

The logo features the text "DIANA 5" in a bold, yellow, 3D block font. The letters are set against a blue rectangular background that has a subtle radial gradient, with the lightest part in the center. The 3D effect is achieved by having the letters cast soft shadows onto the blue background.

DIANA 5

**Diagnosis and Analysis System
Reference Manual**

Preface

February 2002

Dear user of DIANA5

Thank you very much, that you selected DIANA5. This manual and the integrated online help will assist you for understanding this program. The focus of the documentation is this manual. Here you can find all important and less important things about DIANA5. You will also find a quick start chapter. DIANA5 is completely new code, so if you are DIANA4 user, you will also need some time to get used to it.

We always try to offer you the most innovative technology of measuring and analysis systems. We would like to encourage you, to give us comments and proposals about DIANA and this manual. Your feedback is very important to us. Please contact our DIANA5 homepage on the *VOITH intranet*

<http://andoku/diana>

Or send us an email to:

Thomas.Schoenhaar@voith.com

In urgent cases, you can reach me at Tel. 07321/37-8525

Best regards

Thomas Schoenhaar

(Product design, development and documentation)

Contents

1	INTRODUCTION	5
1.1	INSTALLATION OF DIANA5	5
1.2	INTEGRATED HELP	6
1.3	CONTENTS OF A DIANA5 MEASUREMENT FILE	6
1.4	ELECTRONIC CONTROL UNITS AND MEASURING DEVICES	6
1.5	SUPPORTED FILE TYPES	6
1.6	NUMBER INPUT	7
2	PROGRAM PROPERTIES	8
2.1	REGISTRATION	8
2.2	DIRECTORIES	9
2.3	RECORDING	9
2.4	PLC PROPERTIES	11
2.5	PANEL	11
2.6	ANALYZER	12
3	RECORDER	14
3.1	START A NEW MEASUREMENT	14
3.2	CONTINUE A MEASUREMENT FILE	15
3.3	RECORDING	16
3.4	MARKER	16
3.5	TRIGGER LIST	17
3.5.1	<i>Trigger Properties</i>	18
3.5.2	<i>Trigger Conditions</i>	18
3.6	CONTROL SIGNALS	20
3.6.1	<i>Switch</i>	20
3.6.2	<i>Slider</i>	20
3.6.3	<i>Knob</i>	20
3.7	MEASURING DEVICE MONITOR (DIANA5 EDITION ONLY)	21
3.8	PLAYBACK	21
3.9	RECORDING DETAILS AND ECUVIEWER	21
3.10	NETWORK FUNCTIONS	22
3.10.1	<i>Monitoring a record</i>	23
3.10.2	<i>Direct connection</i>	23
4	ANALYZER	24
4.1	GRAPHIC VIEW	25
4.1.1	<i>The Mouse Mode</i>	25
4.1.1.1	Measure data	25
4.1.1.2	Measure difference	25
4.1.1.3	Hyper Zoom	25
4.1.1.4	X-Axis Zoom	25
4.1.1.5	X/Y-Axis Zoom	25
4.1.1.6	Insert Marker	26
4.1.1.7	Insert Signal Marker	26
4.1.1.8	Focus Table	26
4.1.1.9	Workspace	26
4.1.1.10	Delete Data	26
4.1.2	<i>Zoom Functions</i>	26
4.1.3	<i>Assign X-Axis</i>	26
4.1.4	<i>Hold Graphic</i>	26
4.2	TABLE VIEW	27
4.2.1	<i>Sorting</i>	27
4.2.2	<i>Table Filter</i>	27
4.2.3	<i>Export Table</i>	28

4.2.4	Time Statistics.....	28
4.2.5	Symbol Inspector	28
4.2.6	Signal Statistics	29
4.2.7	Signal Distribution	29
4.2.8	Differentiate Signal	29
4.2.9	Integrate Signal	29
4.2.10	Smooth Signal	29
4.3	SIGNAL BROWSER	30
4.3.1	Delete Signals and Tables	30
4.3.2	Add Alias Signal	31
4.4	SIGNAL PROPERTIES	32
4.4.1	Global Settings	32
4.4.2	Signal Format.....	33
4.4.3	Signal Converter.....	34
4.5	COMMON FUNCTIONS.....	35
4.5.1	Workspace	35
4.5.2	Diagram Wizard	36
4.5.3	Combine Signals.....	36
4.5.4	CAN Message Wizard.....	36
4.5.5	Screen Sets.....	37
4.5.6	Analyzer Signal Properties.....	37
4.5.7	Delete Measurement Data	38
4.5.8	Operation Data Difference	38
4.5.9	BASPVviewer	38
5	FILE EXPLORER	40
6	ECUVIEWER.....	41
7	NAVIGATOR.....	42
8	INFORMATION ABOUT DIANA5 MEASUREMENT DEVICES.....	43
8.1	ELECTRONIC CONTROL UNIT E200 AND E300	43
8.2	SOFTING CANCARD	43
8.3	NATIONAL INSTRUMENTS A/D BOARDS.....	43
8.4	QUATECH A/D BOARDS	43
8.5	INTERSEMA AIR PRESSURE SENSOR	43
8.6	GPS RECEIVER.....	43
9	GLOSSARY.....	44

1 Introduction

DIANA (**D**iagnosis- and **A**nalysis system) is a PC program for recording and analysing measurement data. The main purpose was for recording DIWA.3 transmission. However, there are a number of special extensions available that allow the program to be used in many applications. The newest generation of DIANA can be used with any of the following Windows formats: 95, 98, ME, NT, 2000 and XP.

1.1 Installation of DIANA5

If you already have an older version of DIANA5, you will first have to remove this version, before you can install the new one. Please note, your personal settings, measurements and template files will not be deleted. When you run the DIANA5 installer, you will have two different installation methods :

- **Edition** includes all programs
- **Lite** only includes the Recorder

After the installation, you should see a new program group in the start menu, called DIANA5:

Program	Description	Lite
Recorder	Program to record measurements	X
Analyzer	Program to analyse measurements	
TED	Editor to create and modify recording templates	
FileExplorer	Search program to find measurement files on your hard disk	
VarSpy	Variable editor to investigate ECU variables	
ECUViewer	Identify connected control units	X
Navigator	DIANA5 Quick Launch Tool	
MemTool	E200 loading tool for software and dataset	
TestCenter	A program to run special test scripts	
Documents	DIANA5 reference manual	X
Remove DIANA5	Remove DIANA5 from your PC	X

Before you can use DIANA, you have to register your copy. This procedure will be explained in the chapter about the set up.

Attention !

For the installation of DIANA5 on a Windows NT/2000/XP machine, it might be necessary to have administrator rights.

If you install DIANA5 Edition, you will see a new icon in the Windows system tray. This will help you to start the DIANA5 programs very easily.

Another possibility is the installation of Voith Diwagnosis 3.2. With this package, you will also get the DIANA5 Recorder.

After installing DIANA5 Edition or Lite, you will also find a beta version of the new **PocketDIANA** in the DIANA5 program directory. This special version of DIANA5 can be installed on a Pocket PC with Windows Mobile 2003.

1.2 Integrated help

DIANA5 has an integrated help system. Here you will only find a very short description about the related function. You can call it in the help menu or with the F1-Key

1.3 Contents of a DIANA5 measurement file

A measurement file contains signals that are arranged in one or more tables. These tables are then assigned to one or more measuring devices.

A signal represents a measurement quantity and includes important settings about the quantity. Settings for the measurement devices and the visualisation during the record are also stored to this file. If you record a control unit the identification, adaptation, and operation data can also be included. Other features that are included in the program are a marker and event list along with user data and screen set information that is stored in the file.

The difference between a measurement and a template is, only the measurement file contains measurement data.

1.4 Electronic control units and measuring devices

The easiest way to make a DIANA recording is to connect the electronic control unit to the serial port of your PC and start the DIANA recorder. In this case, the sensors and program variables of the control unit will be used as a virtual measurement device. For the connection, you simply need a special level converter, which is supported by VOITH.

DIANA5 supports the following VOITH transmission and retarder control units:

- E200/H4 (DIWA.3, DIWA.2)
- E200/H5 (DIWA.3, DIWA.3E, ELVO)
- E300 (DIWA.5, NPU)
- VERA (Retarder, reduced DIANA support)
- DigiProp (Retarder, reduced DIANA support)

DIANA5 supports the following measuring devices:

- Quatech A/D Boards (DAQP-12, DAQP-16, DAQ-1602PCI)
- National Instruments A/D Boards (AI-16XE-50, NI 6034)
- Softing PCMCIA CANCard and CANusb
- GPS Receiver (NMEA compatible)
- Intersema air pressure sensor (via LPT1)
- Programmable Logic Controller (PLC)
- IRMA Passenger Counting System

With DIANA it is possible to use all measuring devices at the same time.

1.5 Supported file types

The following table contains all file types, which DIANA5 can handle.

File type	Contence	Opened with	Write
d5m	DIANA5 measuring file	Analyzer	Yes
d5t	DIANA5 measuring template	Recorder	Yes
d5v	DIANA5 variable file	VarSpy	Yes
dmf	DIANA4 measuring file	Analyzer (nur lesen)	No
d2d	DIWAGNOSIS measuring file	Analyzer (nur lesen)	No
dcf	DIANA4 CAN measuring file	Keine	No
hex	Hex-File, E200-Software	MemTool	Yes
cod	E200-daaset file	MemTool	No

1.6 Number input

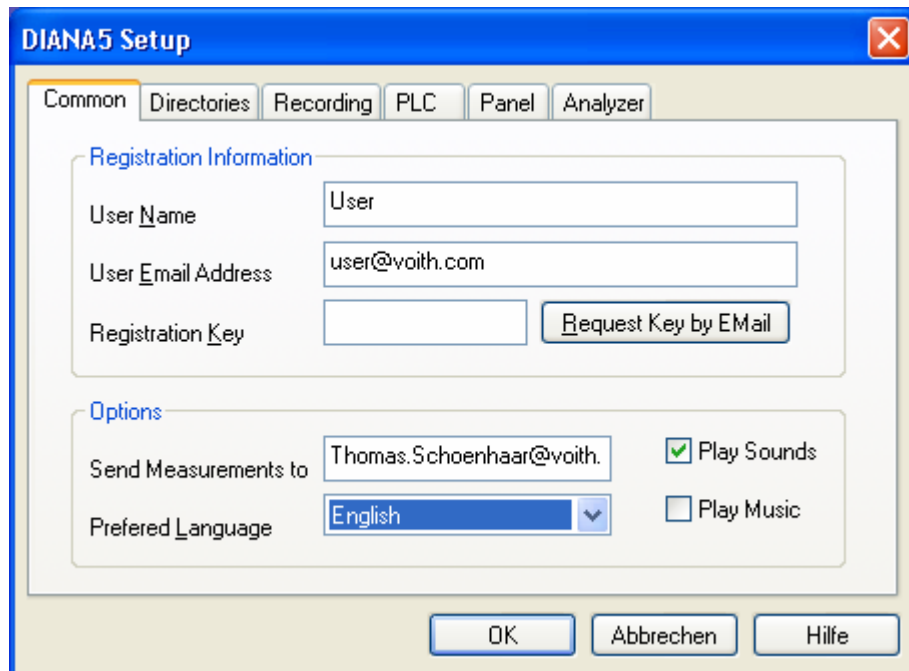
If DIANA5 asks you for entering numeric data, you can use either decimal or hexadecimal numbers. If you choose to use a hexadecimal number, add a "h" at the end of the number. If your hexadecimal number contains a character between "A" and "F", you can omit the "h". Lower and uppercase characters are ignored.

2 Program Properties

To customize or register DIANA5, you have to call the function Program Properties in the File menu. If DIANA5 is not registered, this window will be opened automatically. All your personal settings will be saved to the file "DIANA5.INI", which is placed in the DIANA5 program directory. Since this file won't be deleted during uninstalling DIANA5, you will keep your settings when you install the newer DIANA5 version. In the unlikely event of a strange behaviour of DIANA5, you could delete this file and DIANA5 will automatically create a new "ini" file.

2.1 Registration

When you install DIANA5 Edition for the first time on your PC, you have to register the program. There is no need to register a DIANA Lite version. The first page of the program properties dialog contains all important input fields.



The field *User name* should contain your name or a short name. You *must* also enter an **Email Address**. If you do not have an own email address, you should use a pseudo email address. If your PC is connected to the internet, you can now click on the **Request Key** button. This will generate and send an email to Voith Heidenheim. After a short time you will receive an email, which contains your personal registration key. This key must be copied to the corresponding input field. By pressing the **OK** button, the registration is ready. Note, that depending on your registration key, some functions of DIANA5 still might be locked i.e. access limited. If you have no internet connection, you should contact us by mail, telephone or telefax. In this case, we need to know your name and a pseudo email address.

This page also contains the field **Send measurements**. Here you can enter an email address of a special recipient. The Recorder and Analyzer have a function for sending an email directly to this address.

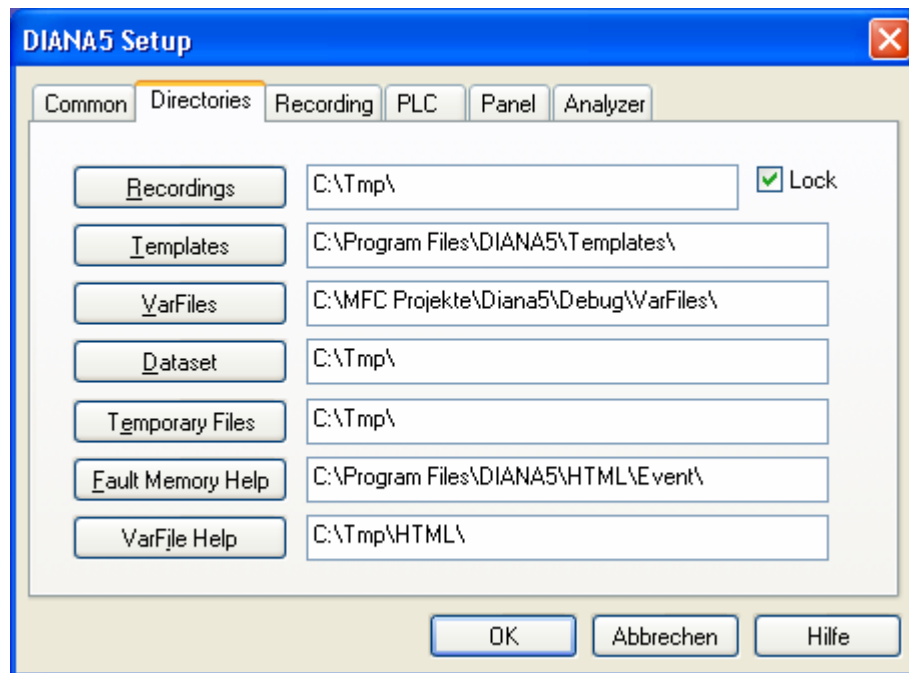
With *Language* you can choose your own language. DIANA5 is now able to translate signal names of foreign DIANA5 measurement files to your language.

With **Play Sounds** you can activate special sound effects of DIANA5. **Play Music** enables playing back of

music during software downloads to an ECU.

2.2 Directories

On this page you can choose the different working directories of DIANA5.



All new recordings will be saved to the **Recording Directory**.

The **Template Directory** contains the user measurement templates.

The **VarFile-Directory** contains the variable files, which are needed by the VarSpy of DIANA5.

Some functions of the Analyzer and the VarSpy need the dataset of the ECU. The **Dataset Directory** should contain these files.

In some cases, DIANA5 creates a text file which contains data like the **ECU Identification or operation data**.

These files are always **stored in the Temporary Directory**.

Normally the last recording directory will be memorised. To avoid this, you can select **Lock Recording Directory**. In this case, you will always be returned to the original recording directory.

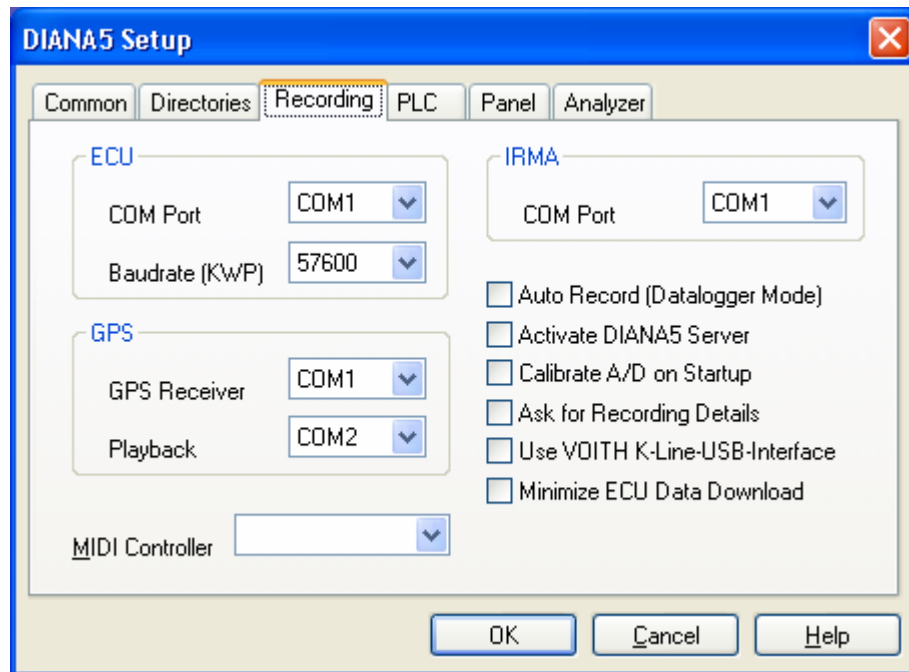
The directories **Fault Memory Help** and **VarFile Help** are used, to define the location of the corresponding Voith Aladin HTML files.

2.3 Recording

This page contains the important settings that are needed for taking measurements.

The **E200/E300-COM-Port** defines the serial communication port of the PC where the ECU is connected to. Instead of using a COM port, you can also select **Network** to access the ECU via network connection to a DIANA5 server.

If you are using an E300, you can also change the baudrate of the serial communication. In this case, you will get a higher sampling rate for your measurement. **WARNING**, in some cases higher baudrates will lead to communication errors.



If you want to make GPS measurements, you must select the corresponding serial port in the field **GPS-Receiver**.

The field **Playback** allows you to select a serial port, where the DIANA5 Recorder (only during Playback) and Analyzer behaves like a GPS receiver and transmits GPS data. This data could be received and displayed by a Map & Guide program like Microsoft Autoroute. If you don't need this feature, you should set this to **off**. The function **Enable Record on Set Marker** starts the recording, when you enter a marker during "record standby" or "wait for trigger" Mode.

DIANA5 uses the MIDI-port for simulating data manually on the CAN bus. You can connect a special MIDI controller with knobs and sliders to your PC or if your PC has no MIDI port, you could use a USB to MIDI converter. To use this function you have to select the desired **MIDI controller device**. With **TED**, you can assign the knobs and fader of this controller to special CAN signals or ECU variables.

When you activate **Calibrate A/D on Startup**, DIANA5 will calibrate the A/D converter each time you start the DIANA5 Recorder. This should only be done after the system has been operating for at least 15 minutes to avoid temperature problems. Quatech cards do not have this feature so under normal circumstances, you do not need to activate this function.

Auto Record is intended to directly start a recording, when a template is loaded. You can use this function to start a recording, when the computer is switched on. ECU recordings will also start a new measurement file, when the communication is interrupted for more than 1 minute. The function **AutoRecord** has the following functionality :

- The Recorder will try to start the communication without any timeout. You can only stop this process with the ESC key or by exiting the program.
- When a template is loaded, the Recorder will immediately switch to recording mode. The standby mode will be ignored.
- When the measurement is interrupted more than 1 minute, a new measurement file will be started.
- On saving a measurement file, no dialog box will be displayed.
- The measurement will be saved, when the program is terminated.

If you want to access the DIANA5 Recorder via a network connection, you must enable **Activate DIANA5 Server** on the computer, which is connected to the ECU.

If you want to use the Voith USB-K-Line-Interface, you have to choose the function **Use Voith K-Line USB-Interface**.

Important !

The USB interface can only be used with the E300.

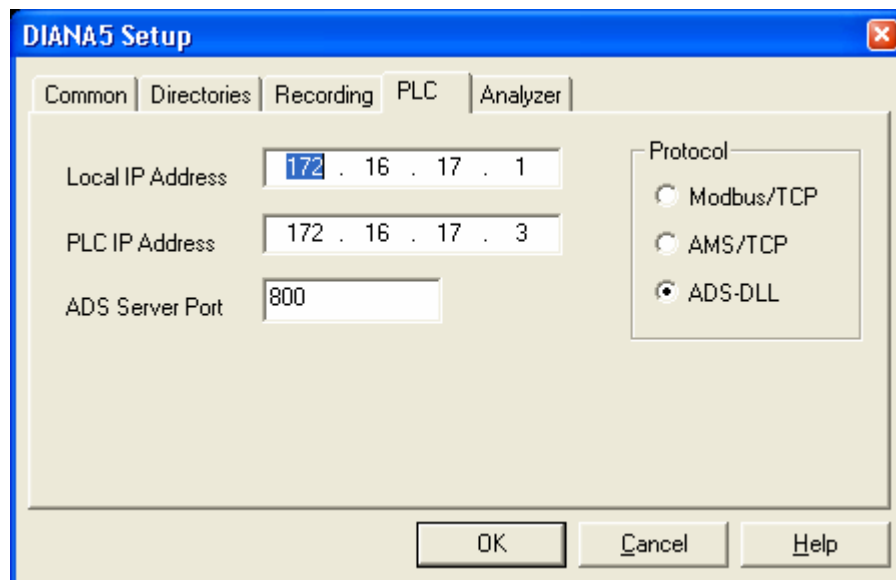
If this interface is used, the data transfer rate for the measurement data is reduced.

Programming the E300 with MemTool is not supported with this interface.

The function **Minimize ECU Data Download** disables the download of extended ECU data (e.g. RIO or PDI data). Therefore, the starting time for recording will be faster.

2.4 PLC Properties

With DIANA you can access some PLC's (Beckhoff) over a network connection. You can read or write a defined memory area of the PLC. For the communication you can choose between Modbus/TCP- and AMS/TCP. With Modbus/TCP you have to enter the IP address of the PLC. AMS/TCP also needs to know the IP address of the local network controller, which is connected to the PLC.



If you have installed the Beckhoff TwinCat software, you can also use the ADS-DLL. In this case you need to enter the PLC IP address, which is used to create an AMS address. DIANA will automatically add ".1.1" to the PLC IP Address (example 172.16.17.1.1.1). Also the *ADS Server Port* is needed. The parameter index group is fixed to 4020h.

2.5 Panel

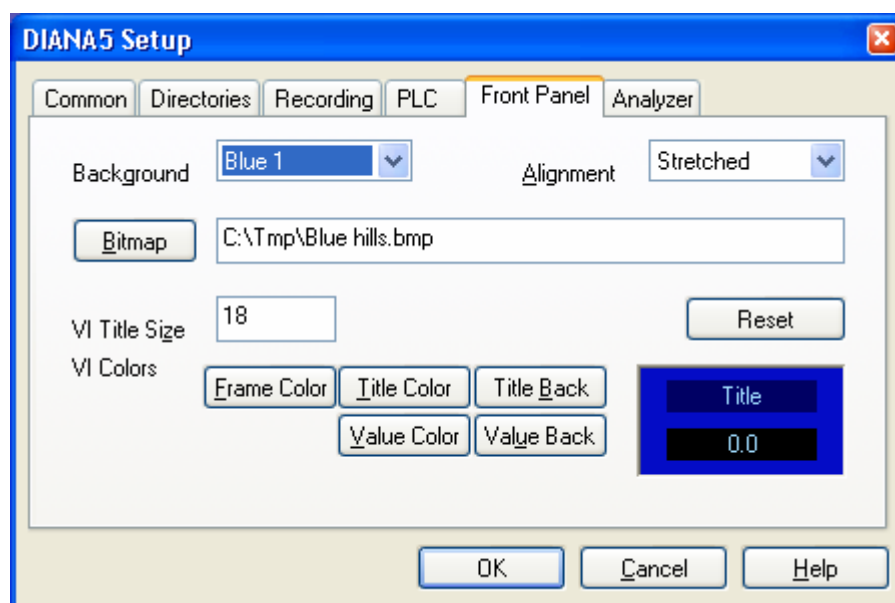
This page is for changing the appearance of the DIANA5 Recorder and TED.

With **Background** you can choose between different background bitmaps. When you select **Faded Color**, the selected **Frame Color** will be used for this effect. You can also open your own bitmap by using the button beside the **Bitmap** field. In this case, the field Background should display **User Bitmap**.

The field **Alignment** can be used to place the bitmap on the screen.

Layout	Meaning
Centered 1	The bitmap will be centered and the border color will be the frame color

Centered 2	The bitmap will be centered and the border color will be the color of the upper left corner of your bitmap
Stretched	The bitmap will be stretched to fill the complete screen
Tiled	The bitmap will be tiled



You can also change the colors of the **virtual instruments (VI's)**. These instruments are used to visualise the measurement data during record and playback. The button **Title Color** lets you select the color of the instrument title. The button **Title Back** lets you select the background color of the instrument title. With **Value Color** and **Value Back** you can set the colors for the measurement values. **Frame Color** sets the color of the instrument frame.

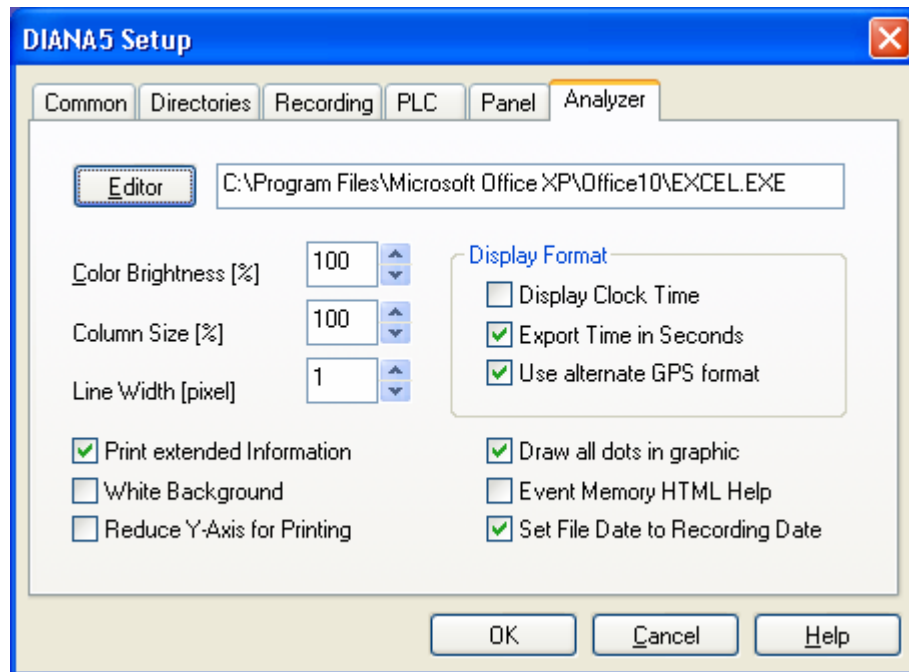
With **VI Title Size** you can change the size of the instrument title.

If you want to reset all panel settings to a default value, you can press the **Reset** button.

2.6 Analyzer

This page contains special settings for the Analyzer.

With **Color brightness** you can change the overall color brightness for printing and exporting a graphic.



If you activate **Add focused data to graphic print** more information about the selected time position will be printed on the bottom of the graphic.

With **White background** you can change the background color of the screen to from black to white.

The input field **Editor** is used to select a external editor program for displaying identification and operation data.

If you want to edit exported tables in another program, it might be better, to have the time in seconds. In this case the function **Export Time in Seconds** must be selected.

When you activate **Keep initial file date** and save a measurement file, the modification date of this file will be overwritten and set to the original recording date. This has the advantage, that you always see the recording date in the windows explorer.

Normally DIANA will print all y-axis, but if you activate **Reduce Y-Axis for Printing**, axis with the same scaling will be combined to one.

To change the line width of the graphic display, you can modify the **Line Width** value.

If you have decided to display measurement dots in the graphic display, you can choose to show all measured point as dots (**Draw all dots in graphic**) or optimize the number of displayed dots.

If you want to change the size of all table columns at once, you can use **Columns Size Offset** to do this.

The function **Display Clock Time** display all timing data as the local time.

Attention

If the recording was interrupted, the displayed clock time might be wrong.

Normally, DIANA will display GPS coordinates as degrees, minutes and seconds. If you activate **Use alternate GPS format**, the coordinates will be displayed as degrees (like Microsoft Autoroute).

3 Recorder

The Recorder is used to record and playback measurement files. The **measurement data** will be displayed with **virtual instruments**. Some instruments contain only one signal, while others can contain more than one signal. **Each measured item is called a signal**. The following figure contains some of the available virtual instruments of DIANA which are placed in a virtual panel. There can be more than one panel in measurement template and you can walk through the panels during recording. Generally, if a special signal is currently not displayed in the selected panel, it will be recorded anyway.



You can use the small two buttons beside the **panel name** to change the current panel or you can use the number keys 1 - 9. If you double click the **panel name**, a selection box with all available panels will be displayed.

The size of the virtual instruments depends on the window size of DIANA.

3.1 Start a new measurement

When you want start a new recording, you have to load a **measurement template**. You can choose between **system templates** and **user templates**. When the template is loaded, the recording standby mode will be activated. In this mode, the measurement data will be updated in the virtual instruments. The following system templates are available:

Template	Application	Automatic
Author:	TSc / anee	
saved:	2005-09-29 11:16	
Version:	5.8	

		Detection
DIWA2.D5T	DIWA.2 with special E200	Yes
DIWA3.D5T	DIWA.3 with software version before 18.20	Yes
DIWA3Xtd.D5T	DIWA.3 with software version before 18.20 Added WR duty cycle and oil temperature	No
DIWA3_18_2x.D5T	DIWA.3 with software version 18.20 and higher	Yes
DIWA5.D5T	DIWA.5	Yes
NPU.D5T	NPU	Yes
RETARDER.D5T	Retarder with VERA ECU	Yes
AQUATARDER.D5T	Aquatarder with VERA ECU	Yes
AD.D5T	A/D measurements	No
ALTITUDE.D5T	Altitude with pressure sensor	No
GPS.D5T	GPS measurements	No
CAN_SAEJ_TX.D5T	SAE-J1939 CAN transmit messages	No
CAN_SAEJ_RX.D5T	SAE-S1939 CAN receive messages	No
CAN_SAEJ_250KB_MONITOR.D5T	Empty SAE-J1939 template with CAN monitor	No
CAN_SAEJ_250KB.D5T	Empty SAE-J1939 template without CAN monitor	No
CAN_IES_500KB_MONITOR.D5T	Empty IES template with CAN monitor	No
CAN_IES_500KB.D5T	Empty IES template without CAN monitor	No
CAN_IES_TX.D5T	IES CAN transmit messages	No

If no measurement template is loaded, the function **New** will try to identify the connected ECU and load a suitable template. However, if there is already a template loaded, this function will start a new measurement and increase the part number of the current filename.

The function **Close** can be used to save and close the current measurement.

Hint

You can create links to your favourite templates on the desktop. When you double click it, the Recorder will be started automatically.

3.2 Continue a measurement file

If you want to continue an existing measurement file, you can also load it with the function **Load User Template**. Press the **Record** button **twice** and the measurement will be appended to the end of this file. A special hint will be inserted in the DIANA event list. This list can be found in the **Options** menu.

3.3 Recording

When you load a template, DIANA changes to the recording **standby mode**. In this mode, the current measurement data is **displayed, but not memorised**.

- When you **press** the **Record** button, **the measurement data will be memorised**.
- When you **press** the **Pause** button, you can **return to** the **standby** mode.
- If you want to **stop the measurement**, you can **press** the **Stop** button
- By **pressing** the **Record** button **again**, you can **switch back to** the **standby** mode.

The following table shows all possible modes:

Display	Meaning
Stop	The recorder is stopped. Measurement data is not updated.
Pause	The playback of the measurement is paused.
Play	The measurement is played back.
Standby	Measurement data is updated but not recorded.
No Trg	DIANA is waiting for a trigger event to start the recording
Record	The recording is running

If a measurement device cannot be started, an error message is displayed. When the measurement template uses more than one measurement device, the recording can be made with at least one working measurement device.

The state of all measurement devices can be watched in the device state window. The **background colour** has the following meaning:

Background color	Meaning
Black	No data received
Green	Receiving data
Red	Measurement device error

If data was received, the window flashes green for $\frac{1}{4}$ second. When the data is received faster than this, the window will stay green.

When a device error is detected, DIANA will add an entry to the event list of the measurement file and try to restart the device in the background.

3.4 Marker

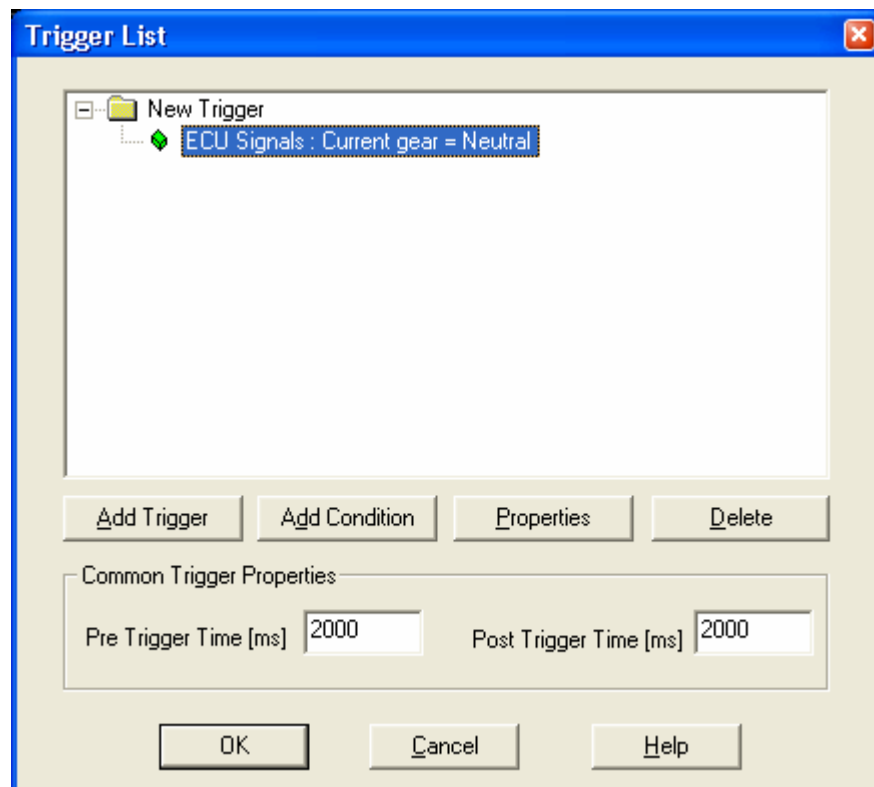
Pressing the **space bar** or **marker button** during playback or record **creates a new marker**. You can enter a comment for this marker. The recording continues in the background. Creating a marker during a triggered recording will also start the recording.

The **marker list** in the **Options** menu can be **used to modify or delete existing markers**. You can even change the marker color or export all markers to a text file. Use the right mouse button to access these functions. During playback you can directly jump to the corresponding position with the **Show Marker** button.

3.5 Trigger List

This function is ideal for **reducing measurement data** or to **record special events** and it can also generate messages or warning sounds. The trigger list has a tree structure and can be fully edited also, every trigger object has its own set of conditions and works individually. **To generate the selected trigger action, all conditions of this object must be fulfilled.**

A trigger recording is started, when the trigger button is pressed and the recorder is in record mode. As soon as the trigger conditions are fulfilled, all measurement data is memorised. During recording you can turn the trigger mode on and off by pressing the trigger button on the panel.

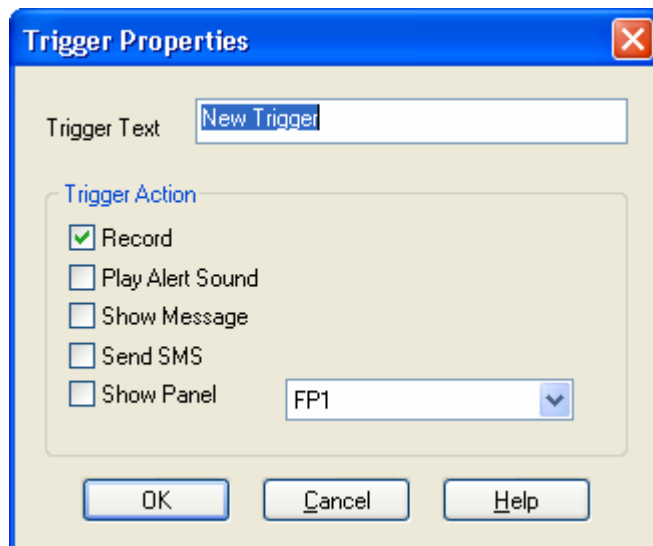


To create a new trigger object, you must press the **Add Trigger** button. With **Add Condition** a new condition will be appended to the selected trigger object. Use the **Properties** button to edit the properties of the trigger object or condition. With the **Delete** button you can delete a trigger object with all included conditions or only one condition.

It is also possible to record data before and after the trigger event. This can be adjusted with the pre and post trigger time of this dialog.

3.5.1 Trigger Properties

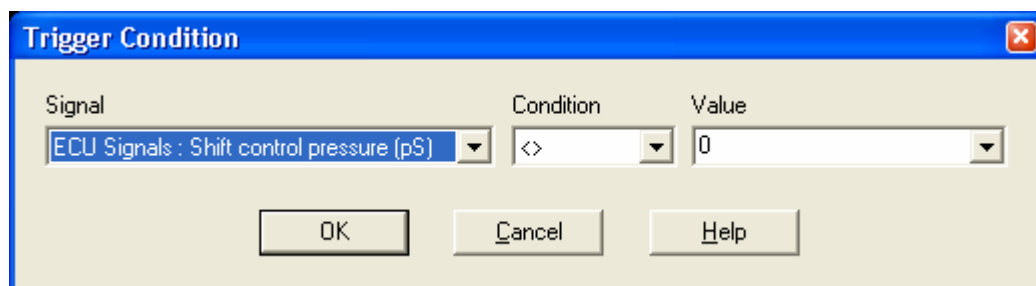
To **edit** the properties of this object select a trigger object and **press** the **Properties** button.



With **Trigger Text** you can enter a text. This text will be displayed in the trigger and event list. If **Record** is enabled, DIANA will record data while all trigger conditions are fulfilled. The **Message** function will show and update the event, when a trigger event is detected. The **Alert** function produces a sound, when the trigger event is detected. **Show Panels** allows you to display an existing panel, as soon as the trigger event occurs. With **Send SMS**, PocketDIANA is also able to send a SMS, if a GMS modem is connected.

3.5.2 Trigger Conditions

To **edit trigger conditions**, you must select a condition and **press** the **Properties** button.



This window allows you to select any signal of the measurement file. The field **Condition** lets you select the required condition and the field **Value** should contain the numeric value. If the selected signal contains a symbol list, you can choose the symbol instead of a numeric value in the **Value** field.

Note

The **AND** condition means the conditions must occur at the same time. With **NAND**, they do not need to occur at the same time.

3.6 Control signals

Templates can also contain special signals, which are able to send messages on the CAN bus or change variables in the ECU while the recording is running. This data can be controlled with virtual sliders, knobs and switches in the panel or with a special MIDI-Hardware-Controller. CAN signals can even be automated to produce user programmed ramps. By double clicking a virtual instrument with the left mouse button, data may be entered numerically or by a text symbol.



When the data of the control signal is changed externally, DIANA will update the position of the controls. If the template contains automated control signals, you can **restart the automation by pressing the record or standby button again.**

3.6.1 Switch

This control switches between the minimum and maximum value of the signal properties. When the data equals the minimum the LED will be dark. Otherwise the LED will be light. Another type of switches is able to set individual bits of a value.

3.6.2 Slider

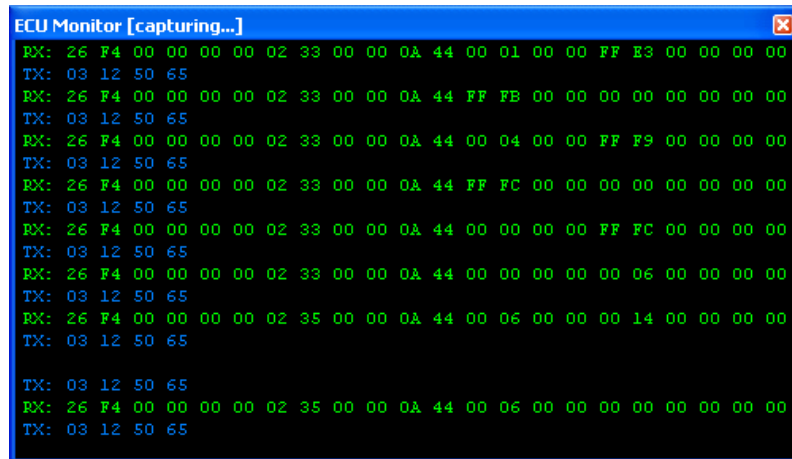
By dragging the slider with the left mouse button, you can set any value between the minimum and maximum value of the signal. During the movement of the slider, data will be updated continuously. If you only want to send the value (to the ECU) when you release the mouse button, you have to press the shift key or click directly into the black track of the slider.

3.6.3 Knob

You can send data (to the ECU) when you move the mouse in vertical direction by clicking the left mouse button into the knob. The shift button can be used to change to a higher sensitivity.

3.7 Measuring device monitor (DIANA5 Edition only)

If you double click the measuring device state window, a monitor window is displayed. Here you can watch the data between PC and device. If you double click a different state window, the monitor changes to the corresponding device.



If you have selected the ECU monitor, data to the ECU is displayed blue and data from the ECU is displayed green.

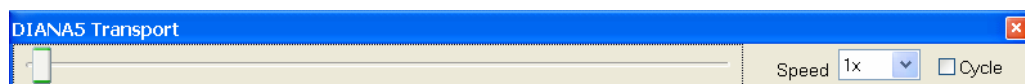
The CAN monitor uses green for receiving data on CAN1 and yellow for CAN2. For transmitting data it uses blue for CAN1 and pink for CAN2.

Errors are display red.

Press the enter key to hold or continue the monitoring. You can also hold the shift key and press the left mouse button.

3.8 Playback

If you have made a record or loaded a measurement file, you can playback the measurement data with the Recorder. To do this press the **Play** button. The measuring devices do not need to be connected to the ECU. If you press the **Pause** button, the playback will be paused. By pressing the **Stop** button, the playback position will be set to 0. To clear contence of the virtual instruments press the **Stop** button again.

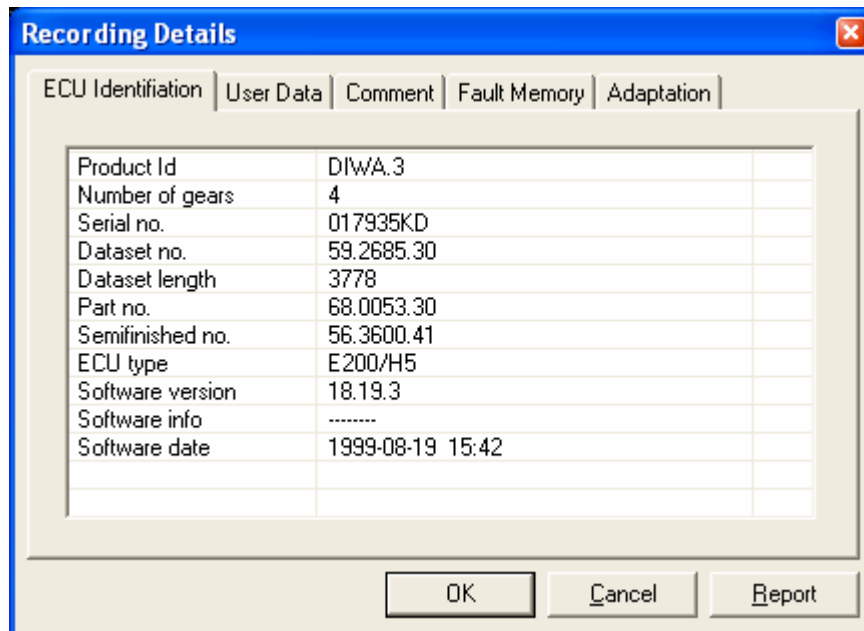


As soon as the playback is started, the DIANA transport window will be shown. This windows has a big slider to select the current playback position. You can also set the playback speed and activate the cyclic playback of the file.

3.9 Recording Details and ECUViewer

The recording details dialog contains information about the **beginning** of the measurement. If you want to see this information without using the Recorder or Analyzer, you can use the ECUViewer. This program will display the current data of the connected ECU and not the data of a measurement file.

On the **User** and **Comment** page you can enter additional data. The ECUViewer does not supply these two pages. With the DIANA File Explorer it is possible to search for measurement files which contain special recording details. So it's up to you, if you will find a measurement file later on your hard disc.



The dialog box titled "Recording Details" has a blue title bar with a close button. It contains a tabbed interface with five tabs: "ECU Identification", "User Data", "Comment", "Fault Memory", and "Adaptation". The "ECU Identification" tab is selected. Below the tabs is a table with two columns. The first column lists various ECU parameters, and the second column contains their values. At the bottom of the dialog are three buttons: "OK", "Cancel", and "Report".

Parameter	Value
Product Id	DIWA.3
Number of gears	4
Serial no.	017935KD
Dataset no.	59.2685.30
Dataset length	3778
Part no.	68.0053.30
Semifinished no.	56.3600.41
ECU type	E200/H5
Software version	18.19.3
Software info	-----
Software date	1999-08-19 15:42

On the **User** page you can **enter data** by **pressing the space bar or double clicking the input field**. As an example; if you want to convert the transmission output speed to mph or km/h the ratio of the angle drive, DIANA needs axle and the dynamic rolling radius. If there is no angle drive, you should enter a "1". The **Comment** page is for your own comments. This comment is also placed in the email, when you use the DIANA function **Send Email**.

The next page is the **Fault memory**. If there are any entries in the fault memory of the ECU, you will see it here. **Active** means, that the fault is currently active. You can also delete the content of the fault memory by pressing the **Reset** button (if displayed by the ECUViewer). In the ECUViewer there is also the function **Automatic Update**. If selected, the content of the fault memory will be updated continuously. If you double click a fault entry in the list, you will get more detailed information about this entry.

The next page shows the shift and brake **Adaptation**. You can reset the adaptation by pressing the **Reset** button (if displayed by the ECUViewer). It is also possible to click on the column header for sorting the adaptation data. Only adapted gear shifts will be displayed here.

The **lamellar slip** page, if available, shows you, if slip was detected during a mechanical gear or during the retarder was engaged. After repairing the transmission, this data should be set to 0 by pressing the **Reset** button.

By pressing the **Report** button, a special text file with the recording details is created and opened in the temporary directory of DIANA.

3.10 Network Functions

With the DIANA Recorder you have the possibility to record measurement data with a network connection. First, you have to establish a TCP/IP network connection between two computers. This can be done via internet, intranet, GSM, GPRS or WLAN. The Windows online help will assist you with this. The computer, which is directly connected to the remote ECU or another measuring device, is called the server. To enable the Recorder to respond to a client request, you must check the function **Activate DIANA5 Server** in the

program properties. The computer, which will request measurement data from the server, is called the client. The client can use two different access methods on the server.

Note

DIANA uses the network port 80 for the TCP/IP connection. Be sure, that this port is opened on your computer.

3.10.1 Monitoring a record

When a recording is running (or standby) on the server, you can connect to the server and watch the measured data. You can monitor nearly all kind of measurement devices. Please notice the following restrictions :

- Output signals can not be controlled
- No static local identifiers
- No shift and brake protocols
- No CAN message monitoring

Use the command **Connect via network** in the file menu of the client recorder. The following input box asks for the computer name or TCP/IP address of the server. When you press OK, DIANA will try to find the server and establish the communication. In the next step, DIANA will automatically download the current measurement template of the server. This will also include the recording details. If successful, the measurement data in the panel of the client will be updated as fast as possible. You can even make your own recording on the client side, including trigger functions. Pressing stop on the client will not stop the server. Notice that GSM connections are very slow ! It is better to use GPRS or WLAN.

3.10.2 Direct connection

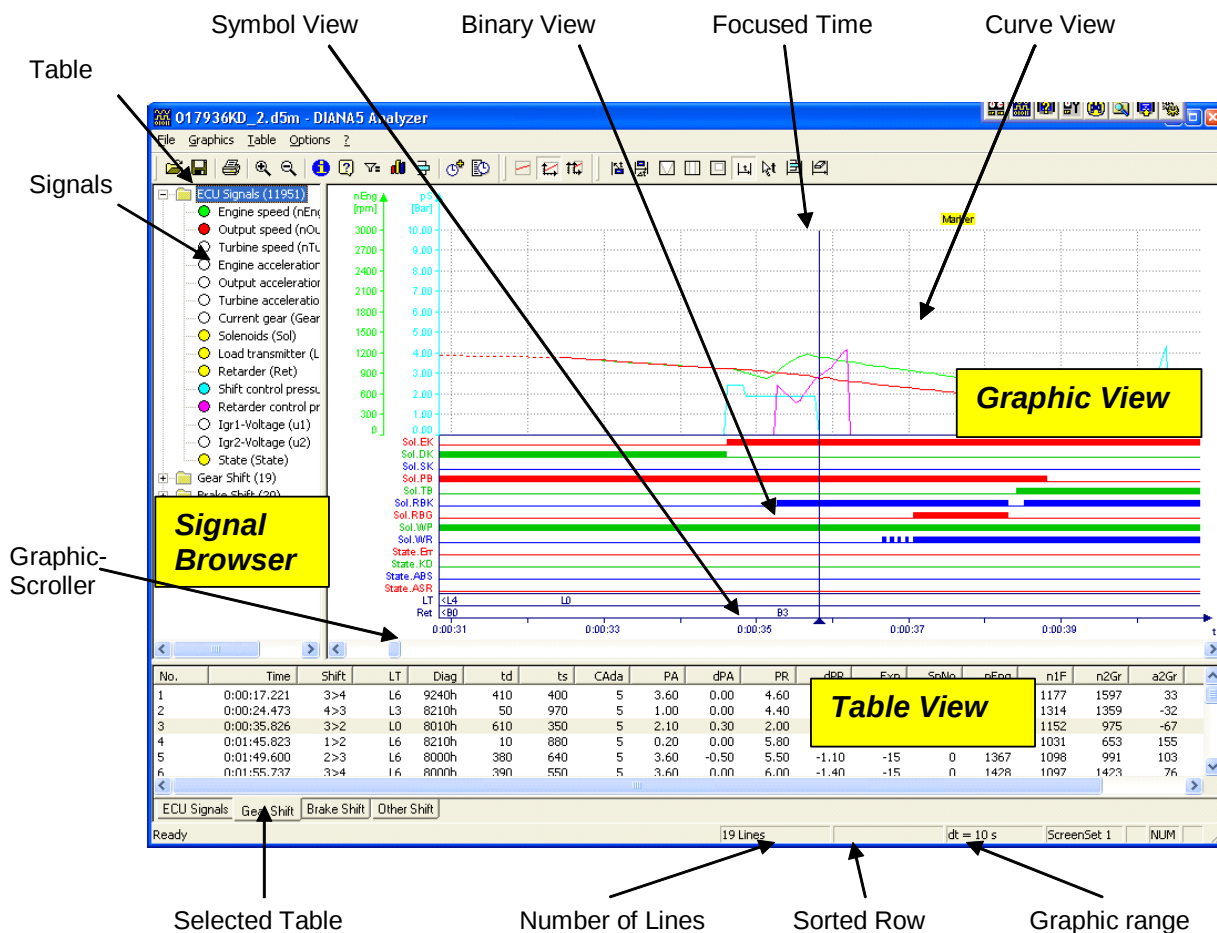
With this method you can directly connect to the ECU, which is attached to the server. You have the same access to the ECU, as if it were directly connected to the client. Instead of selecting a COM port in the program properties you must select **network**. But before you can access the ECU, the Recorder must be started on the server first. It is not necessary to load a template on the server. When you start the recording on the client, you will be prompted to enter the computer name or TCP/IP address of the server. DIANA will now start the communication via network with the ECU. If the server was making a record by itself, it will be interrupted until the recording on the client is stopped. The direct connection is only intended for ECU recordings.

Note

You can also use VarSpy, MemTool or ECUViewer on the client computer to access the remote ECU. However, loading software in a E200 is not possible.

4 Analyser

The **Analys**er is a tool to analyse measurement files, that were recorded by DIANA5, DIANA4 or Diwagnosis (only d2d files). When you open the analyser, you will see **three** different **views**. The **graphic view** shows your measurement data as curves and bars, the **table view** shows the numeric values and the **signal browser** is used to select and edit signals. You can use the **tab** key to jump between the different views. By dragging the separation lines, you can adjust the size of the views. The status bar below the table gives you some more information about the current view settings.



All three views have their own context menus. You can access them with the right mouse button.

4.1 Graphic View

The upper part of the graphic view shows the signals as curves. If the time distances between two measurement points, is more than 2 seconds, the line between may be dashed. No line will be drawn, if the time distance is more than 10 seconds. This is the normal behaviour of a curve, but you can change this in the signal properties.

The scale of the curves can be adjusted with the *Minimum* and *Maximum* fields of the signal properties.

The **analyser** offers three different ways for displaying the y-axis. This can be selected in the menu or the tool bar, but when you copy or print the graphic view, all y-axis will be used by default.

Above the curves there are **two text rows** which include the marker and system events.

Below the curves you can see **all binary signals**. A solid line means "on" and a thin line means "off".

Below the binary signals you can see the data of signals which are using special text symbols.

The **scroller** below the time line is used to shift the graphic view to different positions within the measurement file. Note, the resolution of the scroller is one second.

If you want to see the curves on a white background, you can use the corresponding function in the program properties.

4.1.1 The Mouse Mode

You can use the left mouse button for special functions within the graphic view. The needed function can be selected in the menu or tool bar.

4.1.1.1 Measure data

The current measurement data of all activated signals will be displayed in a floating window. When you drag the mouse and hold the left mouse button, the data will be updated continuously.

4.1.1.2 Measure difference

If you want to measure the difference between two points, press and hold the left mouse button on the first point and drag the mouse to the second point. You will also see a floating window.

4.1.1.3 Hyper Zoom

Press and hold the left mouse button. By moving the mouse upward or downward you can zoom in and out.

4.1.1.4 X-Axis Zoom

To "zoom" an area on the x-axis, press and hold the left mouse button at the start point and drag the mouse to the end point. When you release the mouse button, the graphic will be zoomed to the selected range.

4.1.1.5 X/Y-Axis Zoom

To "zoom" any area of the curves, press and hold the left mouse button at the start point and drag the mouse to the end point. When you release the mouse button, the graphic will be zoomed. You will note; that you can even zoom the y-axis with this function.

4.1.1.6 Insert Marker

By clicking into the graphic with the left mouse button you can insert a new marker. When you move the mouse before you release the left mouse button, a measuring arrow will be created between the start and end point.

4.1.1.7 Insert Signal Marker

To insert a signal marker, you first have to select a signal, which is currently displayed in the line writer view. On releasing the left mouse button, the signal will be marked directly in the graphics at the current time. Signal markers can also be edited or deleted in the marker list afterwards. The signal marker gets the color of the selected signal. You can change it in the marker list dialog.

4.1.1.8 Focus Table

When you click into the graphic with the left mouse button, the line in the selected table, which is next to this position, will be focused.

4.1.1.9 Workspace

You can set the workspace range by selecting an area with the left mouse button. The workspace dialog will then be opened.

4.1.1.10 Delete Data

The measurement data of all tables in the selected range (workspace) will be deleted. Markers and system events in this range will also be deleted.

4.1.2 Zoom Functions

You can use the menu functions **Zoom In** or **Zoom Out** to enlarge or shrink the graphic view.

The **Standard-Zoom** sets the time range of the graphic to 10 seconds.

The **Show All** command displays the complete measurement in the graphic view at once. Depending on the size of the measurement file and the speed of your PC, you might have to wait a little bit.

4.1.3 Assign X-Axis

You can assign any signal to the x-axis. In this case, the time range, which was displayed before will be used.

The **Minimum and Maximum values of the signal properties determine the scale of the x-axis.**

Selecting this function again will reset the x-axis to a time bar.

4.1.4 Hold Graphic

When this function is selected, DIANA stores the current time of the graphic. If you select a different time in the graphic view, the graphic at the stored time will be displayed in the background. The color brightness of this background graphic will be reduced. To optimize the position of the overlaid graphic, you can use the shift key and press the arrows of the scroll bar.

4.2 Table View

The **table view** shows the **measurement data** of the **currently selected table as numeric values**. A measurement file can have more than one table depending on which recording template was used for recording this file. You can directly access the tables with the numeric key 1,2,3...

When you select a new line in the table, the graphic view will be scrolled automatically to the corresponding position.

If you want to hide a column, you can edit the signal properties of this signal.

The first column shows the line number within the table and the second column shows the related measurement time. If you want to see the difference of the time between the lines you can activate the function **Show Period**.

For adjusting the column size, you can simply drag the separators of the column header. If you want to change the order of columns, you have to hold the control key and move the signal in the signal browser to the new position. The position here is according to the position in the table view.

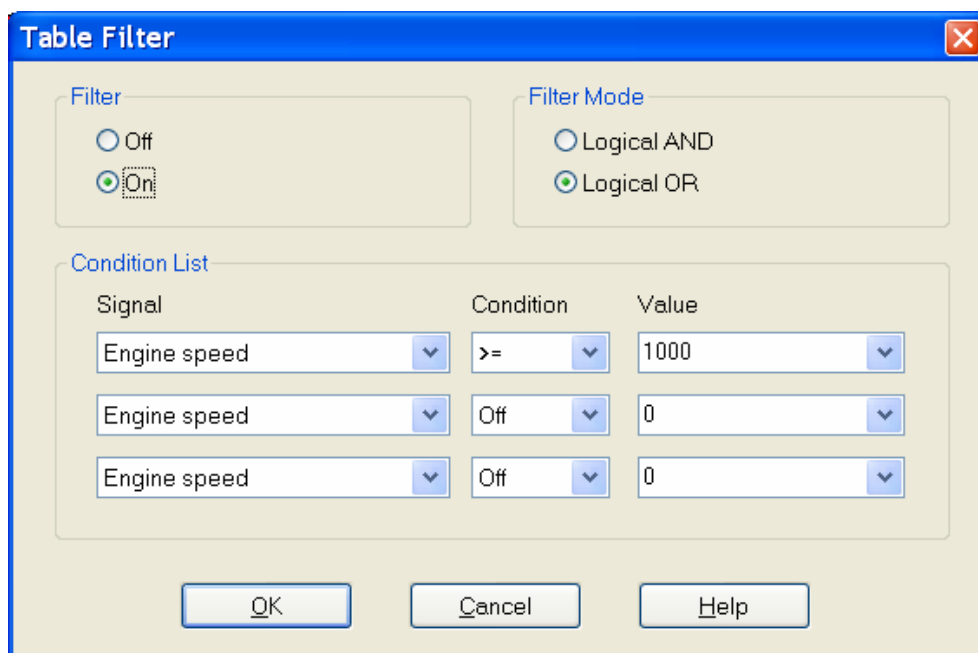
4.2.1 Sorting

Tables can be sorted by clicking on the column header with the left mouse button. If you click on the same column header again, the sorting order will be reversed.

With DIANA5 you can also use a second column for enhanced sorting. Simply press the control key and click on the second column header. To turn off the sorting, you have to click on header of the number or time column and depending on the table size, the sorting may take a little time.

4.2.2 Table Filter

This function gives you a way, to filter special lines of the selected table in order to reduce the number of visible lines. If you have entered up to 3 conditions, you can decide, if all conditions must be true (Logical AND) or if one is enough (Logical OR). Select **Filter On** to activate your filter settings.



Signal	Condition	Value
Engine speed	>=	1000
Engine speed	Off	0
Engine speed	Off	0

Your filter settings will be memorised. When you select a different table in the table view and switch back later to this table, the filter will be restored.

Hint

If you also want to hide data before or after a special time, you can use the workspace function.

4.2.3 Export Table

You can copy or write the currently selected table to a printer the windows clipboard or to a text file. The filter and workspace settings can be used to reduce the number of printed lines. Before the data is exported, you can select the columns you want to export which will be separated by a tab character. Thus making it easier to import the data to Microsoft Excel or WinWord.

Hint

Use the function **Combine signals** to compress the table before exporting it.

4.2.4 Time Statistics

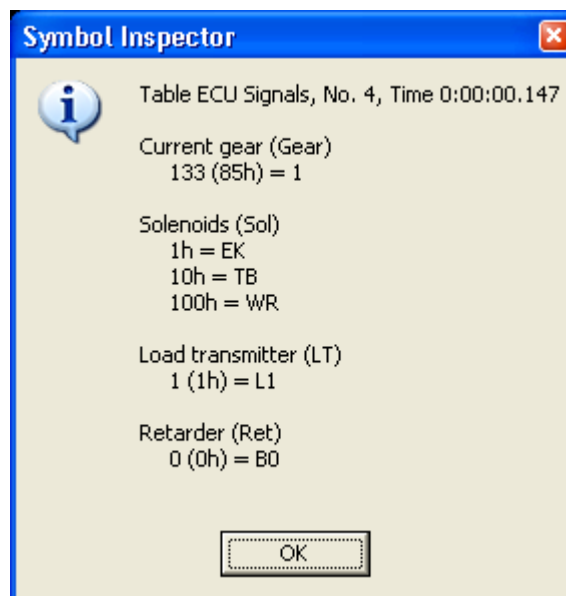
If you have assigned a filter to the selected table, you can calculate the time portions of the filtered and not filtered table. You will also see the shortest, longest and average time distance between two following measurement points. If invalid values (err or n.a.) were detected, the number of their occurrence will also be displayed.

Example

You have recorded a complete drive cycle. Set the table filter to display only the first gear. By using this function, you will get the duration of the first gear compared to the complete drive cycle.

4.2.5 Symbol Inspector

With this function you get more information about the measurement data of the selected line in table view. All signals that are using symbols and hexadecimal values will be interpreted. This can make it easier to understand the measurement data.



4.2.6 Signal Statistics

The minimum, maximum and average value of the selected signal will be displayed. Table filter and workspace will also be considered.

4.2.7 Signal Distribution

This function generates a distribution of measurement data. Depending on the type of the selected signal, a special algorithm will be applied.

Numeric values

Values between the minimum and maximum value will be accumulated in classes with a definable step width. The duration will be analyzed afterwards.

Symbols, states

The duration of each symbol (or value) will be analyzed separately.

Signals of event tables (CAN monitor and protocols)

Signal values will be analyzed according to the number of their occurrences.

The result will be stored in a text file and opened with the selected editor program.

4.2.8 Differentiate Signal

The selected signal will be differentiated. The result is stored in a new signal.

Hint

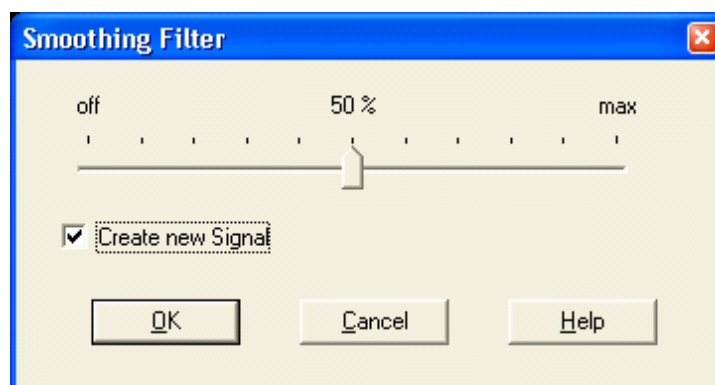
To get better results, it might be a good idea, to smooth the signal first.

4.2.9 Integrate Signal

The selected signal will be integrated and the result is stored as a new signal. Use the converter function of the signal properties to add a constant factor.

4.2.10 Smooth Signal

With this function you can smooth a measured signal. The slider can be used to set the degree of smoothing. Be aware that strong smoothing of a signal leads to a slight delay of the signal.



Use **Create new Signal** if you don't want to overwrite the selected signal.

4.3 Signal Browser

The signal browser is the view, where you can manage all tables and signals of the loaded measurement file. If you double click a signal with the left mouse button, the signal will be displayed or hidden in the graphic view.

By holding the control key, you can display or hide the signal in the table view.

Holding the shift key will open the signal property dialog.

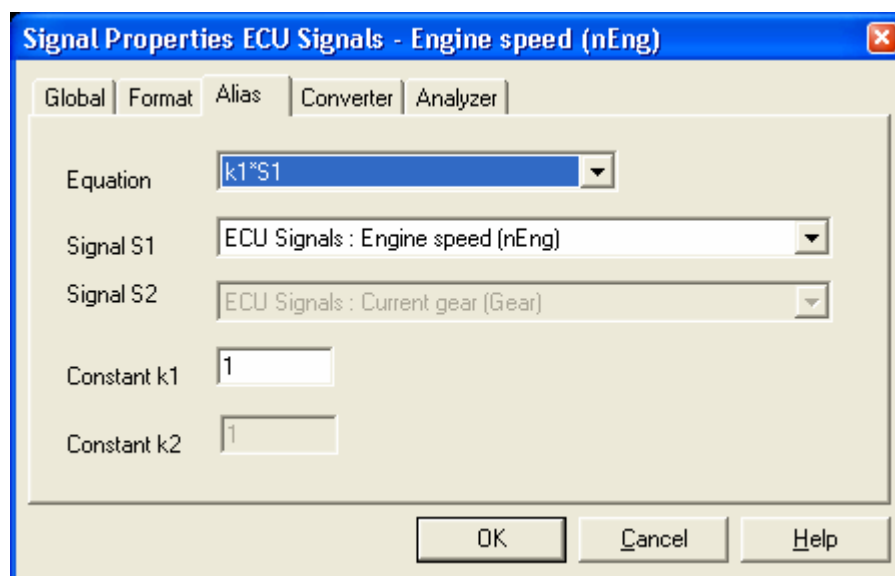
4.3.1 Delete Signals and Tables

You can use the cut function to delete a table or signal from the measurement file.

The copy and paste functions are only useful for copying signals and table to the program TED, since measurement data is not copied by these functions.

4.3.2 Add Alias Signal

An **alias signal** is a signal, which has no measurement data of its own. It accesses the measurement data of one or more foreign signals and combines them with a special equation to get a special result. It is also possible to use an alias signal as an input for a new alias signal to create larger equations. If you are using signals from different tables, the update of the graphic view may be delayed.



The field **Equation** is used to select a pre-defined equation. Some equations allow the use of 2 signals.

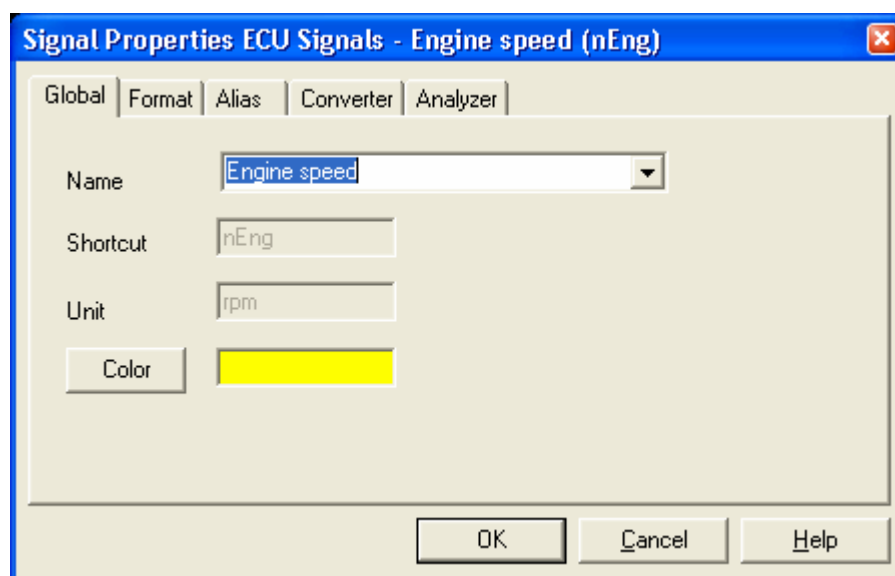
Hint

You want to subtract two signals. Select the equation „ $k1*S1 + k2*S2$ “. Set $k1 = 1$ and $k2 = -1$. Select the required signals. That's it !

4.4 Signal Properties

4.4.1 Global Settings

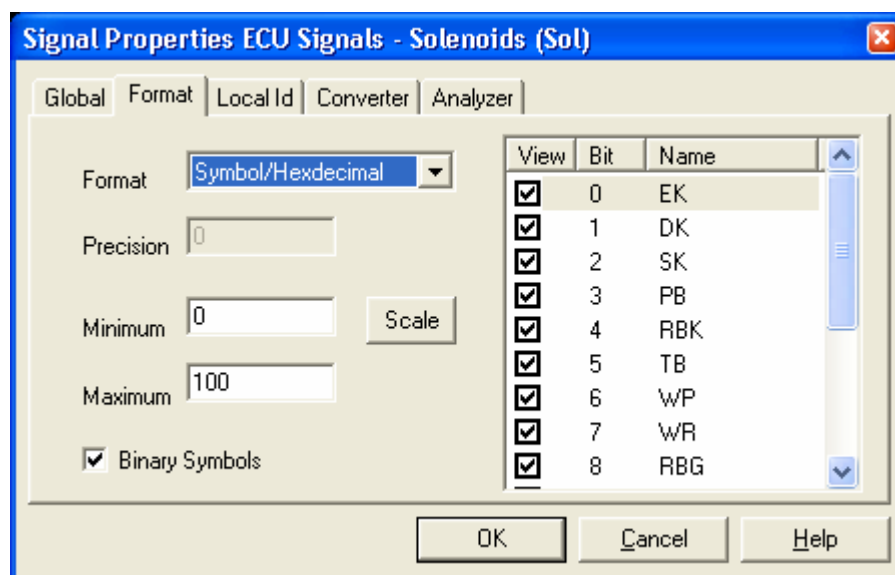
This page of the signal properties lets you enter a name, shortcut unit and color for the selected signal.



If you select a **pre-defined signal name** from the list in the name field, it is ensured that the signal name will be translated automatically to the selected language of DIANA5. In this case, the shortcut and unit are also translated. The automatic translation of **user defined signal names** is not possible.

4.4.2 Signal Format

On this page you will find important settings for displaying the measurement data.



The **Format** list allows you to select an appropriate method for displaying the measurement data. This selected format also defines how the signal is displayed in the graphic view of the Analyser.

Format	Meaning	Displayed as
Decimal	Decimal number	Curve
Hexadecimal	Hexadecimal number	Bar graphic
Binary	Binary number	Bar graphic
Symbol/Decimal	Symbol or decimal number ¹⁾	Text
Symbol/Hexadecimal	Symbol or hexadecimal number ¹⁾	Text
Time Stamp [ms]	Time stamp in milliseconds	Curve
Speed [km/h]	Velocity in km/h ^{2), 3)}	Curve
Acceleration [m/s^2]	Acceleration in m/s^2 ²⁾	Curve
Latitude	GPS Latitude	Curve
Longitude	GPS Longitude	CKurve
Compass	Point of the compass	Text
Speed [mph]	Velocity in mph ^{2), 3)}	Curve
SAE Source Address	SAE-J1939 source address	Bar graphic
SAE Message	SAE-J1939 message type	Bar graphic

1) If a symbol is not defined, the corresponding number will be displayed.

2) $i_{angledrive}$, i_{axle} and rolling radius must be entered in the recording details of DIANA.

3) If the signal name is velocity mph or km/h will automatically be displayed.

If the Format is **Decimal** you can use **Precision** to set the number of decimal digits. This will also work with the format **Time Stamp**.

The **Format Symbol** allows you to show a text instead of a number. This, for example, is useful for showing transmission states as text instead of numbers. Use the context menu to add, edit or delete entries. You can even **Export** the table to the clipboard, edit it with an external editor and **Import** it again.

The **Binary symbol** enables the interpretation of each bit of the measurement value and in this case you can assign a text to each bit of a number. If you don't want to display all bits, you can toggle the state with the **Show symbol** function. The **Solo Symbol** function will hide all symbols except the selected one.

Example for normal symbols :

0 = Neutral

1 = 1.Gear

2 = 2.Gear

3 = 3.Gear

...

Example for binary symbols :

Bit 1 = EK

Bit 2 = DK

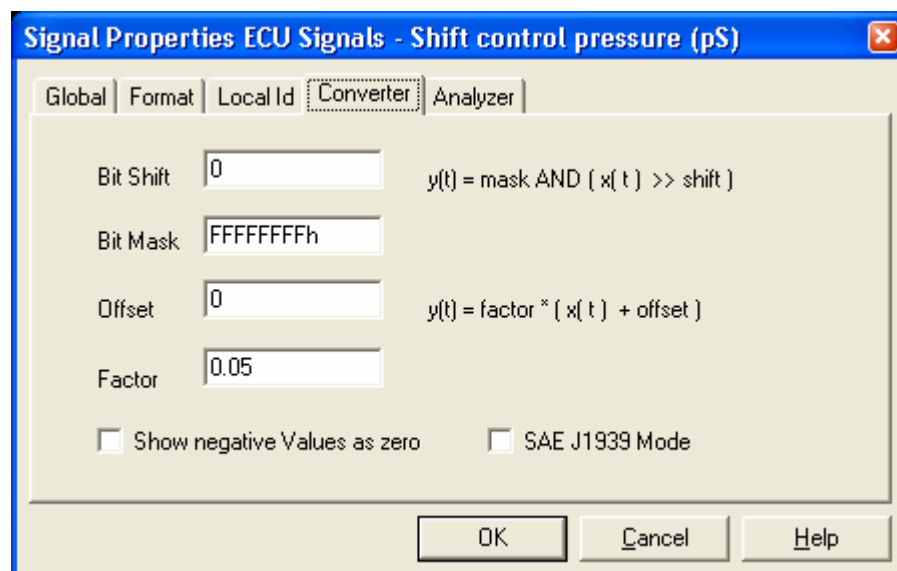
Bit 3 = SK

...

With the fields **Minimum** and **Maximum** you define the range for the signal in the graphic view. If measurement data is present, you can use the **Scale**-Button to automatically adjust this range. In this case it might be necessary to optimise the result manually.

4.4.3 Signal Converter

The **converter page** is intended to allow simple mathematical conversions of the measurement data. Since the original measurement data is not modified, you can restore the original data at any time.



For shifting a **measurement value binary** to the right, you can use **Bit shift**. After this step you can apply the **Bit Mask** to extract the needed bits.

The value **Offset** can be used to add or subtract a constant value from the measurement data and you can multiply the value by using the **Factor**.

The function **Show negative values as zero** cuts the negative part of the measurement data to zero.

Measurement data of certain signals can contain extended error information. To screen the measurement data DIANA5 is able to interpret this error information according to the SAE-J1939. You only have to enable the **SAE J1939 Mode**. If the signal is faulty, DIANA5 will show "Err" instead of the confusing number. If the signal is currently not available, you will see "n.a.".

The following table shows the assignment of the hexadecimal values according to the existing datatypes. The character „x“ is a placeholder for any digit.

Datatype	Hex. value for „n.a.“	Hex. value for „Err“
Bit	3	2
Unsigned char	FF	FE
Unsigned short	FFxx	FExx
Unsigned long	FFxxxxxx	FExxxxxx
Signed char	7F	7E
Signed short	7Fxx	7Exx
Signed long	7Fxxxxxx	7Exxxxxx

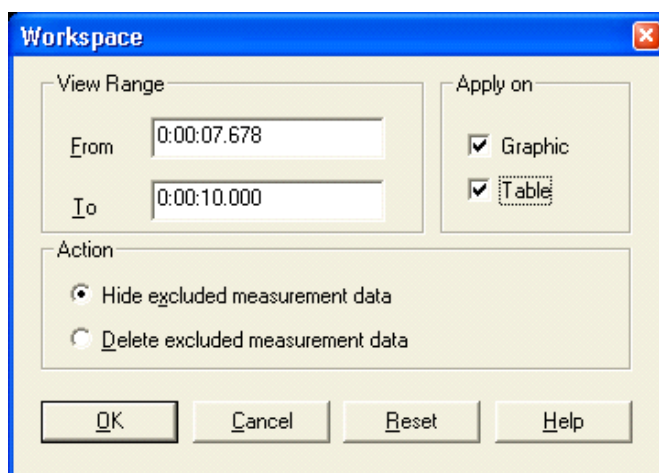
Important

The datatype bit needs at least to 2 bits (f Bit Count), to be able to show the error information !

4.5 Common Functions

4.5.1 Workspace

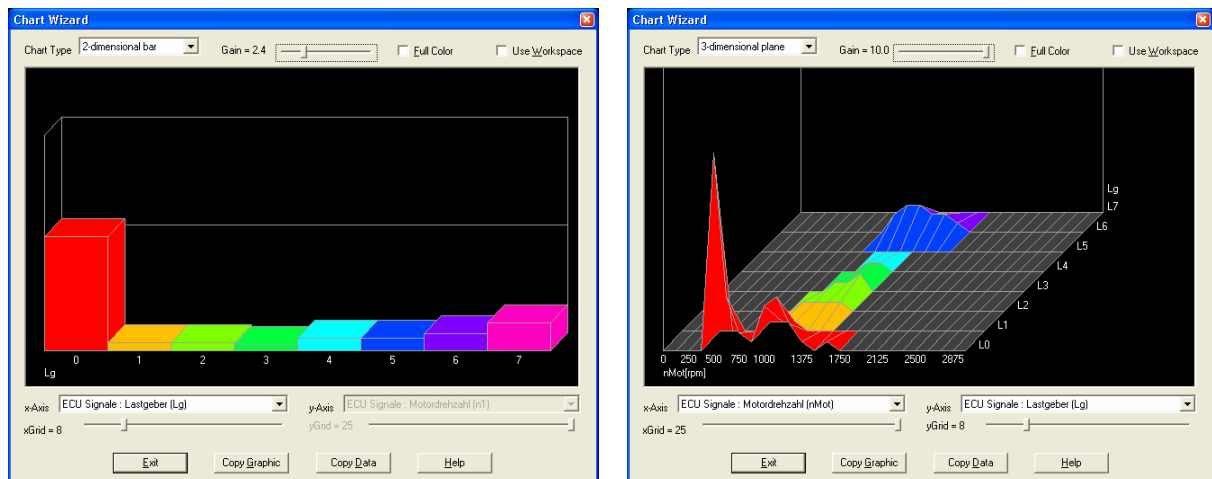
The **workspace** is an easy way to reduce the amount of displayed measurement data. You can enter the time range in the workspace dialog box or use the corresponding mouse function in the graphic view.



You can also decide, which view should represent the selected time range. Normally, you will only hide the data outside the workspace, but with the **Action** setting, you can also delete the data outside the workspace. If the workspace is set, most analyser functions will consider this the time range.

4.5.2 Diagram Wizard

The diagram wizard is used to create diagrams very quickly. The diagrams display the distribution of the measurement data from the selected signals. With **Chart Type** you can choose between 2-dimensional and 3-dimensional visualisation and a surface or bar style of the diagram. The grid of the diagram can be selected with the X-Grid and Y-Grid sliders. Use the **Gain** slider to stretch the Z-axis.



If you have selected a workspace, you can enable **Use Workspace** to display only the data within this workspace.

Normally all zero values will be displayed with a Gray color. The function **Full Color** forces these values to also be displayed in color.

Use the **Copy Graphic** button to copy the displayed diagram to the Windows Clipboard. For copying the data in a numeric format, you can use the **Data Copy** button.

4.5.3 Combine Signals

You can select several signals of all tables and copy them to a newly created table. Since the measurement time points are not the same between the tables, the measurement data must be sampled again. To do this you will be asked to enter a sample rate in milliseconds which will be the time step of the new table. Note: use low sample rate values to get an exact copy of the signal.

Hint

If you choose a higher value, you can reduce the amount of measurement data significantly. This is very useful, if you want to export a large amount of measurement data to Excel.

4.5.4 CAN Message Wizard

If the loaded measurement file includes CAN messages (CAN message monitor), you are able to record this data with any existing CAN measurement template, that has CAN signals defined, within the Analyzer. This recording is processed offline and means, that you don't need a CAN card. The recording time depends only on the processor speed and the selected sample rate. Be aware, that the measurement data of already existing CAN signals will be overwritten.

4.5.5 Screen Sets

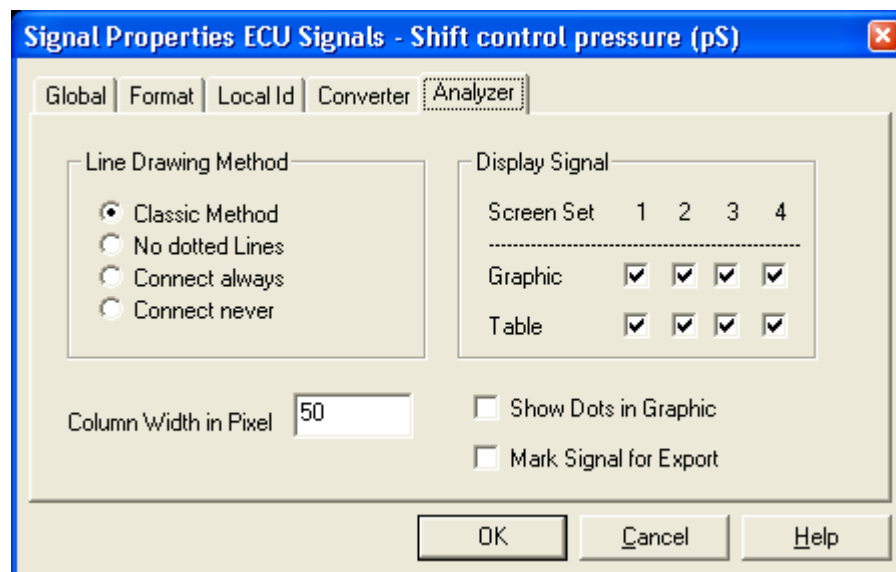
Screens sets are a nice feature to switch between different views of the measurement data. The following data is saved and recalled by each of the screen sets :

- Size of graphic view, table view and signal browser
- Selected time position
- Displayed signals in the graphic view
- Displayed signals in the table view

Use the control key and the number keys 1 – 4 to recall a special screen set. The current settings will be saved to the previous screen set and the selected screen set will be displayed. You can see the number of the current screen set in the status bar. Screen sets are also stored in the measurement file.

4.5.6 Analyzer Signal Properties

Each signal has its own set of parameters for the visualisation in the Analyser.



The **Column Width** defines the width in pixels of signal column in the table view. If you drag the separator of column header in the table view, the field **Column Width** will be updated automatically.

The **Line Drawing Method** allows you to select, how curves are drawn in the graphic view. The **Classic Method** connects two measurement points within 2 seconds with a solid line. Between 2 and 10 seconds a dashed line is used and above 10 seconds, no line is displayed. With **No dotted lines** only measurement point within in 2 seconds are displayed with a solid line. **Connect always** will connect any measurement point. With **Connect never** no line is displayed.

Show Dots in Graphic will display small symbols at each measurement point. If the symbols are too narrow to each other, some symbols will be disappear.

The **Mark Signal for Export** selector pre-selects this signal in the signal select dialog for exporting tables.

The selector of **Display Signal** defines, if the signal will be shown or hidden in the corresponding screen set. If you change the setting in the signal browser, these selectors are updated.

4.5.7 Delete Measurement Data

The best way to delete measurement data is, to use the corresponding mouse mode in the graphic view. Another method is deleting a signal or table in the signal browser. The third method is selecting a workspace and using the delete function of the action field.

4.5.8 Operation Data Difference

If the current measurement file contains operation data (DIWA.3, H5-ECU), you can select a second measurement file to see the difference of the operation data between both files. The result will be written to the temporary directory of DIANA5.

This function will only make sense, when both files were recorded on the same vehicle.

4.5.9 BASPViewer

The BASPViewer is a special extension of the Analyzer to show shift programs of DIWA and NPU. This function can only be used with suitable measurement files. You also need to have the right dataset file.

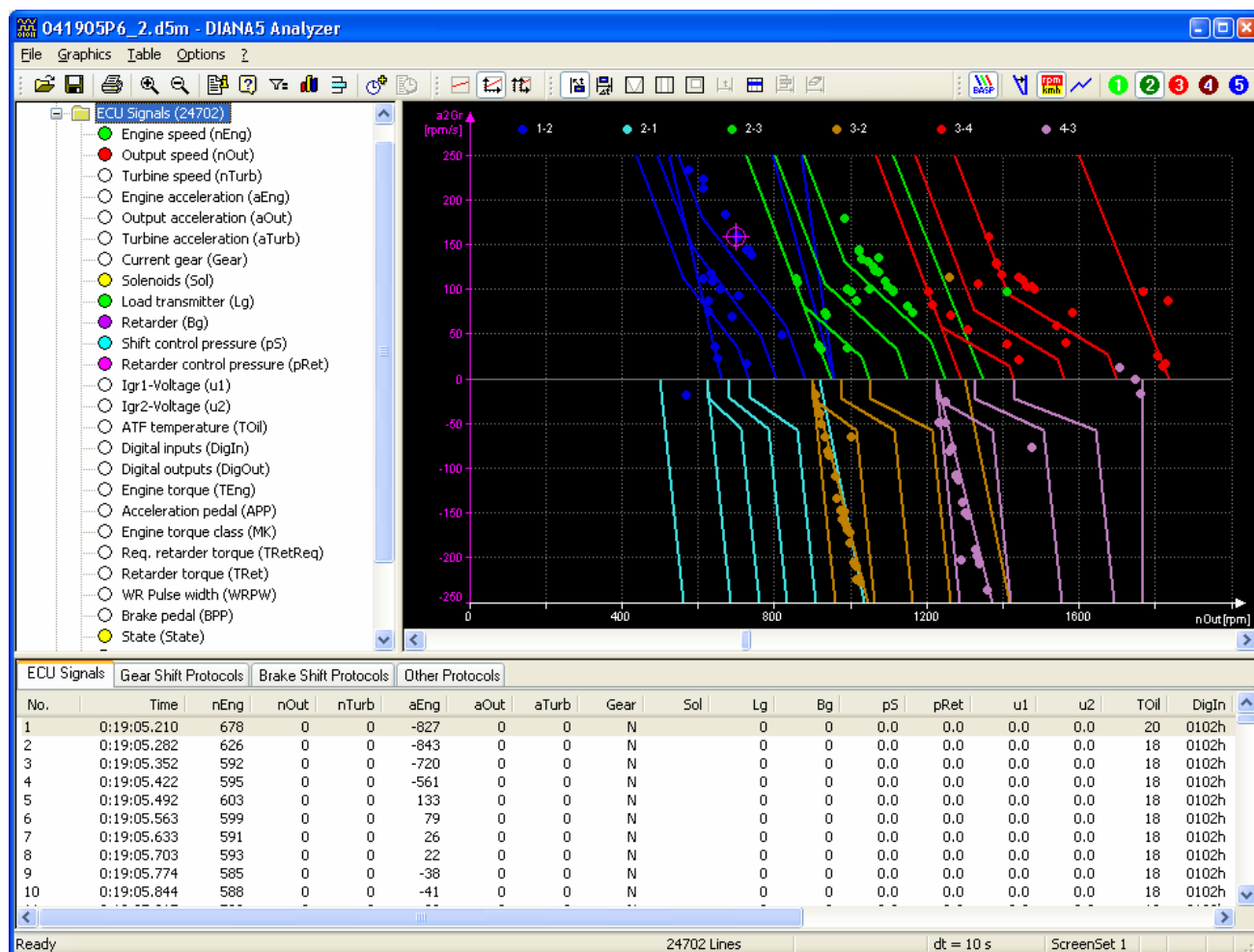
BASPViewer is looking in the dataset directory (DIANA5 Program Properties).

Depending on the version of BASP, there are up to 5 shift programmes. You can use the number buttons 1-5 to select a different shift program. By default, the active shift program will be selected.

BASPViewer will create a diagram, which shows the output speed or velocity as x-axis and the acceleration as y-axis. The small dots represent the gear shifts of the shift protocol table. The coloured lines are the shift lines, which are defined in the dataset of the ECU.

If you have selected the shift protocol table in the table view, the cursor will reflect the currently selected gear shift.

You can use the table filter, to display only some special gear shifts in the table and graphic view.



The graphic view masters nearly all known mouse mode functions. Especially the focus function can be used to select a gear shift in the table by clicking a dot in the graphic.

You also have the choice to display the gear shift point before or after the gear shift.

Another function allows to replace the y-axis with the engine speed. In this case, no shift lines are displayed. The *km/h* button can be used to change the scaling of the x- and y-axis. This scaling is only valid, if the tyre radius and axle ratio are correct (Recording details).

The graphic of the BASPViewer can also be printed or copied to Windows clipboard.

By pressing the BASPViewer button you can always switch back to the time based graphic view to analyze the gear shift further.

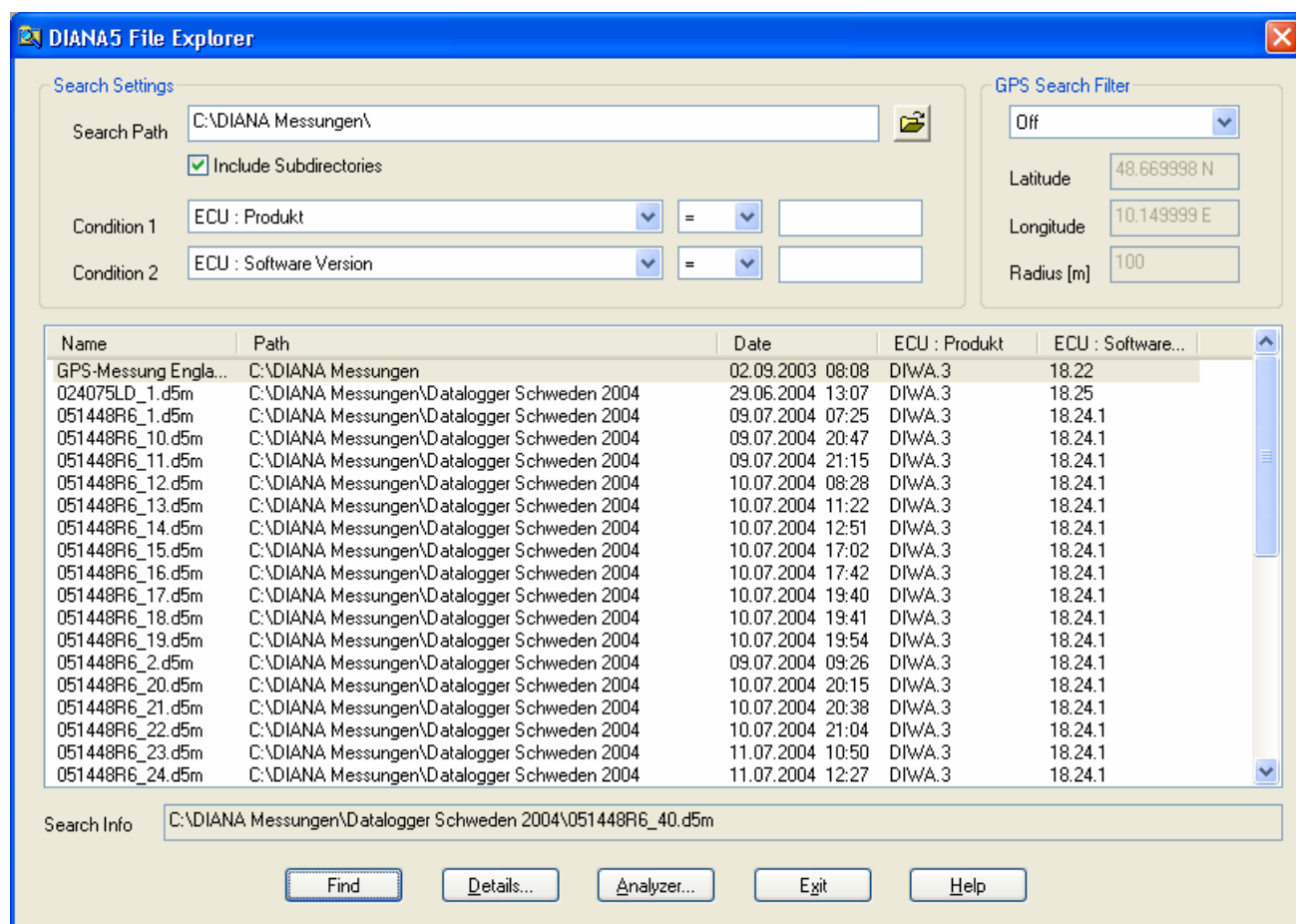
Comment

Because of the different dataset handling of DIWA.5 and NPU, you also need to have the right DIANA5 variable file.

To display the shift points, the BASPViewer function will create some additional signals in the shift protocol table on the first call.

5 File Explorer

This program helps you to find measurement files. You can enter two different search conditions to reduce the results. The search function will look for DIANA5-, DIANA4 and Diwagnosis measurement files.



Select the **Search Path** first. If you want to search all subdirectories, you have to enable **Include Subdirectories**. The next step is the selection of the **Search Conditions**. Lowercase and uppercase are ignored. You can also select the method for searching. This might be interesting in combination with the mileage or other numerical data. There is also the possibility to search measurements with GPS data at a special position within a defined radius.

To start the search, press the **Find** button. You can open the displayed measurement file with a double click or the **Analyzer** button. The **Stop** button will stop the search. You can also click on the Details button to display the recording details of the current measurement file.

If a measurement file is damaged, you should delete it. Otherwise, the File Explorer will always stop at that file. Searching for special signal values will take significantly more time to execute.

Hint

If you select the search conditions and let the input fields empty, you can easily check the selected items in all measurement files.



6 ECUViewer

Refer to *Recording Details* in the Recorder section.

7 Navigator

The Navigator is a small helper program, which allows to start the DIANA5 programs very quickly. When the mouse is over this window,



the following selection window will be displayed :



Press the left mouse button to start the selected program.

8 Information about DIANA5 Measurement Devices

8.1 Electronic Control Unit E200 and E300

You will only need a K-Line level converter and connect the diagnosis plug in the vehicle with the RS-232 port of your PC. This converter can be ordered at VOITH.

Don't forget to select the right COM port in the program properties.

8.2 Softing CANCard

Install the Softing driver, which are included with the CANCard. It is recommended to use version 4.07 or newer. When you start a CAN recording the first time, you will be asked to locate the file "CANCARD.DLL". Normally, you will find it in the directory, where you have installed the CANCard.

Hint

If DIANA has problems with detecting the CANCard, use the Softing program „can_test.exe“ to check, if the installation is correct.

8.3 National Instruments A/D Boards

Install the drivers, which are included with the A/D board. Start the „Measurement & Automation“ program and register the board as first board.

8.4 Quatech A/D Boards

Install the drivers, which are included with the A/D board. Start the „DAQDRIVE Config Utility“ and call the function „Add new Board“. Finally you must save the resulting "DAQP-16.dat" file (or similar) to the Windows system directory. DIANA was tested with Quatech driver version 3.05.

8.5 Intersema Air Pressure Sensor

You can connect a special air pressure sensor to the LPT1 port of your computer. If you are running it under Windows NT/2000/XP, you have to install the additional freeware driver DriverLINX Port I/O (port95nt.exe) from Scientific Software Tools Inc.

8.6 GPS Receiver

All GPS receivers, which apply to the NMEA 2.0 standard can be used with DIANA5. Connect it to the serial port and set the recording properties of program properties.

The serial port of the GPS receiver must be configured with 4800 baud, 8 databits, 1 stopbit, no parity.

9 Glossary

Alias Signal

A signal, which has no own measurement data. It accesses the data of a foreign signal.

Array

A n-dimensional field of variables of the same datatype.

A/D-Board

Measuring device to convert voltages to digital values.

CAN

Fast serial interface for vehicles, which can have multiple transmit and receive knots.

CPU

Microprocessor or microcontroller, which processes the software of an ECU.

ECU

Shortcut for electronic control unit.

GPS

Receiver to find out the exact geographic position.

Marker

Some kind if bookmark, which describes a time position.

MIDI

Serial interface for controlling musical instruments.

MIDI Controller

Device with switches and sliders to control several functions via MIDI.

Sample Rate

The time between two successive measurements of the same signal.

Signal

An object, which contains measurement and configuration data.

Table

A group of signals, which receive their measurement data from the same source.

Trigger

An user defined event, which initiates a special action like recording data.

VI (Virtual Measuring Instrument)

The PC simulation of an analog or digital measurement instrument.