>+G**, see "PANE VIEW", p. 176)
remove pane	removes the partial window of the active signal and inserts the signal into the next window (keyboard: **<CTRL>+D**, see "PANE VIEW", p. 176)
toggle panes	opens/closes the pane view (keyboard: **<CTRL>+H**)
copy selected signal / all signals	copies the x- and y-coordinates of the selected or all signals of a graph display within the cursor range to the clipboard
export	exports a signal segment to a file of the format ***.asc**, ***.lfx**, ***.dat**, ***.txt** (keyboard: **<ALT>+X**)
calculation	dialog box for calculating one or several signals (keyboard: **<ALT>+C**)
FFT	executes a single or multiple FFT analysis (keyboard: **<ALT>+F**)
integration	executes a single or double integration (keyboard: **<ALT>+I**)
differentiation	differentiates the selected signal (keyboard: **<ALT>+D**)
filter	provides a selection of digital filters of various order and type (keyboard: **<ALT>+L**)
data reduction	reduces the number of stored measured values of the active signal (keyboard: **<ALT>+R**)
repeat last analysis	applies the last analysis function to the selected signal (keyboard: **<CTRL>+A** or A-button 🅰 in the graph display)

command	function
setup batch job	dialog for the setup and automation of an analysis task for one or several selected signals of a display, which is stored for each graph display separately
run batch job	starts the analysis task which has been setup for the active display (keyboard: **<CTRL>+B**)

5.6.2 SIGNAL COMMANDS

5.6.2.1   ADD SIGNAL

This command adds any random signal opened in the project into the active live display or graph display (also: command in the context menu of the live display or graph display or function key **F6**).

The specific signal selection is executed on the left in tab "CHANNELS" (see "LIVE DISPLAY: ASSIGN CHANNEL", p. 150) or tab "SIGNALS" (see "GRAPH DISPLAY: ASSIGN SIGNAL", p. 167 under the section "RESOURCES" of the property bar.

- **Before you can add a new signal to the graph display, at least one signal file must be opened in the project.**

- **The tab "SIGNALS" of the property bar gives an overview of opened measurement files. From here, you can load measurement files into the project (see "OPEN / SAVE SIGNAL FILES", p. 67).**

5.6.2.2   HIDE SIGNAL
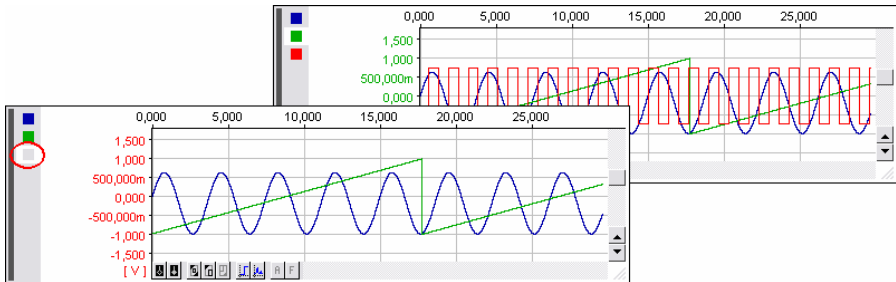
Figure 123

This command temporarily removes the selected signal from the live display or graph display (also: command in the context menu of the live display / graph display or `<CTRL>` + mouse-click on color button).

The settings of hidden signals cannot be modified and they are disabled for analysis. Although their signal name is still displayed, the color button in front of their name is grayed-out.

Another click on this command unhides a signal.

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If using a shared y-axis for all signals (see "TAB "Y-AXIS" ", p. 59), hidden signals might influence the 100% representation (see p. 149) in the display.

5.6.2.3   DELETE SIGNAL

Unlike the command "HIDE SIGNAL", this command entirely removes the selected signal from the live display or graph display (also: command in the context menu of the live display / graph display or function key **F7**) and is no longer available then.

In the case of live data, they will irretrievably be lost. Stored signals can be reinserted in the graph display via the "ADD SIGNAL" command (function key **F6**).

5.6.2.4   PANE VIEW
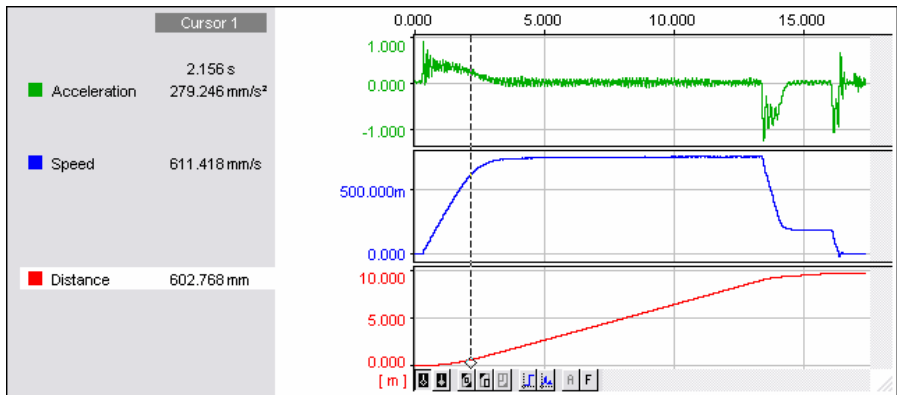
Figure 124

If a live display or graph display contains several signals, the display can be split up in panes so that individually selected or all signals of a display can be viewed in a separate partial window. In a pane, one or more signals can be included.

The panes have the same x-axis but use the individual y-axis of the contained signal (for several signals: y-axis of the active signal). In case of overlapping signals or signals with diverging y-ranges, this often increases the clarity.

Compared to several single displays, the settings and functions are always applied to all signals. The cursor, for example, is used for all panes together.

All signals are simultaneously zoomed or shifted in x-direction, in y-direction this applies only to the signals in the pane of the active signal.

The splitting of the signals to the various panes can be chosen arbitrarily and is executed with the following commands of the "SIGNALS" menu:

command	function
New pane:	inserts the active signal into a new partial window at the bottom edge of the display (keyboard: **<CTRL>+G**)
Remove pane:	removes the partial window of the active signal and inserts the signal into the subjacent (otherwise: above) window (keyboard: **<CTRL>+D**)
Toggle panes:	spreads all signals contained in the display to partial windows or closes all partial windows displaying the signals in one common window (keyboard: **<CTRL>+H**)

If moving the color button of a signal to another partial window by drag&drop, the signal will be displayed in this pane.

5.6.2.5   COPY SELECTED SIGNAL / ALL SIGNALS
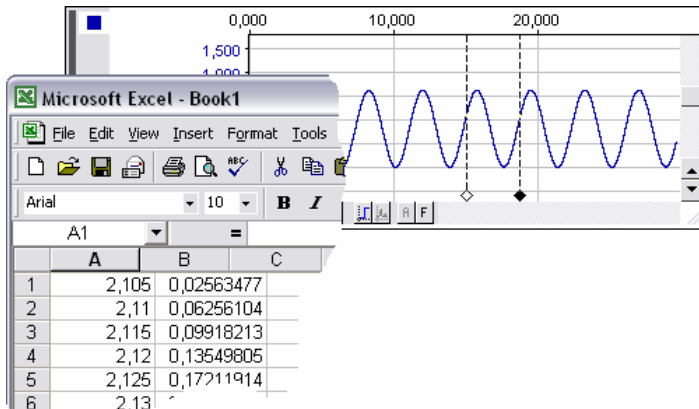
Figure 125

This function makes processing of signal values as table data possible in a very fast and uncomplicated way.

The x- and y-values of the active signal or all signals in the graph display within the cursor range are copied to the clipboard as a text file (1. column: values of the x-axis in relative time, 2. and next columns: values of the y-axis) so that they can be displayed e.g. in an Excel® table, Notepad or OpenOffice using the standard Windows® command "PASTE".

In case of copying several signals, the y-values are listed in the same order as in the graph display top down. Select the required signal by a mouse-click on its color button and mark the signal range by setting the cursors (see p. 165).

Selecting the command "COPY SELECTED SIGNAL" or "COPY ALL SIGNALS" of the menu "SIGNALS" transfers the values to the clipboard.

- **The number of transferred values depends on the sampling rate of the signal and the signal range defined by the cursors. A warning will be shown if more than 4000 values are copied.**

- **Hidden signals (see "HIDE SIGNAL", p. 174) will not be copied.**

5.6.3 EXPORT
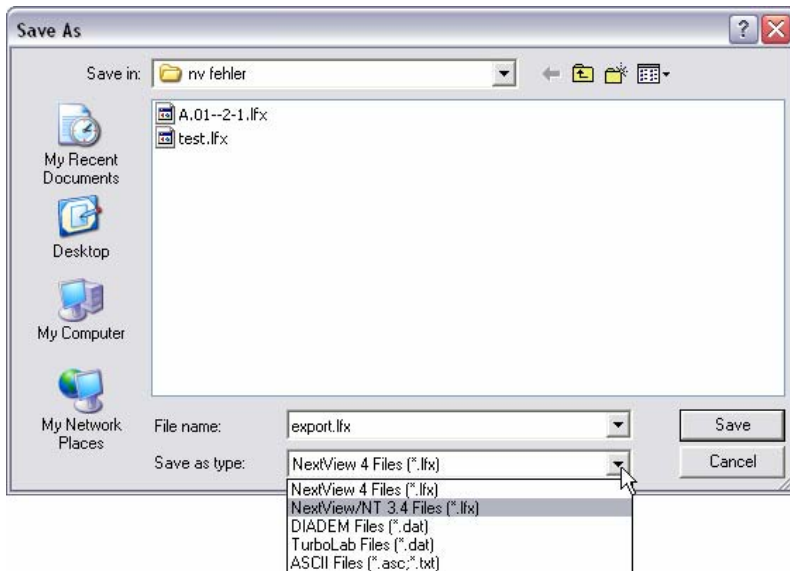
Figure 126

The export functions of **NextView®4** allow to cut out signal ranges from the graph display and copy them to files of different type. Use the cursors (see p. 165) in the graph display to define the signal range to be exported.

file type	open with
`*.lfx`	**NextView®4** (see "EXPORT WITHIN NEXTVIEW®4", p. 180)
`*.lfx`	**NextView®/NT 3.4**
`*.dat`	DIAdem
`*.dat`	TurboLab DAFF
`*.asc`, `*.txt`	e.g. Excel®, WordPad, Notepad (see "ASCII EXPORT", p. 182)

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- **Before you can activate the "EXPORT" command, you must place the cursors in the display properly.**

- **All signals in the cursor range, except for hidden signals (see "HIDE SIGNAL", p. 174), will be exported.**

The command "EXPORT" of the menu "SIGNALS" (also context menu of the graph display: "ANALYSIS / EXPORT" or keyboard: **<ALT>+X**) opens the dialog box shown in Figure 126, in which you indicate name, path and type of the export file.

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Particularly interesting for users of older versions is the export to the NextView®/NT 3.4 file format *.lfx for compatibility reasons (see "COMPATIBILITY WITH NVNT 3.X", p. 16).

5.6.3.1   EXPORT WITHIN NEXTVIEW®4

If only a relatively short time segment of a stored signal is important for analysis, you can use the "EXPORT" command for copying the signal segment contained in the cursor range into a new file. In the case of a long measurement period, this function allows considerably amount of disk space to be saved. The file containing the complete signal is retained.

Both cursors (see p. 165) are set to define the segment in the graph display to be exported. The command "EXPORT" (also context menu of the graph display: "ANALYSIS / EXPORT" or keyboard: **<ALT>+X**) will transfer and store all signals (except for hidden signals) of this range in a new file.
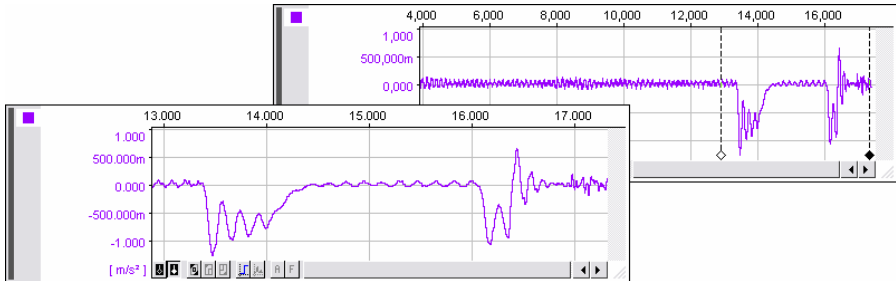
Figure 127

File name and path where the file is to be stored must be indicated. The new file will still be of the type "NextView 4 files (*.lfx)".
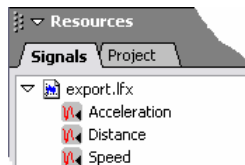
Figure 128

The exported signals will all be stored in one file with the name **export.lfx** for example. However, they can be viewed individually, by opening the relevant folder in tab "SIGNALS" under the section "RESOURCES" and inserting the desired signal in the display (see "GRAPH DISPLAY: ASSIGN SIGNAL", p. 167).

- **First the result file has to be opened in the project (see "OPEN / SAVE SIGNAL FILES", p. 67).**

- **As the x-axis of the source and the result signal are different, these signals cannot be represented together in one display.**

5.6.3.2 ASCII EXPORT
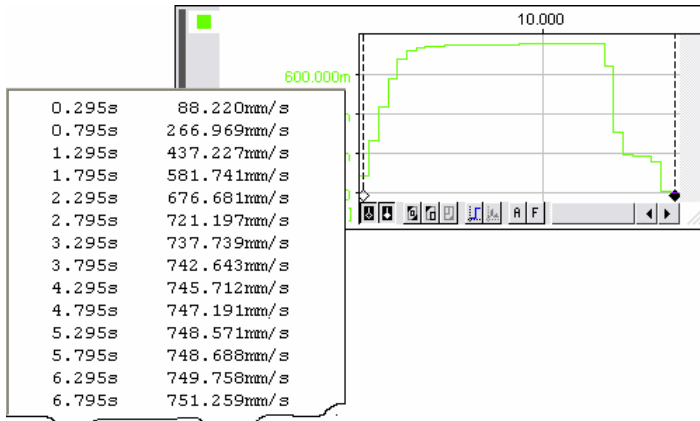
Figure 129

Another important export function is the ASCII export. Signals, recorded with **NextView®4** can be used by other ASCII-compatible programs so that the signals, for example, are available for specific analysis methods or graphical applications.

An ASCII file represents the signal in text format. The numerical values of the signals are listed in two columns, the left listing the values of the x-axis and the right column the values of the y-axis.

You convert a signal into an ASCII-file by defining the signal segment to be exported by means of the cursors. The command "EXPORT" (also context menu of the graph display: "ANALYSIS / EXPORT" or keyboard: **<ALT>+X**) leads you to the dialog box "Save as", where you indicate the filename of the signal to be exported and the path (see Figure 126). Additionally, change the file type to "ASCII files (*.asc, *.txt)".
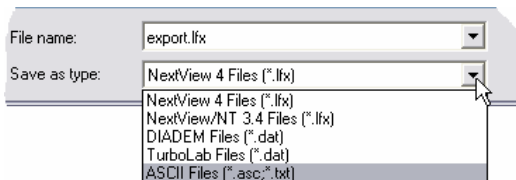
Figure 130

When you confirm by clicking on the button "Save", the "ASCII export options" dialog box (see Figure 131) is opened. In the tab "OPTIONS", you can provide all settings in relation to output- and number format of the x- and y-values.

Enter your settings in this dialog box with regard to the program to be used with this file. For example, some programs cannot read the number formats in "scientific" notation. In this case, the number format must be defined accordingly.

5.6.3.2.1   TAB "OPTIONS"

In the tab "OPTIONS", the following settings are possible for the ASCII export:
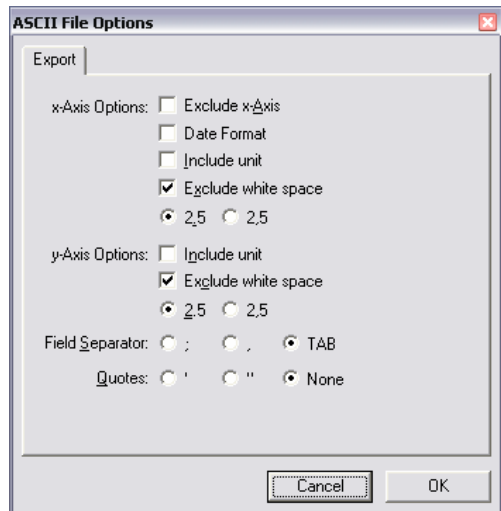
Figure 131

entry	function
Exclude x-axis:	x-axis values are not listed in the file
Date format:	the values of the x-axis are represented in the **NextView®4** date/time format
Include unit:	the unit of the x- or y-values is indicated
Exclude white space:	values are represented without spaces left-justified
2.5 / 2,5:	decimal places are separated by a comma or a point
Field separator:	separates x- and y-values by semicolon, comma or tab characters
Quotes:	number values can be included in inverted commas or quotation marks

5.6.4 CALCULATION
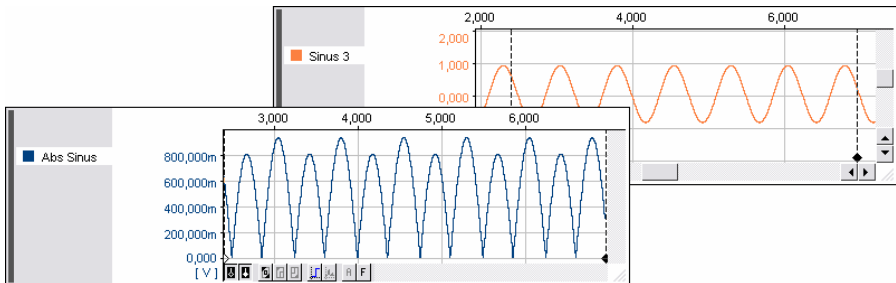
Figure 132

Recorded signals can be used for calculation. Also, signals can be offset against each other.

Only those signals which are entirely represented within the set cursors in the graph display are available for calculation. The calculation is done within the cursor range and the result signal will be displayed together with the source signal in the graph display.

The command "CALCULATION" of the menu "SIGNALS" (also context menu of the graph display: "ANALYSIS / CALCULATION" or keyboard: **<ALT>+C**) opens a dialog box (see Figure 133), which is designed and operated in the same way as a pocket calculator.

entry	function
x-Range:	indicates the selected cursor range
Destination:	name and path of the file (***.lfx**), where there result signal is stored (change with button ⋯ on the right)
Name & Unit:	name and unit which are here assigned to the result signal will be used for displaying the result signal in **NextView®4**
Formula:	clicking on the button lists the 10 most recently used formulas (formulas which can be used are marked by black dots)
Signal:	selection of a signal for calculation fully existent within the cursor range (see "CHOOSE A SIGNAL", p. 187)

- **Before you can activate the "CALCULATION" command, you must properly place the cursors in the display.**

- **As the cursor positions are used for calculation, the required signals must be continuous and visible in the cursor range.**

By clicking on the "Calc" button, the calculation is started and the result is displayed in the graph display.

5.6.4.1   ENTER FORMULA

Via keyboard or by means of the buttons in the lower section, the formula for the calculation of the signal is entered in the white input field. Click the button "Signal" to choose a signal (see below).

A right-click into the formula entry field opens a context menu with familiar Windows® editing functions (see "EDIT", p. 83).
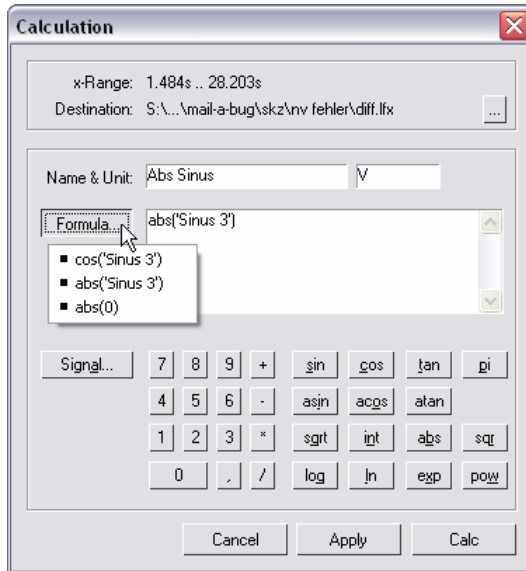
Figure 133

The buttons have the following functions:

buttons	function
0,1,2,3,4,5,6,7,8,9	numerical keys (can also be entered via keyboard)
+, -, *, /	operators (can also be entered via keyboard)
sin, cos, tan, asin, acos, atan	trigonometric functions (sine, cosine, tangent, arc sine, arc cosine, arc tangent)
sqrt, abs, int	square root, absolute value, integer
exp, log, ln	10^x, 10er-logarithm, natural logarithm
pi	π (for angles in radian measure)
sqr, pow(x,y)	square, power, x^y (for all $y \geq 0$)

Other predefined variables and functions:

name	function
N	number of measuring values
i	i-th measuring value (i = 0..N)
x	x-axis value in relative time to the first cursor
dx	time interval (distance) between two samples (sampling period)
$poly(x,a,b,...)$	4 grade (max.) polynomial: $ax^4+bx^3+cx^2+dx+e$ (a, b, c, d, e: coefficients); example: $2x^2-7x+5,2 = $ `poly(x,2,-7,5.2)`

- **If using numbers in decimal notation, always use a point (not a comma) to separate the decimals below 1 from the rest of the number.**

- **Use radian measure to indicate angles. Click the "Pi" button for the Greek letter "π" (see above).**

- **2 or 3 grade polynomials are recognized automatically**

5.6.4.2   CHOOSE A SIGNAL

The "Signal" button leads you to the "Select signal" dialog box, where all signals available for calculation are arranged according to measurement file and group name (see "NAME", p. 95), i.e. all signals entirely contained in the cursor range of the active graph display.

If clicking on the plus sign ⊞ next to the folder of the file or group name, all available signals are shown. Another click on the minus sign ⊟ displayed now closes it again.
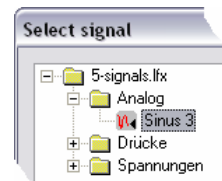
Figure 134

By selecting the desired entry and confirming with OK, the signal will be inserted into the formula.

5.6.5 FFT
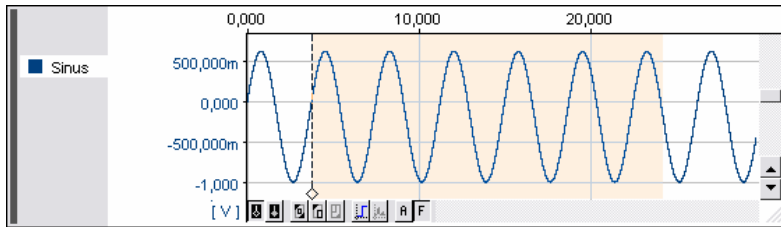
Figure 135

If the white cursor is placed at the beginning of the signal range in the graph display, which the FFT analysis is to be executed for, the "FFT" menu item of the "SIGNALS" menu is displayed.

This command (also context menu of the graph display: "ANALYSIS / FFT" or keyboard: **<ALT>+F**) opens a dialog box where the settings for the FFT analysis can be made.

Click on the "Toggle FFT marker" button (see p. 167) at the bottom of the graph display and the range to be FFT-analyzed will be marked in dark yellow starting at the white-cursor position. An increase of frequency lines will extend this range. If the white cursor is shifted, the range to be analyzed by the FFT is shifted accordingly.

- **The FFT exclusively uses the active signal for analysis.**

- **A calculation can only be executed if the signal is entirely available within this range (for 64 lines at least 128 samples)!**

- **The x-axis of the source signal differs from that of the frequency spectrum. Therefore, their curves cannot be represented in one display.**

5.6.5.1   SETTINGS FOR THE FFT ANALYSIS
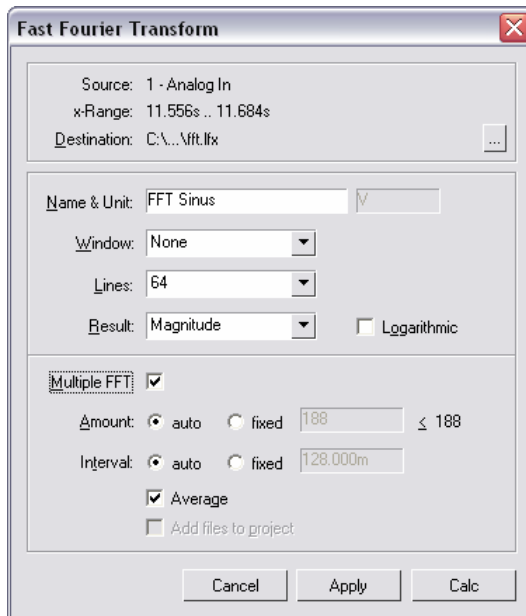
Figure 136

A precise FFT analysis requires the signal range to be analyzed to contain exactly twice the amount of points as the indicated amount of frequency lines.

As it is rather difficult to indicate this number of signal points, **NextView®4** automatically calculates this range according to the frequency lines defined in the "Fast Fourier Transformation" dialog box and shows it by means of the "FFT marker " button.

entry	function
Source:	name of active source signal in the display
x-Range:	time interval starting at the white-cursor position over which the FFT would be executed according to the current settings
Destination:	name and path of the file (`*.lfx`), where there result signal is stored (change with button ⬚ on the right)
Name & Unit:	name and unit of the result signal
Window:	lists available window functions
Lines:	number of values, used to approximate the output signal
Result:	select the FFT output type; if "Logarithm" is activated, the result signal will be represented accordingly
Multiple FFT:	repeated FFT in sections with the same settings (see "MULTIPLE FFT ANALYSIS", p. 190)

For further details on various setting possibilities, please refer to chapter "NOTES FOR FFT ANALYSIS", p. 192.

A click on the "Calculate" button starts the analysis. "Accept" serves to confirm and register the modifications. If, for example, the number of lines is changed, the FFT marker will update its settings.

5.6.5.2   MULTIPLE FFT ANALYSIS

By means of the multiple FFT analysis, the single FFT will be repeated in predefined time intervals starting from the white-cursor position and stopping at the end of the signal or the black-cursor position, if set (see "CURSORS", p. 165).
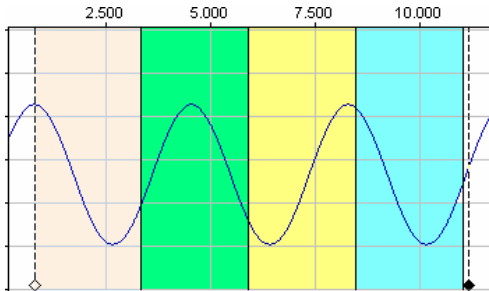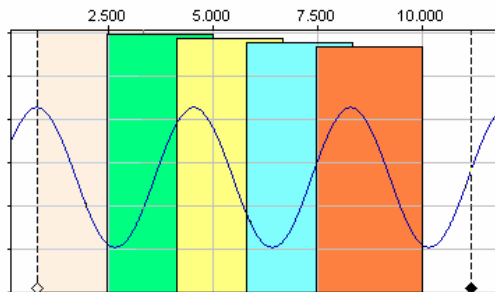
Figure 137

entry	function
Amount:	amount of single analyses • auto: maximum possible number is executed (depends on the defined interval) • fixed: enter number within the maximum possible value
Interval:	interval between the single FFTs • auto: intervals are placed directly one behind the other • fixed: enter width of interval; the intervals may overlay or have gaps between each other
Average:	average of all single FFT analyses is formed and stored in a result file
Add files to project::	if several files are created, they can be loaded automatically into the project

According to the settings for the FFT analysis, the time interval to be analyzed by a single FFT, is automatically calculated by **NextView®4** and displayed by clicking the button "Toggle FFT marker " at the bottom edge of the graph display.

If executing a multiple FFT without averaging, files with sequential numbering are created. They will only be loaded into the project automatically if this option has been checked.

5.6.5.3   NOTES TO FFT ANALYSIS

The FFT (Fast Fourier Transformation) is a specific arithmetic function providing for a faster conversion of a signal in its frequency spectrum. As an example, the computing time for the FFT over 1024 points is less than 1/100th of that for the "normal" Fourier analysis.

Compared to a standard Fourier analysis, for example, the calculating time of an FFT over 1024 samples is less than one hundredth.

5.6.5.3.1   TYPES OF SOURCE SIGNALS

Apart from the number of points, the type of the input signal is a decisive factor for the quality of the FFT analysis. The FFT analysis uses floating-point arithmetic with an accuracy which, for the specified number of points, reduces rounding errors to a minimum.

In most cases, the source signal will be an analog signal acquired by means of a 12 or 14-bit A/D-converter. For analyzing such signals, a so-called quantizing error must be taken into account, irrespective of the scan-time base jitter (deviation from desired scan interval).

Even the most optimal case - only 1 digit being in error - will result in considerable errors in the FFT analysis for small signals.

Therefore, we recommend observance of the following for the acquisition of the relevant signal:

➢   record signal at max. modulation (i.e. use optimum measurement range)

➢   amplify signal externally if necessary

➢   avoid overranging (results in harmonics)

➢   do not use averaging when carrying out data acquisition (bad lowpass filter)

➢   do not store calculated signals as 16-bit values, but use them directly for FFT as floating-point values

5.6.5.3.2 WINDOW FUNCTIONS

As already mentioned, the FFT utilizes the symmetrical properties of the source signal. Correct FFT results require the source signal to be periodic and for one or several signal intervals to be marked. Otherwise, the values supplied by the FFT will be wrong, and a frequency spectrum with many harmonics not contained in the source signal will be generated in addition.

The window functions serve to avoid these problems. They allow you to change the source signal of the selected range in such a way that no jumps will occur. This is achieved by multiplying the values of the selected range with a function, the start and end values of the range remaining constant (mostly 0).

An advantage of these window functions is that no harmonics occur even if the selected range does not cover one of several signal intervals entirely. However, the frequency band will be expanded.

This can be clearly illustrated upon FFT analysis of a simple sine signal. In the case of the Hanning window, the adjacent frequencies are also supplied with signals in the FFT result.

The relevant correction in **NextView®4** provides that in the case of a pure sine signal without window function (or stepped window), the selected range containing one or several signal intervals, the main amplitude corresponds to the peak value of the sine signal.
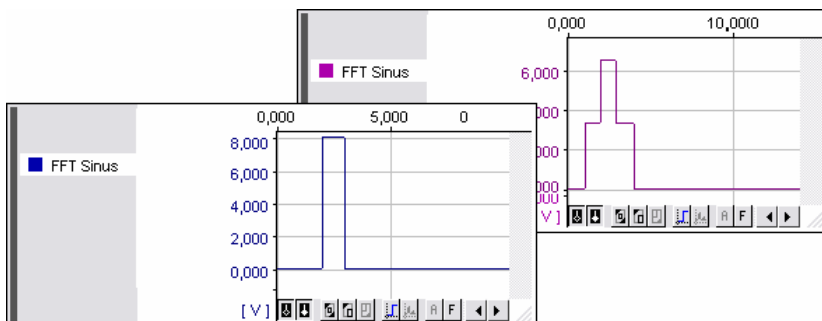
Figure 138

If window functions are used, the amplitude factor cannot be read but must be calculated, by finding the root of the sum of the squares of main amplitude and sidebands:

$$A = \sqrt{\sum A_i^2}$$

A_i: values of main amplitude and sidebands

5.6.5.3.3   RESULT OF THE FFT ANALYSIS

Several output types for the FFT result are available, such as amplitude and logarithmic amplitude, with or without phase. The phase should only be used if the FFT-analysis has been executed without filter function and if a multiple of the basic frequency has been selected. The logarithmic calculation of the FFT (in dB) is scaled in such a way that the measurement range of the output signals (e.g. measurement range 10V) is equivalent to 0dB.

The conversion is done according to the following formula:

$$amplitude = \frac{abs(u-l)}{2} * \frac{10dB}{20}$$

abs: absolute value   u: upper limit   l: lower limit

As the results are always floating point values, it is not necessary to indicate a signal segment. However, in order to be able to display a signal with visual clarity, the lowest and highest measured value is determined during the FFT and stored with an additional 10% serving as a limit of the measurement range. In the case of logarithmic calculation, the measurement range is fixed between -100dB and 10dB.

5.6.6 INTEGRATION
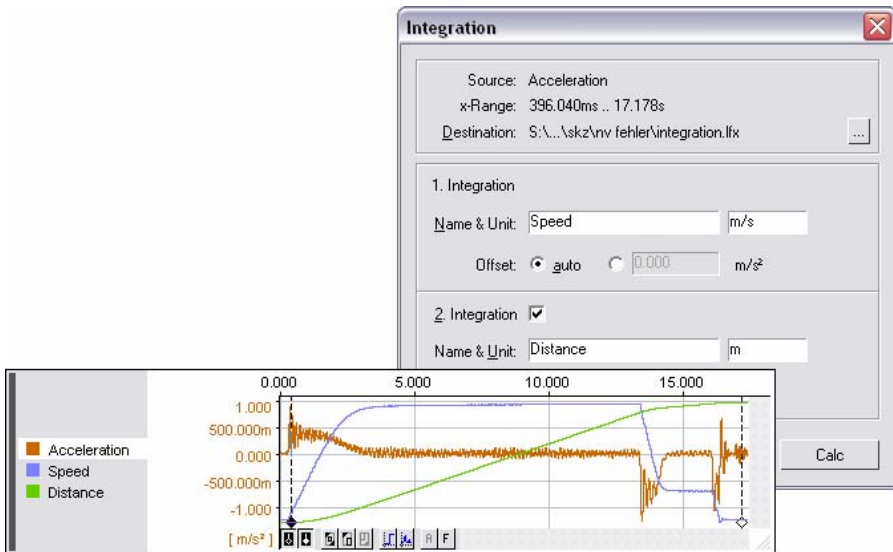
Figure 139

For executing an integration of a signal within the cursor range, the command "INTEGRATE" in the "SIGNALS" menu (also context menu of the graph display: "ANALYSIS / INTEGRATE" or keyboard: **<ALT>+I**) is provided.

entry	function
Source:	name of active source signal in the display
x-Range:	cursor range over which the integration would be executed according to the current settings
Destination:	name and path of the file (***.lfx**), where there result signal is stored (change with button ⬚ on the right)
Name & Unit:	name and unit of the result signal
Offset:	choose between automatic or manually calculated offset
2. Integration:	optionally the second integration can be carried out, too (settings as for the 1. integration)

The following formula is used for calculating the offset k automatically:

$$k = \frac{1}{N} * \sum_{i=1}^{N} x(i)$$

N: number of measured values in the selected range

⊗

If the initial and end values of a result signal are not identical, the automatic offset must be deactivated or entered manually by either using the current initial value as the offset value, or setting the offset to zero (Offset=0V).

The signal to be integrated is then calculated as follows:

$$y(m) = \sum_{i=1}^{m} [(x(i) - k) * \Delta t]$$

y(m): measured value at the position m of the signal to be integrated
x(i): measured value at the position i of the source signal
Δt: scan time (=1/scan frequency)
k: offset

A click on "Calculate" starts the calculation and the result(s) will be represented in the graph display of the source signal.

5.6.7 DIFFERENTIATION
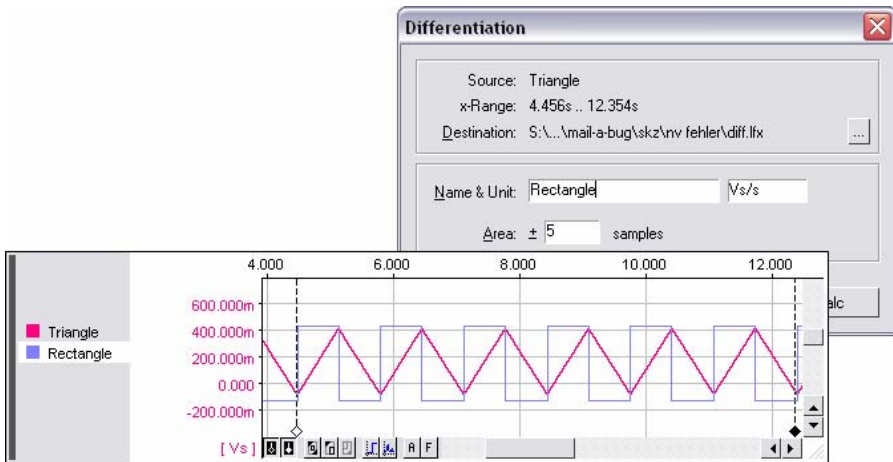
Figure 140

The differentiation of a signal allows to detect changes. The range in the graph display to be analyzed, in which the signal is contained in its entirety, is selected by means of both cursors (see p. 164). The differentiation dialog box is opened via the command "DIFFERENTIATE" in the "SIGNALS" menu (also context menu of the graph display: "ANALYSIS / DIFFERENTIATE" or keyboard: **<ALT>+D**).

entry	function
Source:	name of active source signal in the graph display
x-Range:	cursor range over which the differentiation would be executed according to the current settings
Destination:	name and path of the file (***.lfx**), where there result signal is stored (change with button on the right)
Name & Unit:	name and unit of the result signal
Area:	number of points N for determining the best fit straight line (N=1..1000)

NextView®4 differentiates by means of a best fit straight line, which is placed through N points on the right and left of the point to be differentiated. The pitch of the straight line is the result. The best fit straight line is found by means of the Cramer Rule, using 2N+1 points for calculation.

The pitch of the best fit straight line in point y_i is calculated according to the following formula:

$$y_i = \frac{(2N+1)\sum\limits_{k=i-N}^{i+N} x_k y_k - \sum\limits_{k=i-N}^{i+N} x_k \sum\limits_{k=i-N}^{i+N} y_k}{(2N+1)\sum\limits_{k=i-N}^{i+N} x_k^2 - \left(\sum\limits_{k=i-N}^{i+N} x_k\right)^2}$$

At the right and left margin of the selected range, relatively fewer points are used to determine the mean straight line. For the calculation of the first point to be differentiated, only N+1 points are used, because values outside the cursor range (here: left of the 1. value) cannot be used for calculation.

N=1 indicates that the mean straight value consists of three values, the value of the point to be differentiated and the two values on the right and left of this point.

5.6.8 FILTER
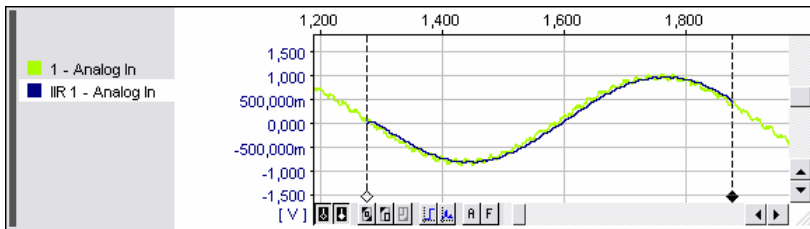
Figure 141

Digital filters provide a simple way of emphasizing desired frequencies or suppressing interference frequencies in a signal.

In the graph display, select the signal range to be analyzed by means of the cursors and open the "FILTER" dialog box from the "SIGNALS" menu (also context menu of the graph display: "ANALYSIS / FILTER" or keyboard: **<ALT>+L**) to execute the settings for digital filters.

5.6.8.1 SETTINGS FOR DIGITAL FILTERS

The small figure illustrates the amplitude-frequency response of the selected filter.
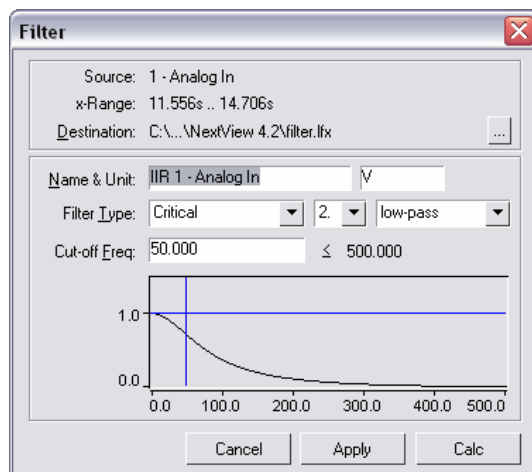
Figure 142

entry	function
Source:	name of active source signal in the graph display
x-Range:	cursor range which the filter would be applied over according to the current settings
Destination:	name and path of the file (`*.lfx`), where there result signal is stored (change with button ▢ on the right)
Name & Unit:	name and unit of the result signal
Filter:	indicate filter type, filter order and filter method
Cut-off frequ.:	set minimum frequency at which filtering is done

In the case of a lowpass or highpass, the filter cut-off frequency serves to set the frequency at which the signal is attenuated by 3dB (factor 0.707). In the "FILTER" dialog box, half of the scan frequency is indicated as the upper limit, which cannot be exceeded. If the values are relatively small, the transient period increases accordingly.

5.6.8.1.1   FILTER TYPE

NextView®4 provides 7 types of digital filters.
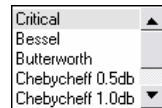
Figure 143

Although the **NextView®4** filters mathematically process the signal, these filters lead to results complying with the respective analog filters. Very much like the analog counterparts, the digital filters show a transient period at the beginning of the signal and a phase shift dependant on the signal frequency.

In addition, the principal restrictions imposed by digital methods of signal processing must be taken into account. As an example, frequencies above half of the scan time cannot be filtered.

5.6.8.1.2 FILTER ORDER

The transient response from the stop range to the pass range should not be confused with the order of filters. The order of filters indicates the extent of attenuation of signals above or below the filter cut-off frequency.

Figure 144

The order is the same for all filter types. Order 4 means an attenuation of 4*6dB per octave. If the frequency is doubled, the signal is attenuated by the factor $10^{4*6/20}$=15.85 .

Values of the order 2 to 8 can be set. The advantage of a filter with a sharp cut-off being selected must be weighed against the disadvantage of the increased transient period which ensues.

5.6.8.1.3 FILTER METHOD

Apart from lowpass (frequency components above the indicated cut-off frequency are attenuated) described in detail in the following chapter, **NextView®4** provides for several methods such as highpass (frequency components below the indicated cut-off frequency are attenuated), bandpass or band stop.
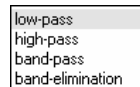
Figure 145

In the case of highpass filtering, stop and pass range are mirrored and all frequencies below the filter cut-off frequency are attenuated. A signal with the same frequency as the filter cut-off frequency is attenuated by 3dB (factor 0.707).

With a bandpass, the signal is led through a low- and a highpass with the same cut-off frequency. The filter is adjusted in such a way that in the case of a sine signal the amplitude is not changed.

A bandstop only blocks the indicated frequency. As in the bandpass, the order is a parameter which allows setting the width of the attenuated or passed frequency band.

5.6.8.2 PROS AND CONS OF THE VARIOUS FILTERS

The following examples demonstrate the properties of the filters from the diagram of the amplitude-frequency response represented in the "FILTER" dialog box and the filter result of a rectangular signal.

The jumps in the signal result from the type of resolution. For the sake of clarity, the signals of the time axis are considerably magnified.

All selected signals are recorded at 2kHz and the filter cut-off frequency is set to 200Hz.

Depending on the desired result, you normally select between a steep transition from pass range to stop range, including ripple content (Tschebyscheff filter) or a slow transition with almost constant amplitude (Butterworth filter).

5.6.8.2.1 CRITICAL DAMPING

The simplest filter shows the flattest transition from pass range (below 200Hz in this case) to stop range. Even with a filter cut-off frequency multiplication factor of 2.5, the signal can clearly be detected

Similar to a physical filter composed of resistor and capacitor, the attenuation already starts with very small frequencies.

If this filter is put on a step response, the transient period will hardly be afflicted with overshoot. In contrast to the filters described in the following, it reaches its final value faster and shows the least tendency to overshoot.
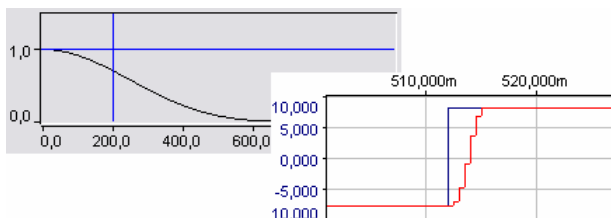
Figure 146

5.6.8.2.2   BESSEL FILTER

Only upon a very close comparison with the critical damping can one recognize a more marked damping of the amplitude following the filter cut-off frequency.

The Bessel lowpass filter is the fastest to settle with a new value after a jump. However, this rapid reaction is compensated for by an overshoot.
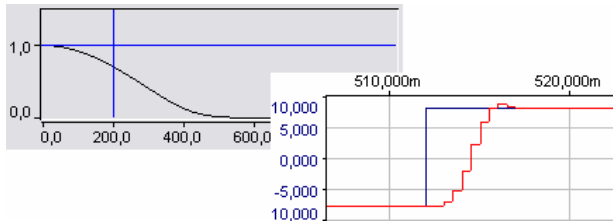
Figure 147

A special feature of the Bessel filter is its perfect square-wave transmission response, i.e. the phase shift in the range of the filter cut-off frequency is proportional to the frequency.

5.6.8.2.3   BUTTERWORTH FILTER

The Butterworth lowpass shows an amplitude-frequency response, which is horizontal at first and makes a sharp bend shortly before the cut-off frequency is reached. In principle, it can be regarded as a special type of Tschebyscheff filter if its ripple content (0.5dB to 3dB can be indicated in this case) is allowed to go to zero.
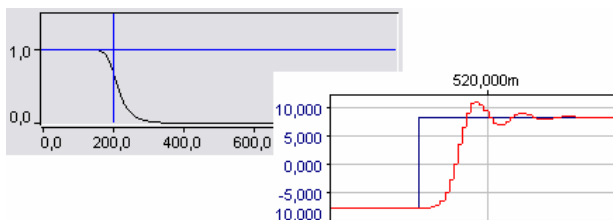
Figure 148

A step response shows a considerable overshoot, tending to increase with the higher order. With a filter of order 8, the overshoot amounts to a nominal 16.3%.

5.6.8.2.4 TSCHEBYSCHEFF FILTER

The gain of a Tschebyscheff filter shows a ripple content in the vicinity of the cut-off frequency, which in this case can be selected from 0.5dB to 3dB. The higher the value, the steeper the transition into the stop range.
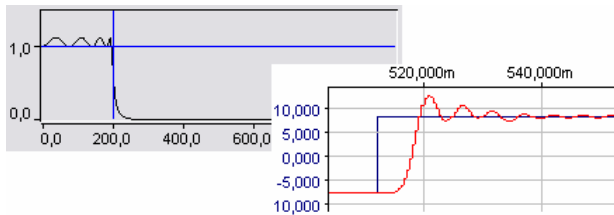
Figure 149

The following overview lists the maximum gain of a signal in the pass range with various Tschebyscheff filters:

ripple content	gain factor
0.5	1.059
1.0	1.122
2.0	1.259
3.0	1.413

The overshoot of a signal is even higher as has been in the case of the Butterworth filter and it also depends on the selected ripple content.

5.6.9 DATA REDUCTION
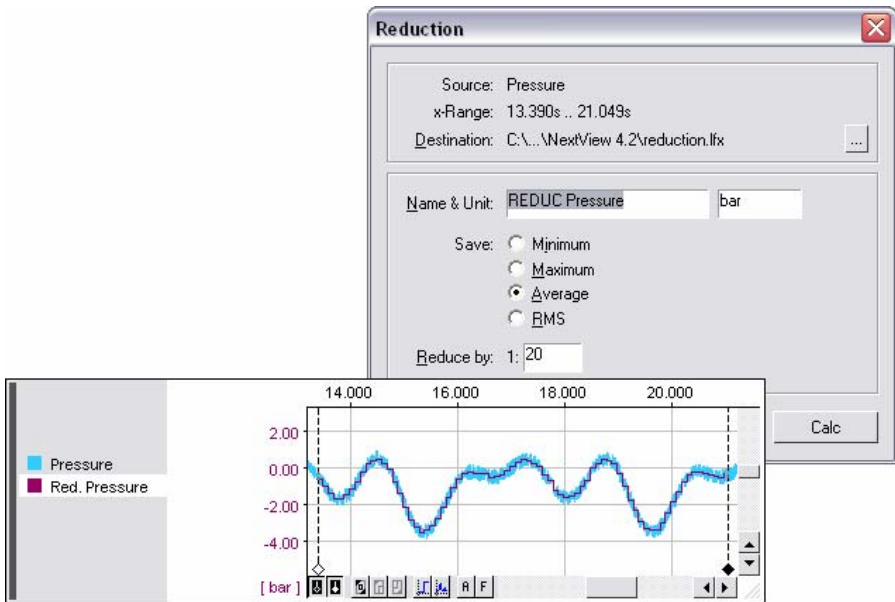
Figure 150

If the overall response of signals with a strong oscillation is more important for analysis than individual peaks, these signals can be smoothed by means of data reduction.

To calculate a reduction signal of the active signal in the graph display within the predefined cursor range, open the command "REDUCE" from the "SIGNALS" menu (also context menu of the graph display: "ANALYSIS / REDUCE" or keyboard: **<ALT>+R**).

entry	function
Source:	name of active source signal in the display
x-Range:	cursor range over which the reduction would be executed according to the current settings
Destination:	name and path of the file (***.lfx**), where there result signal is stored (change with button ▫ on the right)
Name & Unit:	name and unit of the result signal
Save:	select the way of reducing data: minimum, maximum, average or RMS) of N (see below) values is saved in intervals
Reduce by:	the reduction rate 1:N defines how many values N are combined in one value (N=1..1000).

In this process, the measured values of individual intervals are combined to form one storage value each on the basis of the defined criteria. The result is a considerable reduction of the storage space the signal would usually require.

5.6.10 REPEAT LAST ANALYSIS

This command reapplies the last analysis function, which has been carried out in the active graph display to a selected signal of that display within the cursor range (also context menu of the graph display: "ANALYSIS / REPEAT LAST ANALYSIS" or keyboard: **<CTRL>+A**) using the same parameters as before.

This means that the same analysis task can be applied to many signals in a very fast and comfortable way. For example, frequency spectra of different signals directly can be viewed and compared.
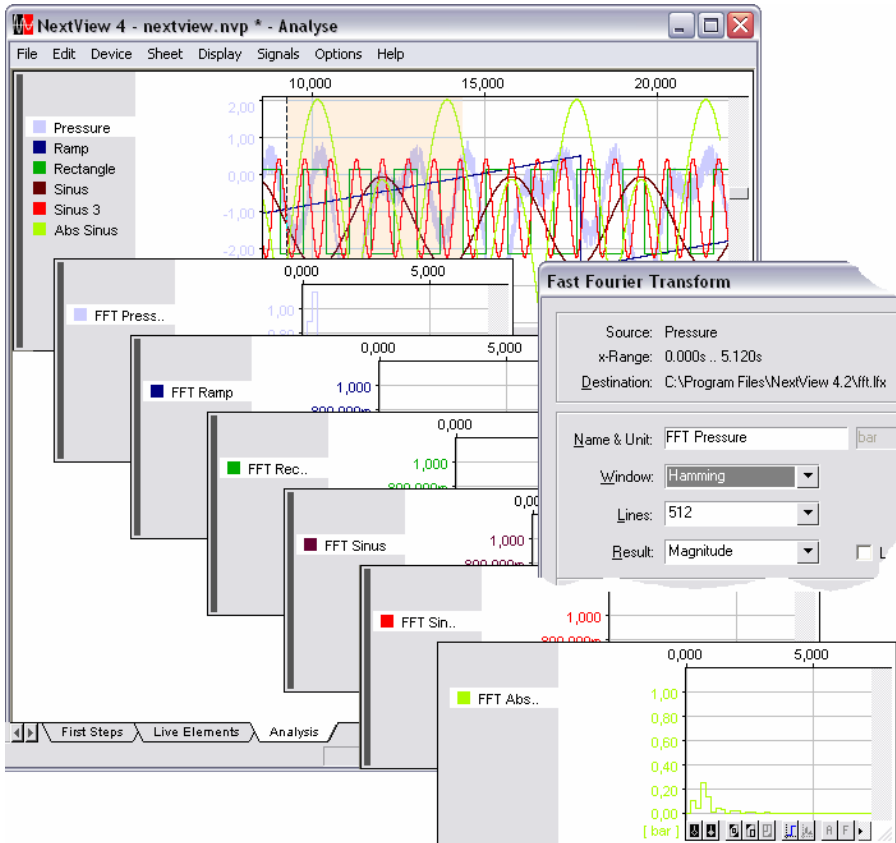
Figure 151

If the name of the resulting signal includes the name of the original signal, it will also be updated when repeating the analysis. One example: You are making an FFT analysis for a signal named "Sinus" and you call the resulting signal "FFT Sinus". So when repeating the FFT, the resulting signal of the signal "Rectangle" will be "FFT Rectangle" now. Besides the better overview, another advantage is that the resulting files are not overwritten by the following ones.

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- **The command can also be opened clicking the button 🅰 (see "GRAPH DISPLAY: BUTTONS", p. 164) at the bottom of the graph display.**

- **The analysis functions are always stored for each display separately and are kept when saving a project so that when opening the project the last analysis function carried out in a display can be applied to the active signal of this display with the same settings.**

5.6.11　SETUP BATCH JOB

A batch job is a function to apply an analysis task with the same parameters to all or several selected signals of a display at the same time. In many different types of applications, the batch job is advantageous (see "BATCH JOB: TYPICAL APPLICATIONS", p. 213). Especially for repeating measurements the batch job offers great advantages, as processing analysis functions can automatically be started and printed at the end of a scan or when replacing a measuring file.

A batch job is always stored for each display separately. So if you set up a different analysis task for each graph display, you can automate multiple analysis functions processing a signal step by step.

If you set up several batch jobs on a sheet, they are numbered and carried out in this order. The numbering of the batch jobs depends on the order the graph displays have been inserted in the sheet.

Always the last batch job with its settings is stored for each display separately and is still available when restarting the project.

5.6.11.1　SETTINGS FOR THE BATCH JOB

All parameters to execute a batch job in the active graph display are specified in the "SETUP BATCH JOB" dialog box (menu "SIGNALS" or context menu of the graph display).

The command is only selectable if a graph display has been activated displaying one signal at least and if the cursors have been set within the signal range to be analyzed. At least the active signal must be completely within the cursor range.
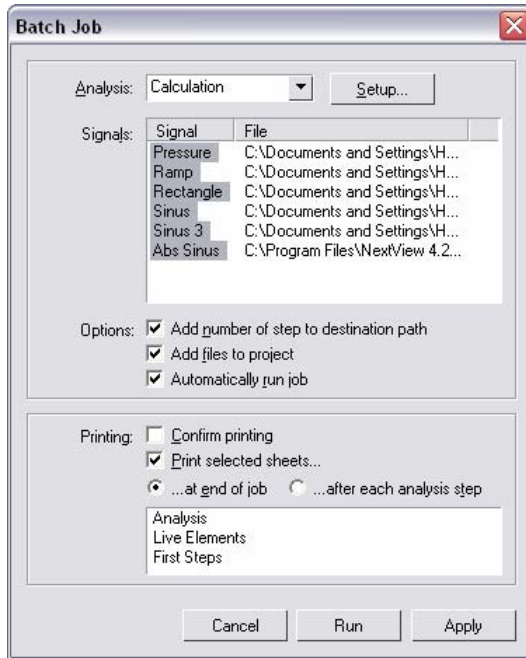
Figure 152

entry	function
Analysis:	select analysis function
Signals:	list of all signals contained in the graph display: mark the signals to be integrated in the analysis
Options:	choose various additional options (see "BATCH JOB OPTIONS", p. 211)
Printing:	if you want to "print selected sheets", further printing options become active so that the sheets to be printed can be selected in the white field below and other settings can be made

Clicking the button "Cancel" closes the dialog box without changing anything. "Apply" saves the settings, and with the button "Run", the batch job will be applied to the selected signals of the graph display.

5.6.11.1.1 SETTINGS FOR ANALYSIS

Open the list of functions by clicking on the arrow button and select the analysis function (calculation, FFT, integration, differentiation, filter, data reduction) to be used for the batch job.
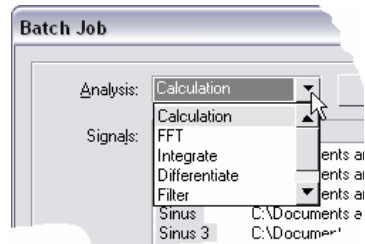
Figure 153

Press the "Setup..." to open the respective dialog box, where all necessary parameters of the analysis function are entered. All settings are stored when clicking on the button "Apply".

If the file name of the original (active) signal in the display is part of the name of the resulting signal during the analysis setup, it will be updated for each resulting signal respectively. For example, if you apply an FFT on the signal "Sinus" and you name the resulting signal "FFT Sinus", the resulting signal of the signal "Rectangle" of the same display will be called "FFT Rectangle" (see Figure 151).

5.6.11.1.2 SELECT SIGNAL

In the white field of the item "Signals", all signal files of the graph display are listed with their signal names, file names and path. Here the signals to be integrated in the analysis function are selected.
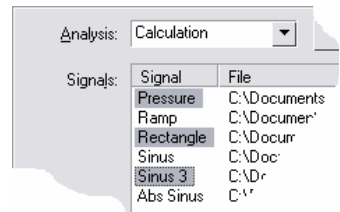
Figure 154

event	function
mouse click on signal name:	selection of an individual signal (keyboard: ↑ ↓)
\<**CTRL**\> + mouse click:	selection of several individual signals
\<**SHIFT**\> + mouse click:	selection of all signals, located between two clicked signals
draw a rectangle with mouse button pressed	selection of several adjacent signals

If continuing with the settings for the batch job, the marked signals are highlighted (see Figure 154).

The signals to be analyzed must be completely within the cursor range.

5.6.11.1.3   BATCH JOB OPTIONS

entry	function
Add number of step to destination path:	sequential numbering for file names, given when making the settings for analysis
Add files to project:	open result file after each batch job in the project and show it in the graph display of the source signal (exception: FFT analysis, because x-axes are different)
Automatically run job:	batch job is repeated automatically at the end of a scan or partial scan of a multi-scan, or when replacing a measurement file in the project (see "OPEN / SAVE SIGNAL FILES", p. 67)

If analyzing several signals of a display, the sequential numbering is highly recommended, because otherwise each result signal which has just been calculated would be overwritten by the next one and only the last signal of the batch job would be kept.

Figure 155

- **If only one of the numbered result files is opened in the project (uncheck 2. option!), the displayed signal can be replaced directly in the graph display (see "OPEN / SAVE SIGNAL FILES", p. 67) with the shortcut <CTRL>+<+> or <CTRL>+<−> (use numeric keypad!).**

- **Turning off the sequential numbering to save disk space is only recommended if the result files are printed automatically after each analysis step (see "PRINT BATCH JOB", p. 212).**

5.6.11.1.4   PRINT BATCH JOB

Using the batch job function enables you to print selected sheets at the end of a batch job or after each analysis step.

If you mark the option "Print selected sheets...", the rest of the grayed-out settings become active. The selection of sheets to be printed is executed in the same way as the selection of signals as described before (see "SELECT SIGNAL", p. 210).

We recommend printing "after each analysis step" if the result file has not been consecutively numbered (see "BATCH JOB OPTIONS", p. 211).

The option "Confirm printing" gives you the chance to choose whether you really want to print the result files before the batch job starts. This is especially useful for testing purposes.

5.6.11.2   BATCH JOB: TYPICAL APPLICATIONS

The batch job is a very complex function, which you certainly need some experience for, but which includes many advantages and conveniences. Especially for repeating processes it can save a lot of manual single steps. When setting up a batch job, always run a test first. We shortly summarized the following typical applications

➢ **Analysis of several signals**

   You want to apply an analysis function to several signals with the same settings: If you do not want to select the signal and start the analysis command for each signal separately, insert all signals in a graph display and setup a batch job. Add a sequential number to the files so that no resulting signal is overwritten.

➢ **Repeated analysis**

   A signal is processed step by step: Insert several graph displays on the sheet including the original signal in the first display and in the others always the resulting signal of the previous analysis. If the automatic run of the batch job is selected, the analysis chain is processed step by step when the original signal is replaced.

➢ **Automatic printing**

   You want to commit everything on paper: Choosing the entry "Print selected sheets..." in the batch job setup dialog box and then the option "after each analysis step", documents all changes. Even automatic printing of files that have just been scanned can be realized: Just setup a batch job making a calculation of the original signal, e.g. 'signal'+0. As soon as a scan writing in the same measurement file (e.g. `latest.lfx`, see "FILE", p. 90) is finished, the result will be printed.

➢ **Automatic analysis after a scan (also multi-scan) or when replacing a measurement file**

   You make long-term measurements or test. The analysis processes are always the same, yet the original signal changes. This process can be perfectly automated using the batch job function. Selecting the option "Automatically run batch job" makes an analysis as soon as the original signal changes. Add a number to the resulting files so that signals will not be overwritten.

5.6.12   RUN BATCH JOB

This command from the "SIGNALS" menu starts the batch job (see "SETUP BATCH JOB", p. 208) setup for the active graph display (also context menu of the graph display: "ANALYSIS / RUN BATCH JOB" or keyboard: **<CTRL>+B**). Before it can be started, the respective graph display has to be selected first and the white cursor (for FFT analysis) must have been set at least.

The setup of a batch job is always saved for each display separately and is kept when saving a project so that when opening the project a batch job can be restarted.

5.7 OPTIONS

This menu provides special display, operating and project options as well as possibilities to change version and measuring hardware.
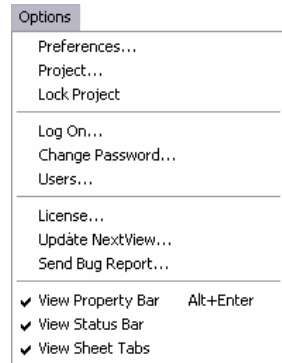
Figure 156

5.7.1 COMMANDS OF THE MENU "OPTIONS"

command	function
preferences	selection of specific dialog and print settings, frame settings
project	selection of specific project options
lock project	restricts the access rights of the project to read-only
license	lists the installed **NextView®4** version and add-on modules inclusively serial number
update NextView®	free installation of the latest **NextView®4** versions (updates) via internet
send bug report	send error messages via e-mail to bmcm
view...	show/hide property bar, status bar or sheet tabs

5.7.2 PREFERENCES

This command allows **NextView®4** users to set their specific preferences.

5.7.2.1   GENERAL OPTIONS
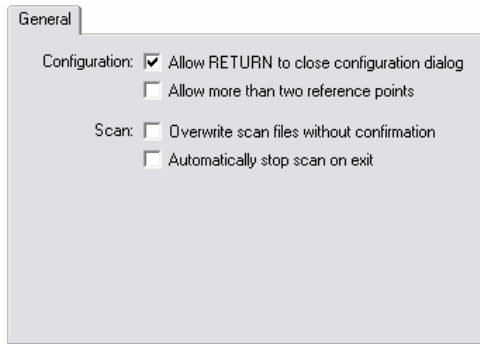
Figure 157

In tab "GENERAL" you will find options for using the "DEVICE CONFIGURA-TION" dialog for example.

entry	function
Allow RETURN to close configuration dialog	uncheck option to prevent the configurations made in the "DEVICE CONFIGURATION" dialog box from being stored rashly; in this case operation only by pressing the buttons (OK", "Apply", "Cancel")
Allow more than two reference points	To convert voltages of an input into measuring values, several reference points can be used. If this option is selected, tab "INPUT" (see p. 97) is adjusted accordingly.
Overwrite scan files without confirmation	If this option is selected, the additional prompt is left out to confirm the overwriting of the existing file. You should only choose this option if there is no danger of unintended overwriting and loss of measuring data.
Automatically stop scan on exit	Leaves out the additional prompt to confirm the scan stop when closing **NextView®4**. This option is required for PC systems without any equipment for input or visualization used for scans only. Make sure that there is no danger of unintended loss of measuring data.

5.7.2.2   PRINTING OPTIONS

Sheets or displays can be printed with a frame to illustrate analysis individually and conform to your requirements.

Therefore, a graphics with **`*.emf`** file format has to be loaded.
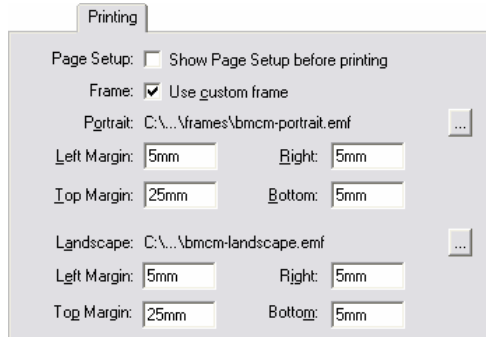
Figure 158

entry	function
Page setup:	if you need to adjust the header before each print-out, optionally open page setup automatically before printing
Frame:	optionally use a graphics to add an individually created frame into the print-out
Portrait / Landscape:	name and path of the graphics file (**`*.emf`**) in portrait or landscape orientation used as a frame in the print-out (change with button ⬚ on the right)
Margins:	inserts internal margin between the outside margin of the **`emf-`**graphics and the displays to be printed (settings become active when choosing the "frame" option)

❗

- **Always choose the same orientation (portrait or landscape) as declared in the "PAGE SETUP" dialog box. Otherwise, the frame might not be displayed with the correct aspect ratio.**

- **To print a frame, the option "No frame" must be unchecked in the "PAGE SETUP" dialog box (see p. 81)!**

- **You can show or look over the print result in advance by means of the print preview.**

5.7.3 PROJECT OPTIONS

entry	function
Configuration:	optionally save / load settings of the "DEVICE CONFIGURATION" dialog box when saving / opening a project
Special access:	assign special access rights to the project, e.g. block the "DEVICE CONFIGURATION" dialog box

If, when a project is stored, the configuration is saved together with the project, **NextView®4** will additionally create a configuration file (*.nvc) in the same directory as the project file (***.nvp**). This file will contain all data relating to the device configuration.

A project can be protected individually against unauthorized access or changes by selecting or unchecking the desired special rights.

5.7.4 LOCK PROJECT

If this option is activated, no modifications can be made in the program. Access is restricted to read-only.

If a project is locked, the property bar on the left is hidden, too. If you then unlock the project again, the property bar has to be opened via the relating command from the "OPTIONS" menu (keyboard: `<ALT>+↵`).

5.7.5 LICENSE
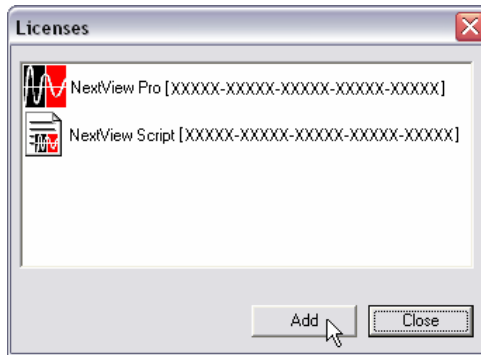
Figure 159

Choosing this command from the "OPTIONS" menu opens a window, that shows the installed **NextView®4** version (see "NEXTVIEW®4 VERSIONS", p. 13).

Installed add-on modules, such as **NextView®4 Script** for example, are listed, too so that you can check if the installation was successful. In addition, the relating license numbers are displayed.

To change to another **NextView®4** version (e.g. Lite, Pro, Analysis) or to install add-on modules (e.g. **NextView®4 Script**) press "Add". Enter the new serial number in the "LICENSING" (see p. 20) received at purchase of the software to request the license number for this PC.

Reinstalling is not necessary. All projects, measuring files and setting created until now (also with the 30-day trial) can still be used.

5.7.6 UPDATE NEXTVIEW®

Visit the download area of the bmcm website at http://www.bmcm.de to install free updates of **NextView®4**.

5.7.7 SEND BUG REPORT

"Nobody is perfect!" and because of its bugs software is lifelike. Make use of the direct line to bmcm by reporting bugs or other annoying things via e-mail so that **NextView®4** will improve more and more.

5.7.8 VIEW...

The options in the lower section of the "OPTIONS" menu serve to activate/deactivate various elements of the user-interface, such as the property bar, the status bar and the sheet as a tab of a register card. If an entry is checkmarked ✔, this option will be displayed on the screen.

5.8   HELP

In the truest sense of the word, this menu item is meant to be a help to you.

From here, you can open the PDF help file of **NextView®4**. The Adober Reader must be installed. The help file provides central and useful information.
.
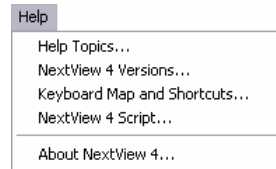
Figure 160

The **NextView®4 help is started by pressing the function key `F1`. It can be accessed from any display or operating element (dialog box, register card, display etc.) and offers support with your current problems.**

5.8.1 HELP TOPICS

Select this item to open the PDF help file of **NextView®4** (keyboard: function key `F1`).

5.8.2 NEXTVIEW®4 VERSIONS

This chapter of the PDF help gives an overview of the features/functions of the versions of **NextView®4** as described in the chapter of the same name.

5.8.3 KEYBOARD MAP AND SHORTCUTS

To make life easier: Use the reference for key assignment and shortcuts in **NextView®4**.

5.8.4 NEXTVIEW®4 SCRIPT

This menu item opens the PDF help of the add-on option **NextView®4 Script** (for charge). The BASIC-like script language allows to automate processes or to realize individual applications. In case of alarm, for example, an programmed event can be set off.

With the Script Editor being open, a HTML help will open by pressing the function key F1.

5.8.5 ABOUT NEXTVIEW®4

A **NextView®4** welcome dialog box will be displayed, providing additional information, such as the current version number and the license number indicated upon installation.

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