DEWETRON Automotive Applications & General Test and Measurements

Re-inventing Data Acquisition

worldwide

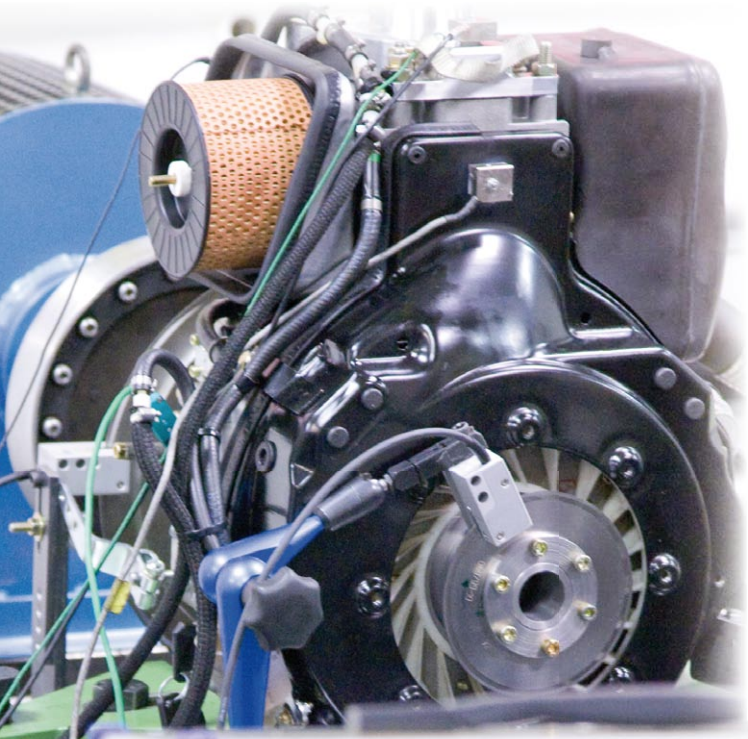
DEWETRON

www.dewetron.com

Working with DEWETRON

Shortest time to high quality test and measurement data

worldwide DEWETRON



Due to shorter product development cycles, the pressure on engineers and technicians to produce accurate and repeatable test data has never been greater. DEWETRON supports them by providing market leading Test and Measurement Instruments and Solutions.

Our system's characteristics:

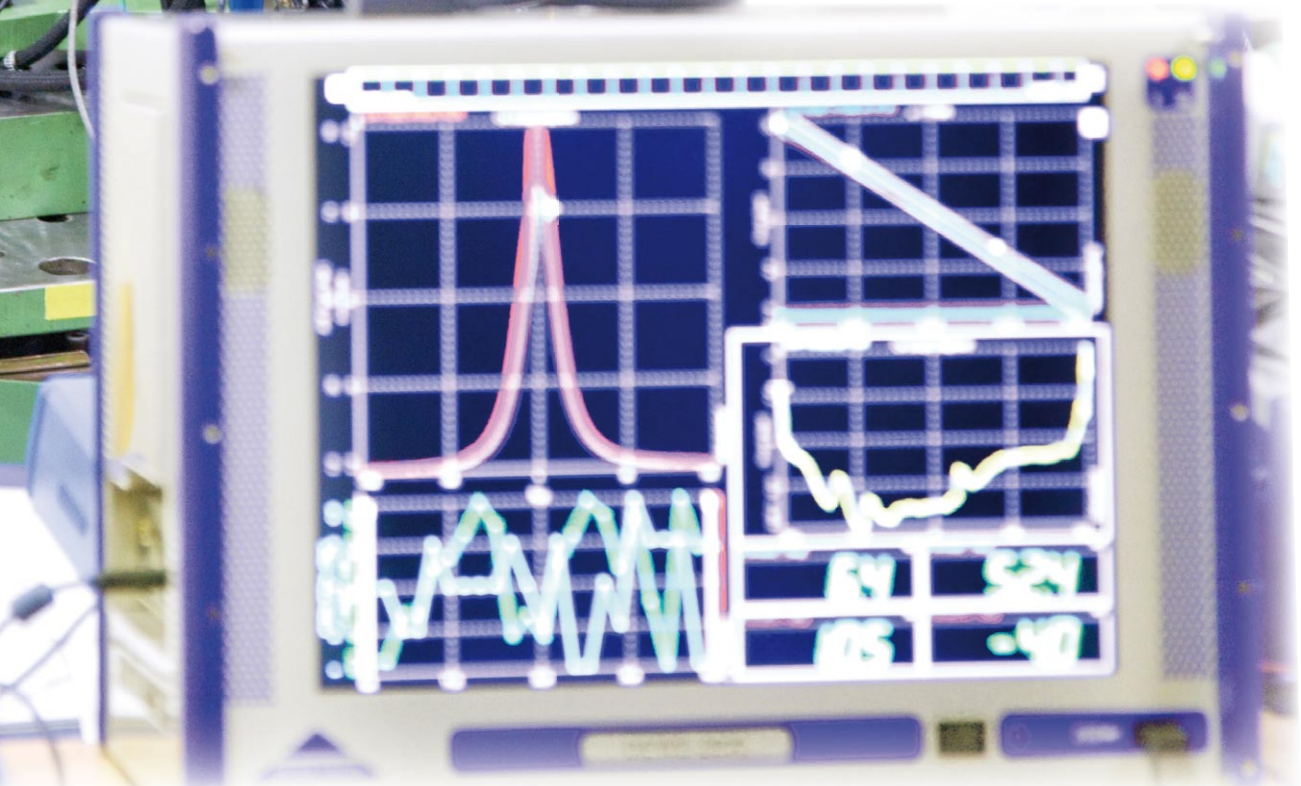
- *Synchronous multi-domain data acquisition*
- *Signal conditioning for any sensor*
- *Market leading software with sensor database support (TEDS and more)*
- *Scalable, flexible and reliable hardware*
- *Worldwide support and service*
- *Connectivity to and many third party products including data analysis software*

DEWETRON's unique product architecture put data from many sources in one RECORDING and in SYNC. Having automatically all data synchronized, makes data analysis and processing faster and easier than ever. This brings a whole new level of understanding and comparing test data and results.

Specialized know-how and many years of experience make DEWETRON the reliable partner for demanding test and measurement applications.

Whatever your measurement application is - WE HAVE THE SOLUTION!

DEWETRON - Re-inventing Data Acquisition



Why DEWETRON?

SYNCHRONOUS MULTI-DOMAIN DATA ACQUISITION

Consider testing a car or airplane. You will want to connect some sensors of your own, such as accelerometers, thermocouples, RPM, etc. In addition you will connect to the CAN BUS or in airplanes, to ARINC 429BUS and monitor one or a hundred parameters. And you might as well use a GPS sensor to get position, a more precise speed, distance, direction, etc. Finally, why not hook up a camera so that you can record what the driver/pilot saw, or to watch a wheel turning?

So immediately we have ANALOG sensor data + COMMUNICATION BUS digital data + GPS serial data + VIDEO frames... all of these data types exist in different domains, and they come into our system at their own rates, i.e., asynchronously. Our systems can easily sample asynchronous multi-domain data input simultaneously (one clock for all channels) from these sources AND MORE!

We offer all of these interfaces, and more for most of our systems. More interfaces are being added all the time.

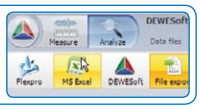
SCALABILITY AND MODULARITY

Our different signal conditioning amplifiers cover a wide range of input types for any sensor.

The ability to scale from a few channels to many and to split in several housings without compromising the simultaneous data sampling of all channels is unique. Consider large scale testing facility e.g. a train with hundreds of dynamic sensors and perhaps thousands of static measurements. You can have several Measurement Instruments and use each separately or have them networked from different locations and combined to one multi channel measurement solution.

Rugged designs (MIL-STD and EN STD) allow our systems to go just about anywhere, and get the job done from rack-mounting up to mobile.

CONFIGURE, CONTROL, MEASURE, PROCESS, ANALYZE AND STORE



DEWESoft - our award-winning software is standard on all Measurement Instruments and Solutions. DEWESoft provides the interface to all DEWETRON hardware, the interfaces, signal conditioners, A/D cards ... and allows you an unprecedented level of control over the data sampling (with multiple modes) and visualization (screen lay out). The online (during measurement) data processing with mathematical formulas simplifies and accelerates data analysis. Multiple export filters allow post-analysis and documentation with your existing tools. Programming interfaces are available to extend DEWETRON systems to your specific needs.

For each measurement, sensor parameters together with the test parameters can be stored in the data file. This enables easiest and complete post-processing of measured data and allows seamless repetition and traceability of tests.

QUALITY FIRST

Our commitment to Total Quality is based on the understanding of what is important for the success of our customers. It starts with the definition of the technical specification, covers the development, production, quality control, shipment, and ends with support and service of our systems during the operation. Our systems cover a wide range of meeting specifications and norms (EMI, CE, etc) and each of our components and systems come with calibration certificates.

DEWETRON is ISO 9001:2000 and ISO 14001:2004 certified with rigorous quality procedures and documentation of every aspect of our business.

SUPPORT AND SERVICE

DEWETRON and partners are close to you in more than 25 countries around the world. We offer one stop shopping to define the optimal test and measurement system for your need and application. After shipment we can provide training on-site or at our locations. Over the long life cycle of our systems, support and service close to you exist in multiple languages. Different calibration services for our components and systems are available.

LEADING TECHNOLOGY

State-of-the-art technology is used in every aspect of our systems to achieve market leading precision and accuracy.

Our high precision signal conditioning amplifiers with galvanic isolation cover a wide range of input types for any sensor and offer high Common-Mode Rejection Ratio. The AD conversion with different resolution and sampling rates offer time synchronized data capture of all analog channels, digital I/O, counters, encoders and CAN-Bus signals. Our mechanical designs provide excellent shock and vibration specifications.

Put it all together to create a DEWETRON system – time synchronized, multi-domain, flexible, reliable and easy to use Test and Measurement Instruments and Solutions.

DEWETRON - Re-inventing Data Acquisition

Combustion Analysis (on page 7)

Key Features

- *Synchronized multi-channel data acquisition*
- *In-vehicle and testbed application*
- *Crank angle and time domain data acquisition*
- *Direct pressure and angle sensor connection*
- *CAN-out, analog out, testbed interface*
- *Combustion noise calculation*
- *Programmable angle sensor support*
- *Extended combustion and thermodynamic analysis*
- *Cold start testing*
- *Export to different file formats (txt, ifl, ...)*

CAPS System (on page 19)

Combined Active and Passive Safety

Key Features

- *Easy mounting, setup, alignment and calibration*
- *Ready-to-go CAPS measurement solution*
- *Multifunctional measurement system*
- *Synchronized analog, digital, video data*
- *Master and slave synchronization via GPS clock*
- *Online data transfer to master system*
- *Developed with TÜV SÜD Automotive and GeneSys*
- *High accurate combined GPS and Gyro measurement*
- *Comparable and reproducible tests*
- *Multisensor inputs (voltage, acceleration, strain, etc.)*
- *Automated report generation for predefined maneuvers*

Road Load Data (on page 27)

Key Features

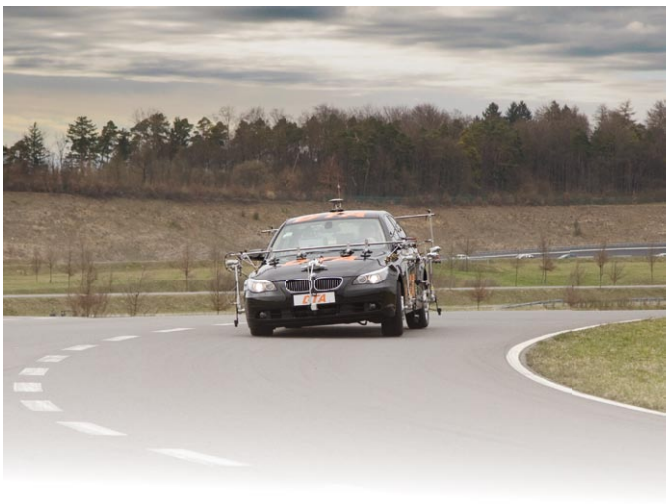
- *High channel count (16 to 1000 channels)*
- *22-bit aliasing free sampling*
- *Multiple inputs (voltage, acceleration, strain, etc.)*
- *Support for Kistler RoaDyn® measurement wheels*
- *Flexible filtering capabilities*
- *Realtime mathematics*
- *Export to different file formats (supports RPC III)*
- *Battery powered, portable system for in-vehicle use*
- *Easy mounting, setup, alignment, and calibration*
- *Real time analog output*

Basic Brake Test (on page 39)

Key Features

- Integrated 100Hz GPS receiver
- Quick and easy test setup
- Automated workflow with DEWESoft sequencer
- Automated report generation
- Synchronized data acquisition of GPS, analog input, CAN, counter and video data
- Multisensor input (voltage, strain, bridge, ...)
- Export to different file formats

Ride and Handling (on page 47)



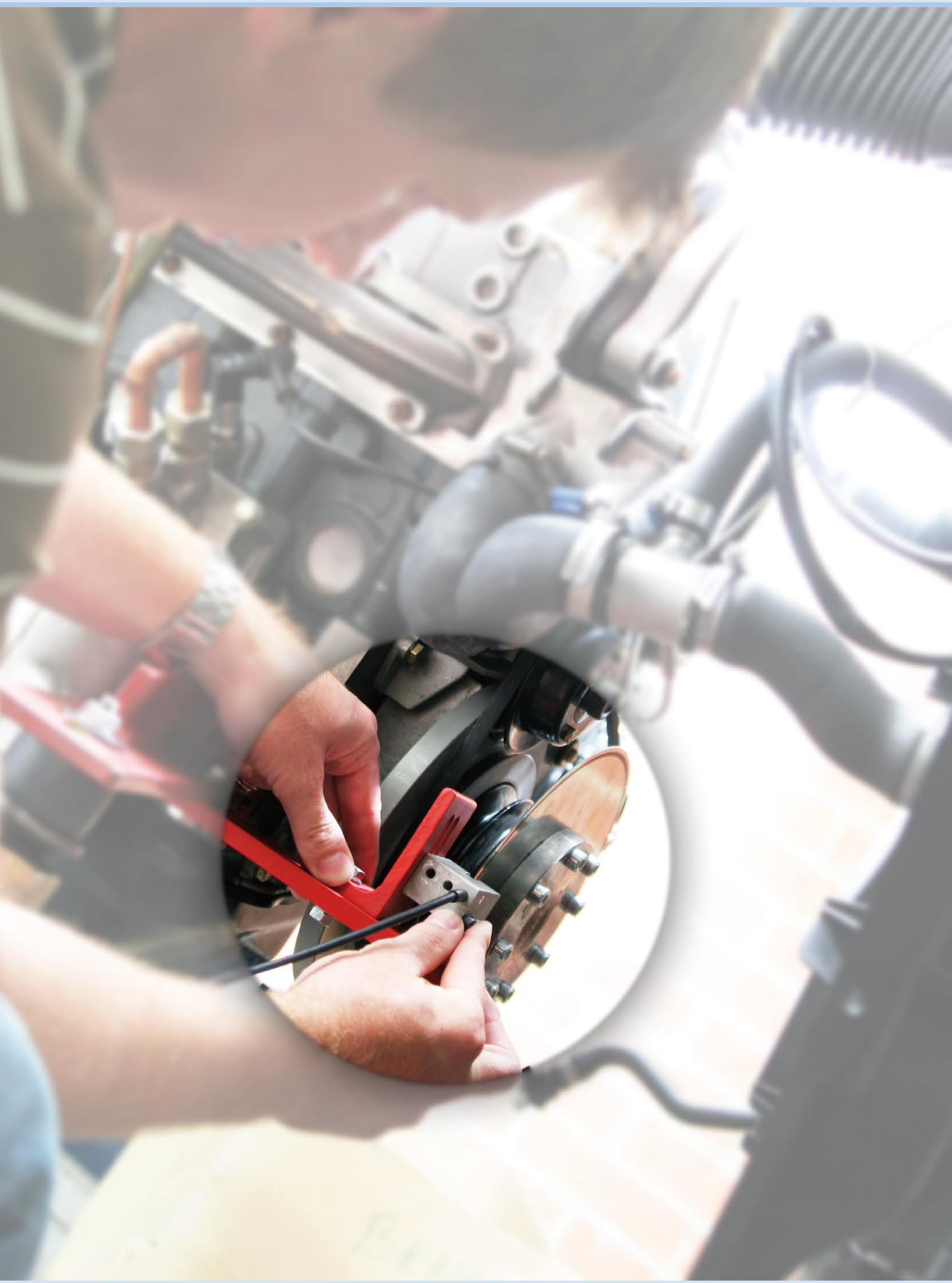
Key Features

- Synchronized multichannel data acquisition without phase errors
- Proven package due to DTA
- Guaranteed compatibility of the whole system
- Compact and rugged equipment for in-vehicle use
- Easy mounting, setup, alignment, and calibration
- Multisensor inputs (voltage, acceleration, strain, etc.)
- Aliasing free sampling and flexible filtering capabilities
- Real-time Mathematics
- Support for Kistler RoaDyn® measurement wheels
- Export to different file formats

Pass-by Noise System (on page 55)

Key Features

- Flexible pass-by noise system for multi purpose use
- Integrated 100 Hz VGPS speed sensor
- Automated report generation
- Reuse of existing sensors
- Fully battery powered
- Re-use of existing sensors
- Multisensor input (voltage, strain, bridge,etc.)
- TEDS support for microphones
- CAN and OBD interface



Combustion Analysis

DEWETRON Combustion Analyzer systems are used for engine research, development and optimization. Also for component development and testing – such as ignition systems, exhaust systems and valve control gear.

The system supports angle and time based measurement and uses highly improved algorithms for online mathematics and statistics – calculating heat release and further thermodynamic parameters. Offline calculation and the export to several file formats are included.CAN, video, Ethernet and the integration within a testbed is also supported.

In addition to combustion analysis, the system can be expanded to handle other measurement applications such as hybrid testing on the power train, noise and vibration measurement together with synchronized video or GPS data.

Key Features

- *Synchronized multi-channel data acquisition*
- *In-vehicle and testbed application*
- *Crank angle and time domain data acquisition*
- *Direct pressure and angle sensor connection*
- *CAN-out, analog out, testbed interface*
- *Combustion noise calculation*
- *Programmable angle sensor support*
- *Extended combustion and thermodynamic analysis*
- *Cold start testing*
- *Export to different file formats (txt, ifl, ...)*

Testbed interface
Analog/RS-232/
Ethernet

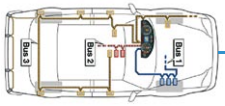
DEWE-VGPS
Position interface

DEWE-CAM
Video

Additional Sensors
Intake pressure
Exhaust pressure
Water temperature
Air volume
Fuelmass
Electrical power
Acceleration

CAN-OUT (ETAS INCA)

DEWE-ORION card



CAN

Counter input

Digital input

Digital output

Industrial PC
PC

DEWESoft

DEWESoft CA
Combustion Analyzer

CA-OPT1
Extended Mathematics

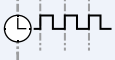
CA-OPT2
Torsional and Rotational Vibration

CA-OPT3
Combustion Noise

DAQP Module
Signal conditioning
Sensor supply

Analog input

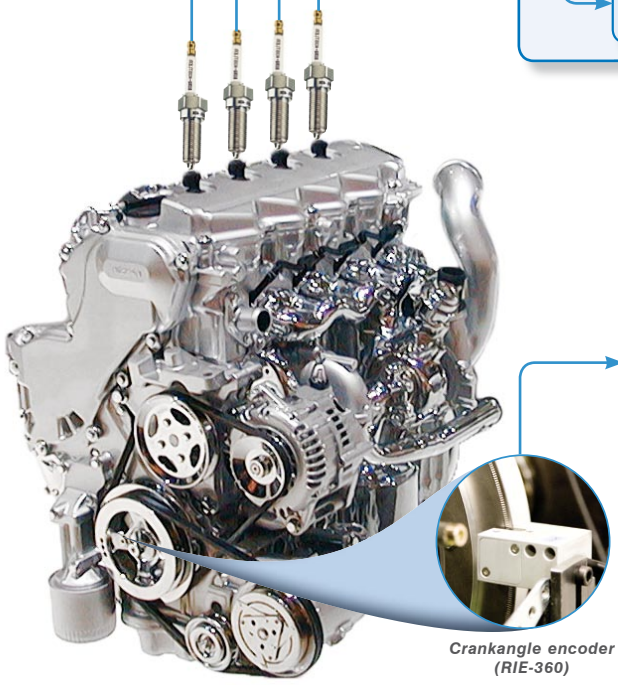
Trigger input



Crankangle CPU

ext. clock

int. clock



Crankangle encoder
(RIE-360)

pV Diagram

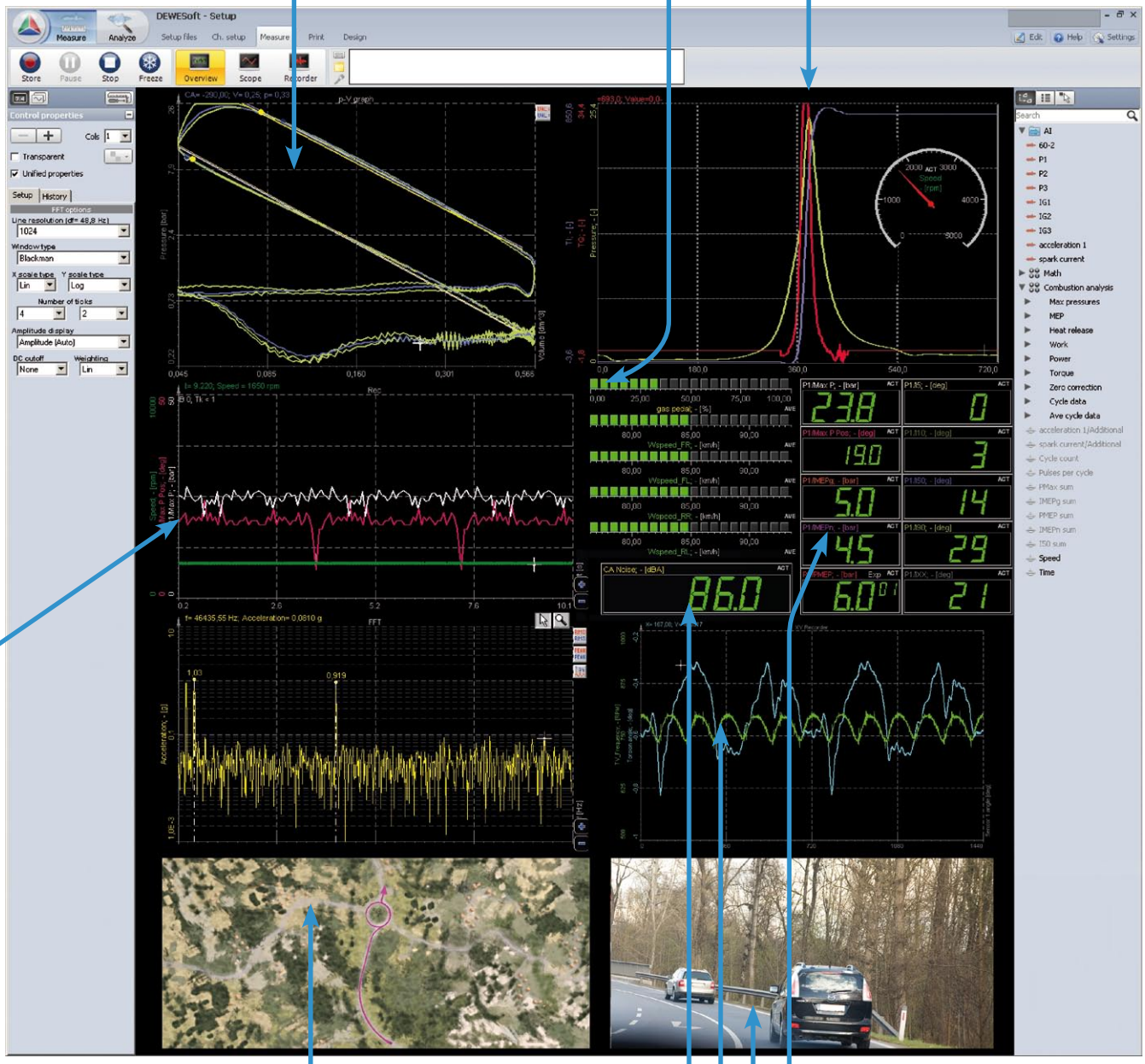
Pressure versus volume graph

CAN

Synchronous data from CAN-bus

CA Scope

Pressure versus angle display, heat release, integrated heat release, speed etc. and the average of all these could be shown.



GPS

Position data

Recorder

Maximum pressure and angle of maximum pressure

Combustion Noise

Calculates the engine noise online

Torsional and Rotational Vibration

For enhanced analysis

Video

Synchronized video information

Extended Mathematics

MEP values, statistics, derivation

Heat release calculation

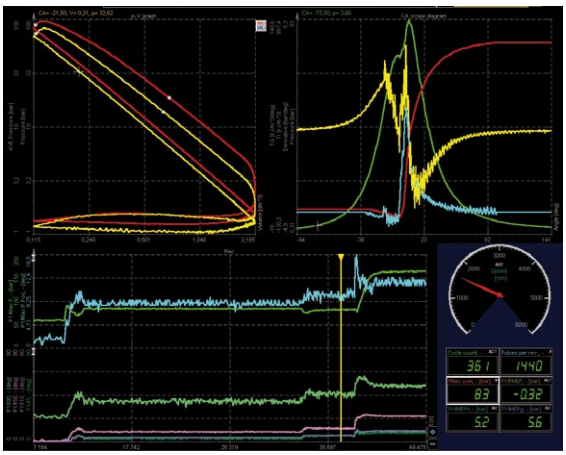
Energy, progression with exact SOC and EOC (start and end of combustion)

Combustion Analyzer Application

Combustion analysis is a standard application for all research, development and calibration tasks of a combustion engine and development of exhaust gas after treatment. From the beginning of a prototype - e.g. for friction testing or in research for basic particle or emission analysis, combustion analysis is required. On the engine testbed, combustion analysis is a standard tool to calculate and visualize relevant physical parameters from the combustion engine and to monitor and protect the unit under test.

An exact identification of the top dead centre and a calibrated and compensated measurement chain is the key to accurate measurement results. Combustion analysis is often used on a chassis dyno or even for the prototype within the driveability calibration procedure to optimize engine and vehicle behavior.

DEWETRON Combustion Analyzer can be used on all types of combustion engines, such as car, truck, ship, motorcycle, power-saw, etc.



Engine Research and Development covers the following tasks:

- *Misfire and knock detection*
- *Friction analysis*
- *Injection and ignition analysis*
- *Valve control system and timing*
- *Combustion noise and vibrations*
- *Mechanical stress diagnosis*
- *Energy balance*
- *Gas exchange analysis*
- *Residual gas verification*
- *Exhaust gas after treatment*
- *Engine mapping*

Based on the measured pressure signal, DEWESoft-CA calculates all important parameters online and can be used for visualization, monitoring and alarm procedures on the testbed. Additional results can be calculated with post-processing and used to generate professional reports.

Workflow Support

Upload the XML setup and choose the sensors from the sensor database. The setup can be done offline. For measurement you connect your sensors and fine-tune the setup. Some sensors need a zero adjustment before measurement. With a few simple clicks you adjust the prepared visualization screens to your needs – and the test starts.

- *Offline Setup*
- *Sequence Control*
- *Sensor Database*
- *TEDS*
- *Engine Data Setup*
- *Global Header*
- *Data Import and Export*

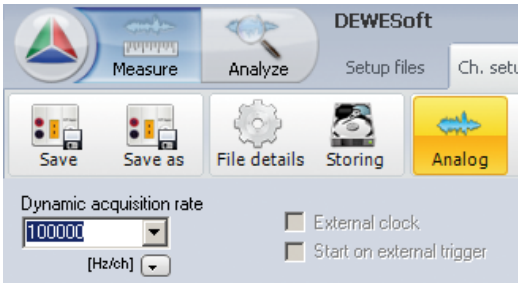
Time and Angle based Measurement

A standard Combustion Analyzer uses external clocking for an angle based displays. The disadvantage of such a setup is that the time information is missing, so only angle based data is shown.

Internal clocking with a fixed sampling rate avoids this problem. The DEWETRON Combustion Analyzer uses resampling technology to record in time domain and transfer all the CA related values to angle domain. This technology is needed for:

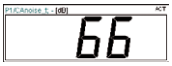
- *Cold start test*
- *CA noise measurement*
- *All benefits of time domain measurement*

CA measurement and time measurement (FFT [Hz]) of a vibration channel.



Fixed sampling rate

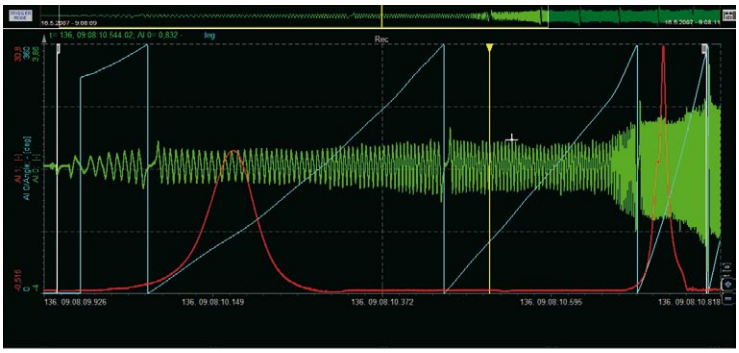
CA Noise

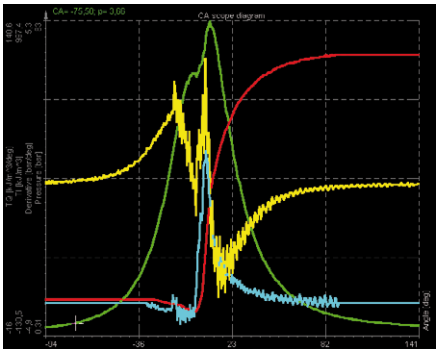


dB(A)

Cold-start testing

The accurate resampling technology with time based measurement and fixed sampling rate allows us to analyze not only the first cycle, but even the first movement of the piston. The example shows the pressure signal based on the resampled analogue (60-2) angle information. This technology can be used for any angle sensor.

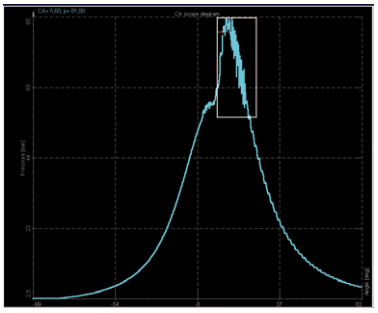




Knock Detection (CA-OPT1)

For spark ignition engines, knocking is often a strong limitation for a parameter variation of an engine. Knocking causes damage to the structure of the engine.

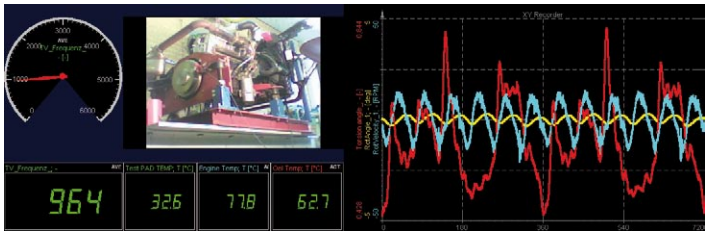
The screenshot shows typical knocking signal of a gasoline engine. The high frequency bouncing after the TDC in the frequency range between 10 to 15 kHz is a typical indicator of engine knock.



Torsional and Rotational Vibration Analysis (CA-OPT2)

This powerful package supports advanced mathematical features for torsional and rotational vibration, including differential revolution and slippage measurements.

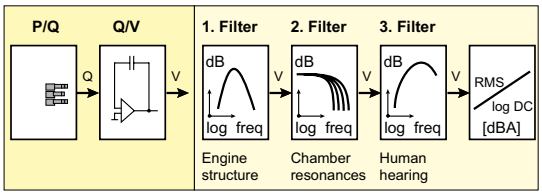
- *Angle resolution up to 0.00075° at 10000 rpm*
- *Supports all incremental position encoders*
- *Definable setting of filters and calculations*
- *Definable display settings*



Combustion Noise (CA-OPT3)

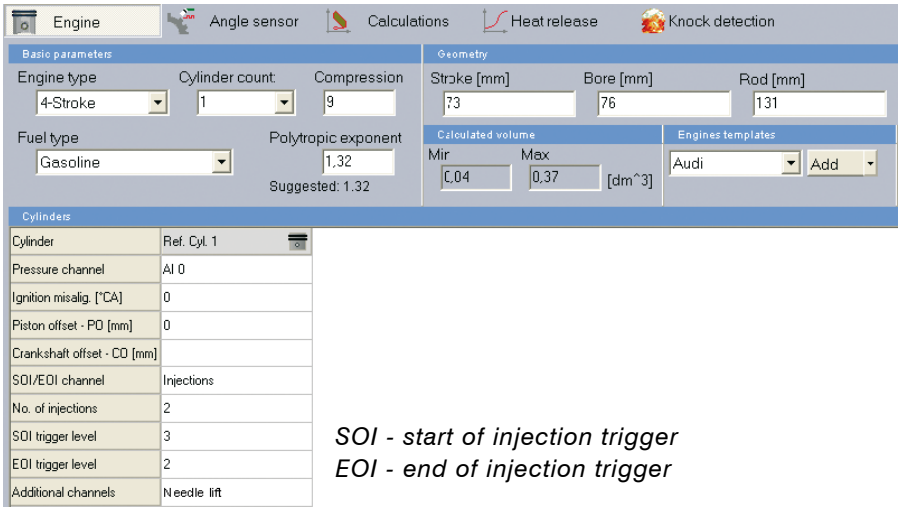
The combustion noise option allows the measurement of noise level caused by an internal combustion engine during operation.

The CA-noise must be calculated in time domain. First the value is scaled from bar to Pascal. This is followed by the U-filter, which simulates the transfer function of the engine, (1. and 2. Filter in the overview).

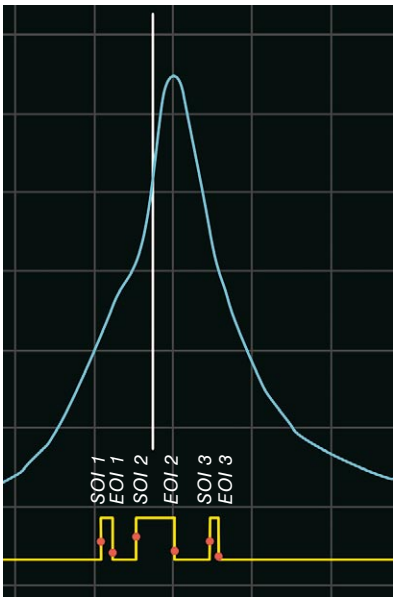


Additional Channels, Multiple Injections

- *Any additional signal can be acquired and referenced to the appropriate cylinder channel*
- *For injector signals (or any other signals) the angle information of SOI and EOI (start of injection and end of injection) is measured. For multiple injections this information is available for all SOI and EOI.*



SOI - start of injection trigger
EOI - end of injection trigger



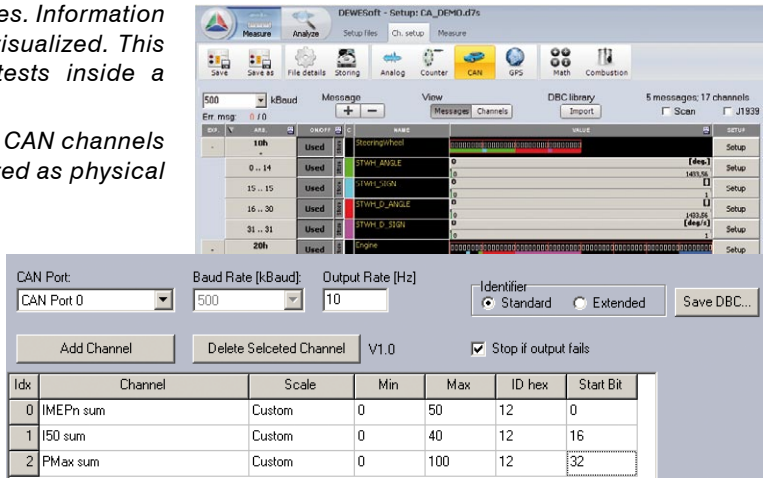
Testbed Interface

A Combustion Analyzer can be integrated within a testbed system, which receives all the calculated results. Different protocols via Ethernet or RS-232 are supported – e.g. AVL PUMA Open. Also analog output channels are supported.

CAN Input (option)

The CAN option adds two high speed CAN interfaces. Information from the CAN bus is recorded synchronous and visualized. This feature is especially useful while performing tests inside a vehicle or using CAN sensors.

After importing existing dbc libraries, the required CAN channels are set up as measurement channels and are treated as physical measurement channels.



CAN Output (option)

CA relevant parameters are communicated to an ETAS INCA system via CAN.

DEWESoft Net (option)

DEWESoft Net allows the communication between different DEWETRON systems and a standard PC. The system can be configured as stand alone, as master or as a slave unit. It's also possible to use any PC for remote control. For the CA application it is very useful to have the measurement device in the testbed chamber and remote it by DEWESoft-NET.

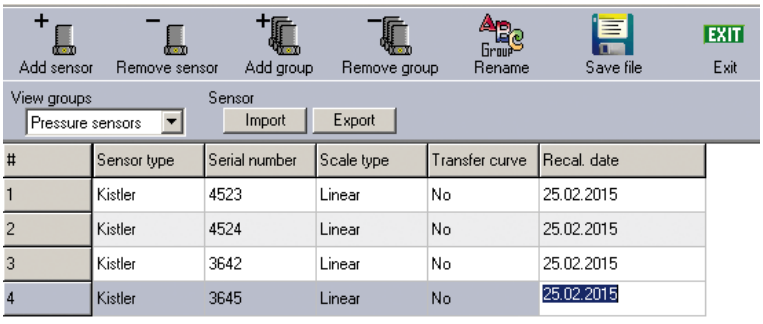
Sequence Control

The sequencer is a tool to predefine process steps in a sequential format. The interface can be graphically programmed or in a code oriented view. The sequence is stored with the system setup so a measurement can be repeated at any time under the same conditions (traceability). So it's possible to manage these sequences centrally to guarantee a standardised and defined measurement procedure.

Sensor Database and TEDS

All sensor data is stored and maintained in the sensor database. This database keeps a comprehensive list of sensors and all their parameters, including scaling, units and calibration date info.

One click and the entire channel is set up and scaled. If necessary it's possible to zero the sensor or even to renew the calibration parameters. This guarantees the reproducibility, traceability and quality of the measurement results.



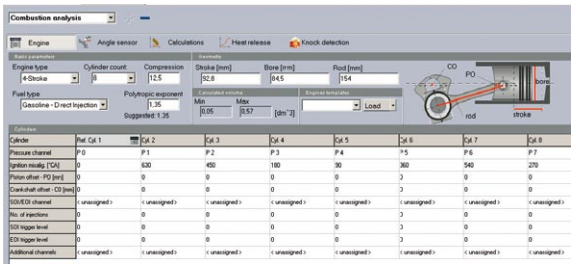
To make the sensor setup even more automated, our signal conditioning modules support TEDS, which is a standardized „smart sensor interface". TEDS is an acronym for Transducer Electronic Datasheet. It is a table of parameters (manufacturer ID, model number, serial number, version, and many more) that identifies the transducer.

Engine Setup

Set up the engine type with the number of cylinders and its geometrical parameters. In the Cylinder menu the analog channel and the cylinder specific parameters are defined. Analog channels of each cylinder as well as the alignment of the cylinder angles. Different setups and engine parameters can be stored for later use.

Engine relevant parameters:

- *Geometry*
- *Engine type*
- *Cylinder count*
- *Fuel type*
- *Polytropic exponent*
- *Additional channels*

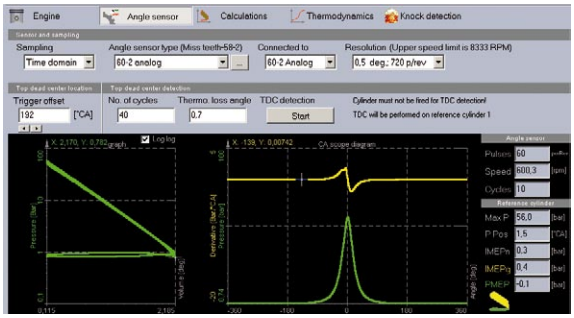


Setup of Angle Sensor

- *Sampling method (time or angle based)*
- *Angle sensor type (encoder, CDM or 60-2)*
- *Angle resolution*
- *TDC (top dead center) setup*

Two possibilities to define the TDC:

- *Measure the cylinder pressure without firing the engine, and the peak pressure will be at the TDC. (Must be corrected with the thermodynamic loss angle)*
- *Use TDC detection sensor, this sensor will provide the exact TDC position.*

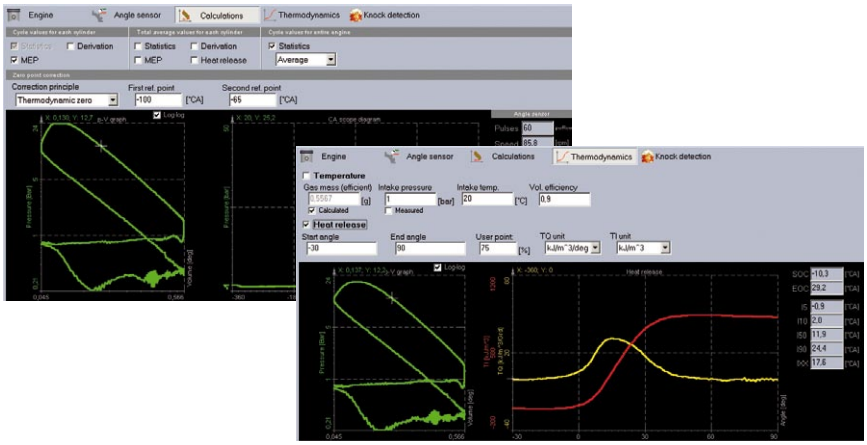


Calculations

MEP values, derivation and heat release

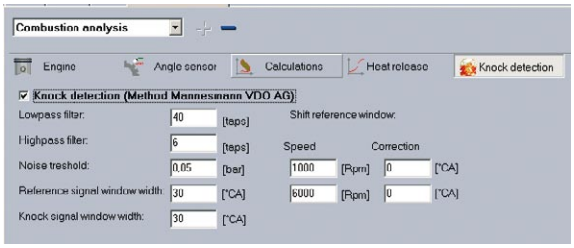
Different methods for thermodynamic zero correction:

- *Thermodynamic zero*
- *From known value*
- *From measured value*



Knock Detection

Knock detection is based on the pressure signal within an area of typical 30 degrees before and after TDC. The integrated signals of these two areas are an online comparison of these two areas. The result is shown as the knock factor (Kf).



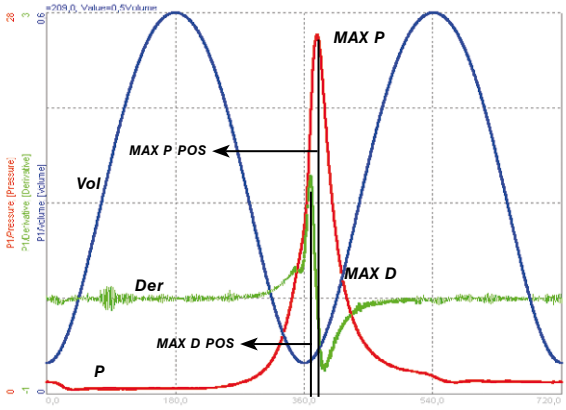
Online Mathematics and Statistics

The physical channels can be expanded with the online mathematics, filters and statistics (sample-based and block-based). Math channels can be used and displayed like any other channel, e.g. for triggering. Online calculated values may be used for optimization or other automated procedures.

Calculated Results

Online calculated values are required for visualization and monitoring also for optimization or other automated procedures. For many calculated parameters, the correct determination of the top dead centre and the correct setup of the engine is essential.

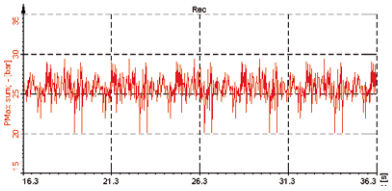
Calculated combustion figures are values that require other information such as engine parameters or crank gear geometry for calculation in addition to the basic pressure curve. Mean Effective Pressure, Start of Combustion, Energy Conversion, Mass Burned Fractions or Combustion Noise are examples of those parameters. These parameters are calculated online up to the limit of processing power - and in DEWESoft-7 you can calculate the values required offline with the recalculation feature.



Based on the engine setup parameters many online calculations are done:

- *Basic statistic channels (max pressure, max pressure position...)*
- *Derivation of pressure and position of maximum derivative*
- *Mean effective pressures*
- *Overall cycle calculations are:*

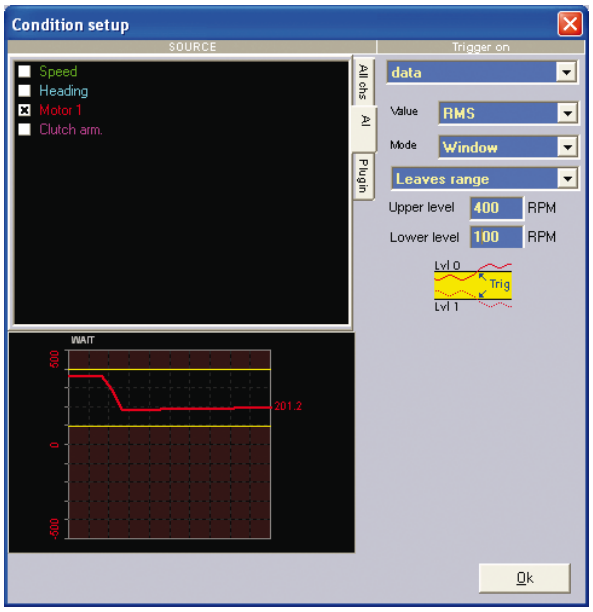
  Cycle count, missed triggers, frequency...



Triggers and Alarms

DEWESoft includes a versatile TRIGGER section for measurement control, which includes the following types of trigger conditions:

- *Simple edge (either rising or falling slope)*
- *Filtered edge (edge plus a rearm level; either slope)*
- *Window trigger (two levels; entering or leaving logic)*
- *Pulse-width trigger (longer or shorter than duration logic)*
- *Window and pulse-width (completely selectable as above)*
- *Slope trigger (either rising or falling slope)*



It is possible to define a trigger within the Fourier Spectrum using a FFT trigger for a certain range of frequency - so you can trigger from frequency and magnitude.

Even relative or absolute TIME as a trigger source can be set to trigger an action. You can always press the manual TRIG button to force an acquisition at any time.

All of these sources are available also to STOP the acquisition or set a digital alarm channel.

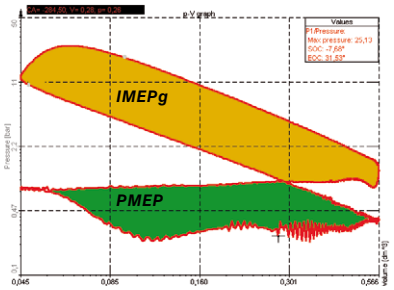
The signal can also be used to control a digital output e.g. to stop the engine.

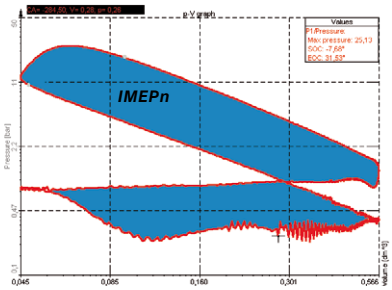
Heat Release

Analyzing the measured pV diagram is a proven method to gather information for each cycle. The online heat release calculation gives you the energy for each cycle and various parameters. Result is furthermore the exact angular progression (5, 10, 50 or 90 %) of the energy. Also the SOC (start of combustion) and EOC (end of combustion) is calculated. All these values are based on the heat release algorithm. The Combustion Analyzer shows all these values as well as relevant mean values IMEPg, PMEP and IMEPn – all these values can be online accessed in a graphical or in a numerical view.

Mean Effective Pressure Values

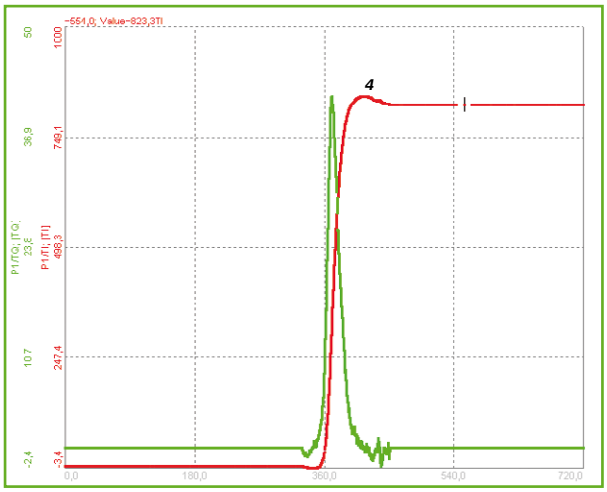
The mean effective pressure is the indicated work done by the gas on the piston using the effective volume. Because it is independent of the engine speed and cylinder size means that it is a good comparison between different engines. Three mean effective pressure values (MEP values) are calculated.



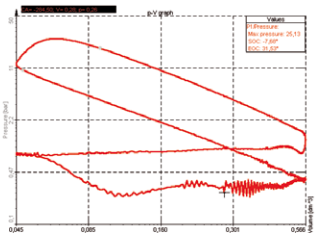


Heat Release

TQ shows the calculated heat release and corresponds to the indicated moment. TI is the integrated TQ over a cycle. The CA module calculates the interesting points at 5%, 10%, 50%, 90%, 95% - these are usually the interesting points in heat release analysis.



Start and end of combustion can be shown in the pV diagram (calculated out of heat release). Start of combustion in diesel engines is defined as zero crossing of heat release and in gasoline engines it is the 5% of heat release. End of combustion is set to 95 % of the heat release.



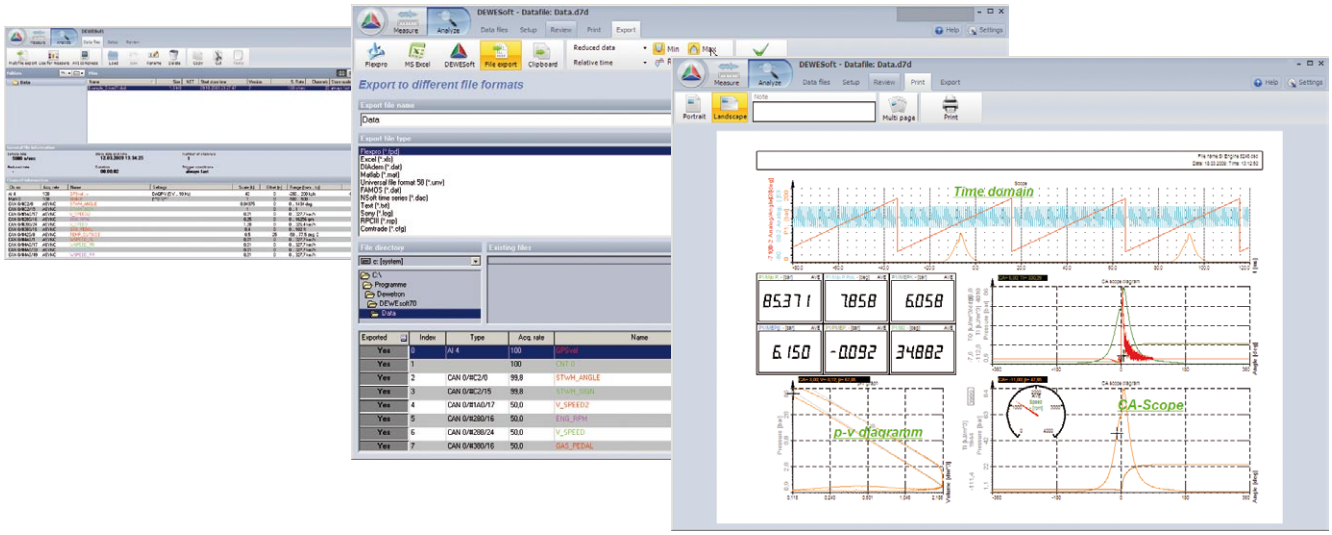
DEWESoft Postprocessing

DEWESoft 7 allows you to recalculate additional mathematical channels. Add new channels and resample the settings of the encoder or of the engine. All parameters are recalculated and saved in the datafile. Using this feature it's possible to avoid CPU consuming calculation during the measurement – the channels can be produced in the office after the measurement procedure.

Analyze Mode - Replay, Export, Share Data

You can replay any captured data file, zoom in with the recorder graph cursors, make measurements, print in full color to any printer.Export the data to a wide variety of formats compatible with today's popular analysis software package, like FlexPro®, MATLAB®, Excel®, AVL CONCERTO™ and many more. You can even export the whole measurement view to an AVI video file to create dynamic documentation.

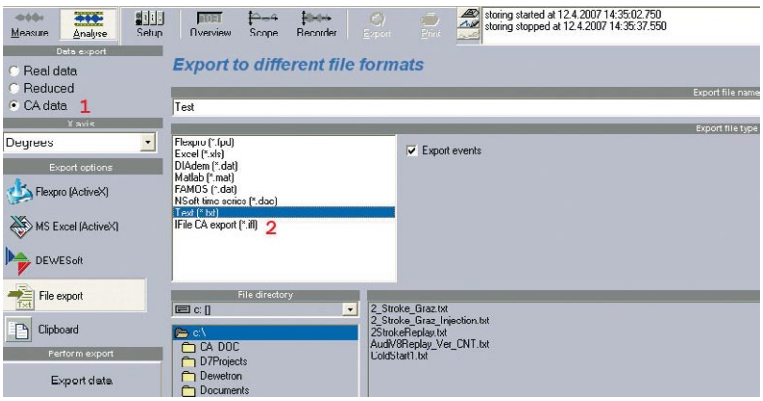
No license is needed to use DEWESoft in the ANALYZE mode. So you can install the software on all your computers, or even distribute it to your customers, and they can view to the results. In this way, all of your colleagues and customers can replay your data files – just by sharing the data file!



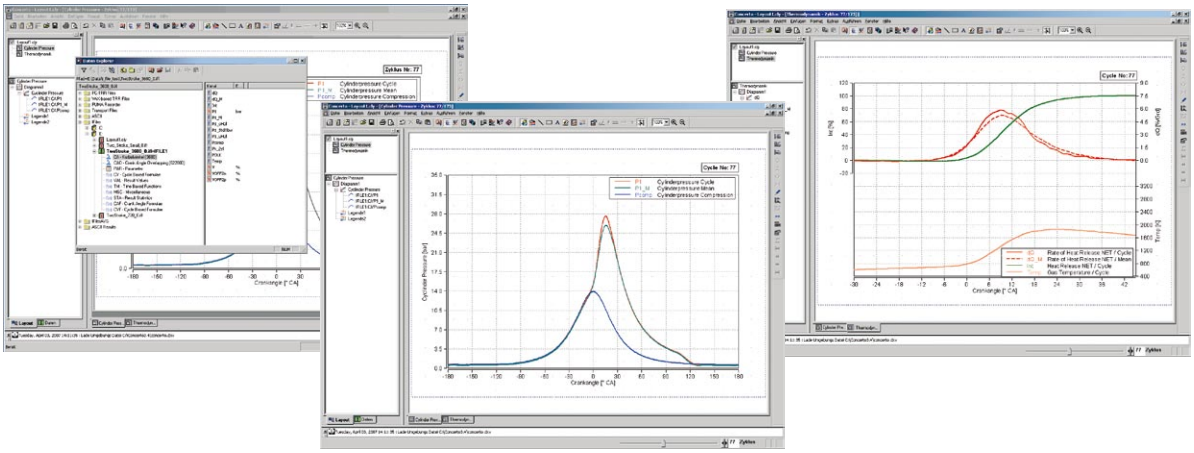
The export dialog allows selecting different export file formats in time and angle based format. For angle based data export you select the CA data option. Choose the format and start the export.

DEWESoft supports a wide range of export file formats:

- *FlexPro®*
- *Excel®*
- *CONCERTO™*
- *DIAdem™*
- *MATLAB®*
- *UNV*
- *FAMOS*
- *nSoft*
- *Text*



Typical analysis-example using AVL CONCERTO™:



DEWETRON CA Hardware Configuration




	DEWE-211-CA	DEWE-800-CA	DEWE-2600-CA	DEWE-5000-CA
Application	Smallest CA system, typically motorcycle	Testbed, rack mounted	In-car-use, fully battery powered	Portable or testbed
Analog input channels	2 x charge 6 x voltage	16 DAQ series modules[1)] e.g. charge, voltage	16 DAQ series modules[1)] e.g. charge, voltage	16 DAQ series modules[1)] e.g. charge, voltage
Digital channels	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI
Channel expansion	No	Yes	Yes	Yes
CAN interfaces	2	Up to 4 (opt.)	Up to 4 (opt.)	Up to 4 (opt.)
Video	DEWE-CAM or USB DirectX	DEWE-CAM or USB DirectX	DEWE-CAM or USB DirectX	DEWE-CAM or USB DirectX
Display	External MOB-DISP-x	External	15" 1024 x 768	17" 1280 x 1024
Power supply	8 – 30 V_{DC}, external AC adapter	115 / 240 V_{AC}	Battery powered, 18 – 24 V_{DC}, ext. AC power supply	115 / 240 V_{AC}
Dimensions (W x D x H)	317 x 252 x 92 mm 12.48 x 9.92 x 3.62 in.	437 x 443 x 181 mm 17.2 x 17.44 x 7.13 in.	417 x 246 x 303 mm 16.42 x 9.69 x 11.93 in.	460 x 351 x 192 mm 18.11 x 13.82 x 7.76 in.
Weight	Typ. 5 kg (11 lb.)	Typ. 12 kg (26.4 lb.)	Typ. 14 kg (31 lb.)	Typ. 17 kg (37.4 lb.)

[1)] DAQ series modules are isolated signal amplifiers and are available for almost all kinds of sensors

Re-inventing Data Acquisition

DEWETRON Ges.m.b.H. • Parkring 4 • A-8074 Graz-Grambach
Tel (0043) 316 3070 0 • Fax (0043) 316 3070 90 • sales@dewetron.com

worldwide DEWETRON
www.dewetron.com

CAPS System

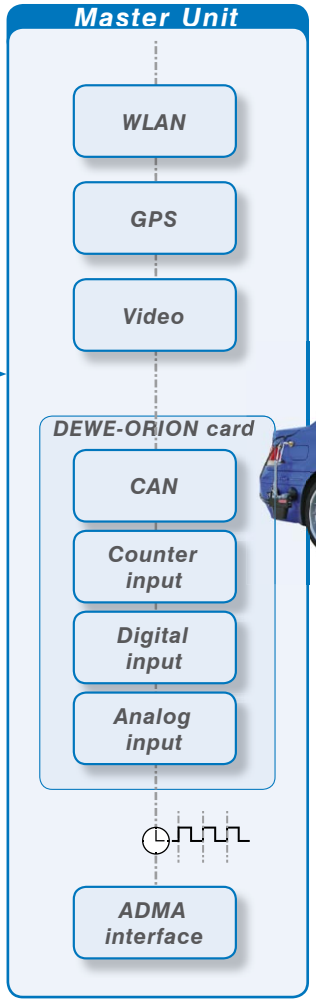
Combined Active and Passive Safety

DEWETRON CAPS systems are used for developing and evaluating CAPS features such as driver assistance, comfort and active safety systems. Together with TÜV Süd Automotive and GeneSys Electronic GmbH we developed an application package for standardized maneuvers to test and evaluate a wide range of CAPS-features.

In addition to CAPS testing, the system can be expanded with additional hardware and software features. Further automotive measurement tasks such as hybrid testing on the power train, brake test, together with synchronized video data is also possible - The possibilities are endless!

Key Features

- *Easy mounting, setup, alignment and calibration*
- *Ready-to-go CAPS measurement solution*
- *Multifunctional measurement system*
- *Synchronized analog, digital, video data*
- *Master and slave synchronization via GPS clock*
- *Online data transfer to master system*
- *Developed with TÜV SÜD Automotive and GeneSys*
- *High accurate combined GPS and Gyro measurement*
- *Comparable and reproducible tests*
- *Multisensor inputs (voltage, acceleration, strain, etc.)*
- *Automated report generation for predefined maneuvers*



SYNC-CLOCK Technology: Synchronisation

CONFIGURATION

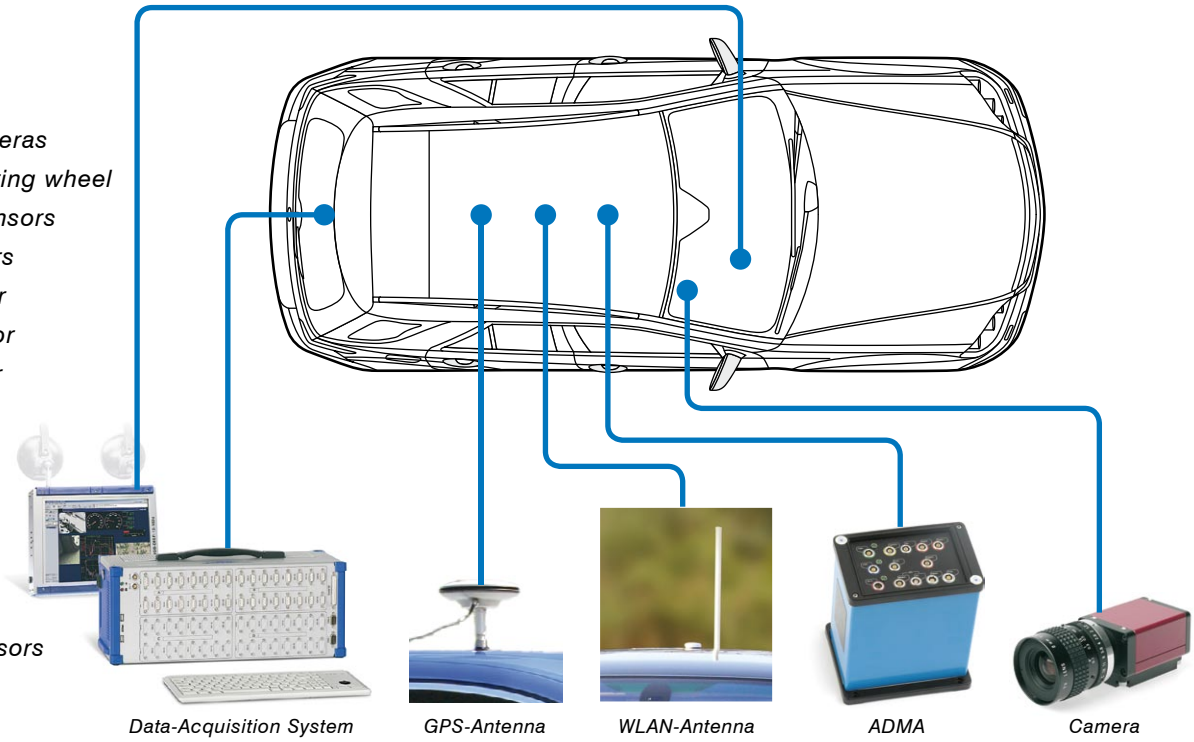
The master unit collects all synchronized data from the master vehicle and the slave unit via WLAN.

- *Data from all vehicles is recorded fully synchronized*
- *Online checking of the measurement data quality*
- *Master manages the measurement and the configuration of the slave – so the driver can concentrate on his task.*
- *Online data transfer of selected channels from slave to master.*
- *Measurement data is redundantly stored on each measurement unit and can be transferred after the measurement*

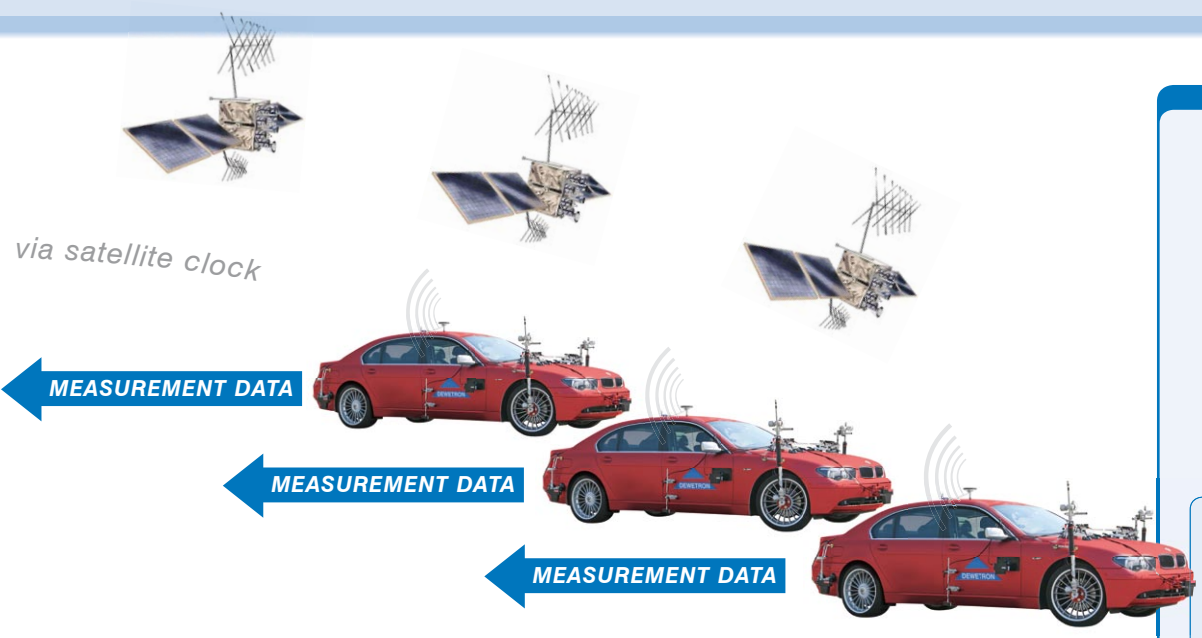
The CAPS system uses the GeneSys inertial measurement system ADMA for six degree of freedom motion analysis in combination with high performance GPS position measurement. This combination avoids the drawbacks of each system – on one hand the drift of the gyro platform and on the other hand outages and jumps in GPS position. Kalman filters are used for optimizing the measured result.

Additional Sensors:

- *Multiple video cameras*
- *Measurement steering wheel*
- *Optical velocity sensors*
- *Height level sensors*
- *Wheel pulse sensor*
- *Wheel vector sensor*
- *Wheel force sensor*
- *Tire temperature*
- *Brake pressure*
- *Acceleration*
- *Temperature*
- *Strain gages*
- *Steering robot*
- *Potentiometric sensors*



Data-Acquisition System *GPS-Antenna* *WLAN-Antenna* *ADMA* *Camera*



Slave Units

- WLAN
- GPS
- Video
- DEWE-ORION-card
  - CAN
  - Counter input
  - Digital input
  - Analog input
- ADMA interface

The measurement systems are synchronised and send the data to the master measurement unit.

RF-modem:
Interface DGPS data

Differential GPS:

GPS base station and antenna Differential GPS is required to gain the required accuracy for the vehicle or obstacle coordinates.

CAPS Channels
Relative vehicle distance, speed, heading

CAN BusData
Synchronized data from CAN-bus

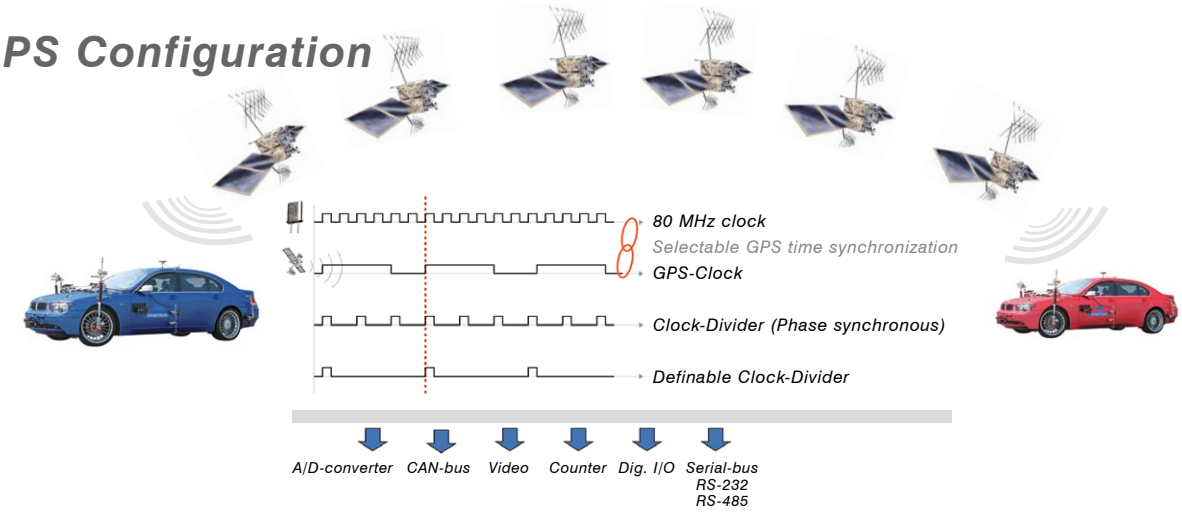
Video Information
Synchronized video information

Analog Data
Synchronized data

CAPS Display
The CAPS display visualises the distance between the cars, the relative position and the heading

GPS Map
GPS data on map overlay

CAPS Configuration



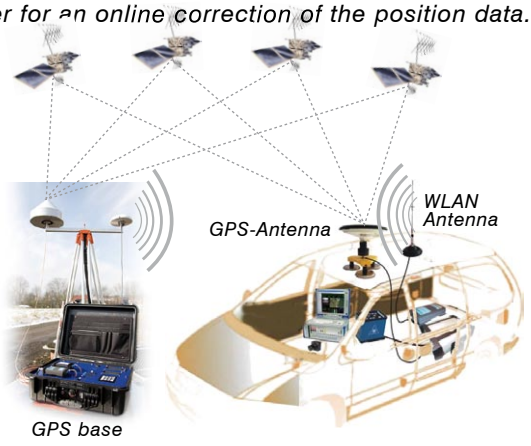
CAPS requires very high accuracy of the measured parameters, which is achieved using the latest technology of data acquisition, inertial measurement, GPS technology and test methodology.

***SYNC-CLOCK technology:** For the exact position of the vehicles or obstacles, synchronisation of the different systems is required. To achieve the required accuracy we implemented a high precision system clock. All data channels, analog and digital signals, CAN information or video are synchronized.*

DGPS - Differential GPS

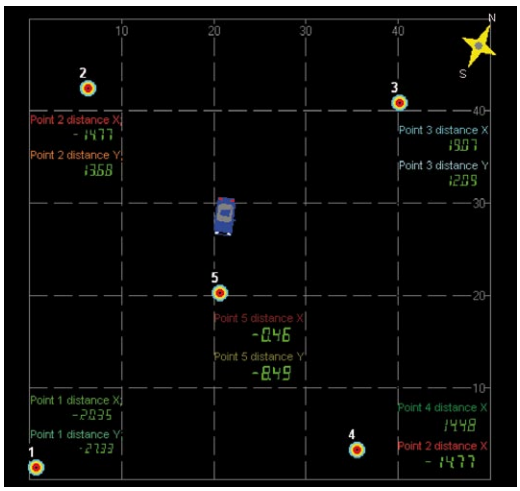
This technology improves the measurement accuracy where a second stationary GPS receiver is required. Due to the known position of this base receiver errors in the GPS signal transmission can be calculated. The data of the DGPS corrections are transmitted vie WLAN to mobile GPS receiver for an online correction of the position data.

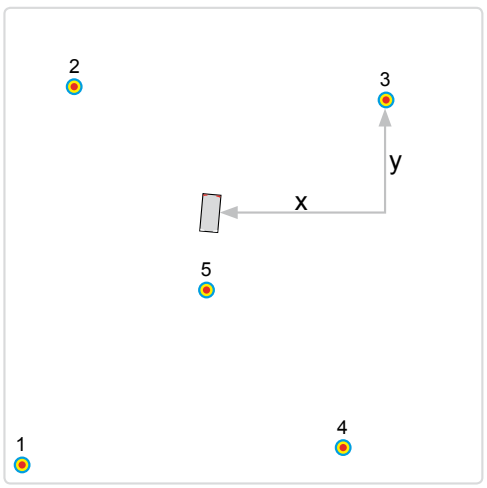
- *Elimination of GPS outages*
- *Suppression of jumps in GPS position*
- *Residual accuracy is better than Inertial Measurement Unit or GPS accuracy on its own*
- *Position data with high dynamic and bandwidth*
- *Highly accurate motion states of a vehicle with low setup time*
- *All motion states in body-fixed, levelled and NED coordinates*
- *All motion states in 3D (t, a, v, p, dΦ/dt, Φ) via CAN or RS-232 or Ethernet*



Fixed obstacle testing

The fixed obstacle testing allows to define the measurement area and obstacle positions. When the obstacles are defined, the distance vectors to those points are calculated online. The CAPS display can visualize the measurement area including all vehicles and obstacles.





DEWESoft Net

DEWESoft Net allows the communication between different Dewetron instruments. Each unit can be configured as stand alone, as master or as slave. It's also possible to use any PC to control a measurement unit remotely.

For CAPS measurement requires a master/slave configuration. The relevant data is sent to the master, where it is visualized and processed.

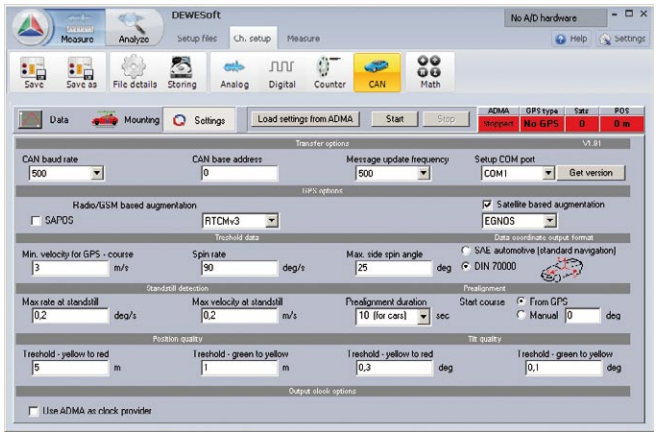
- *Data transfered to the master via WLAN*
- *The configuration of the slave is managed from the master*
- *Data is redundantly stored on each unit*

CAPS Setup

Setting up the CAPS system:

- *Calibration of GPS system*
- *Activating the ADMA plug-in*
- *Setup of ADMA*
- *Setup of CAPS test*
- *Initializing the ADMA*

The screenshot shows the master/slave connection of the two DEWETRON systems. All further configurations including the initialization can be done from the master measurement unit.



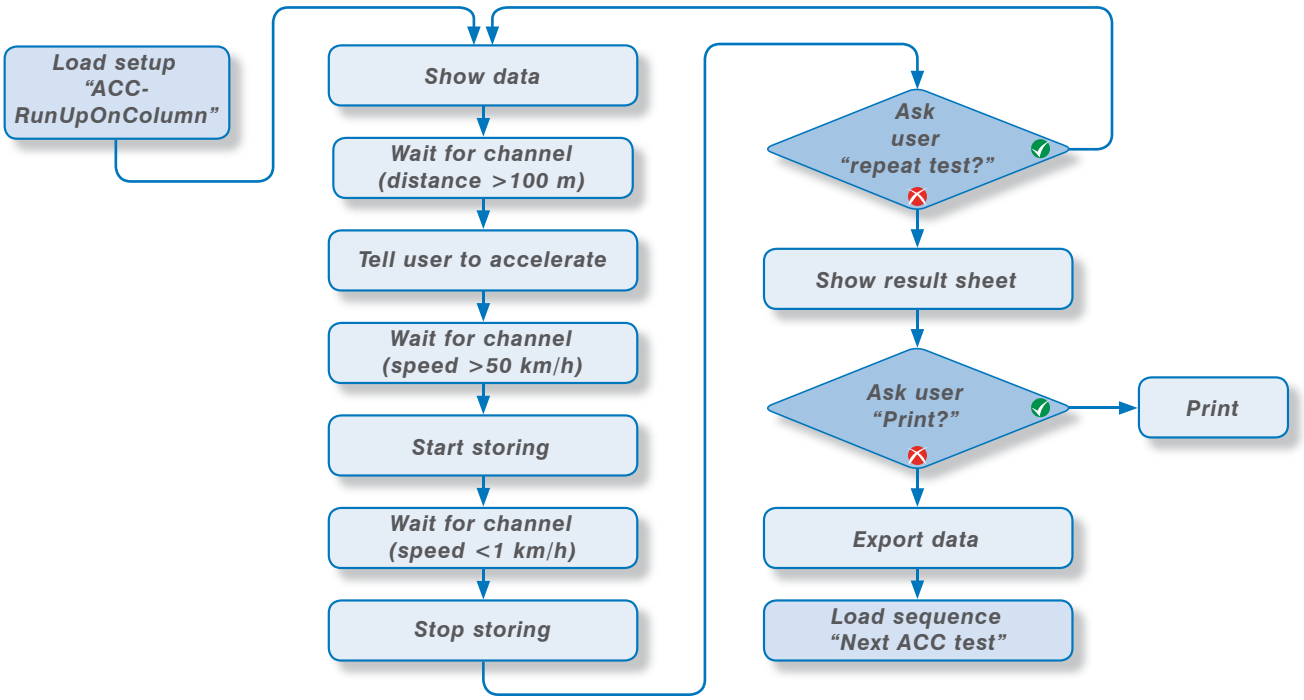
Offline Setup

In large channel count applications a standard PC can be used to create the measurement setups off-line independent from the measurement hardware.

Sequence Control

The sequencer is a tool to predefine process steps in a sequential format. The interface can be graphically programmed or in a code oriented view. It is possible to manage these sequences centrally to guarantee a standardized and defined measurement procedure.

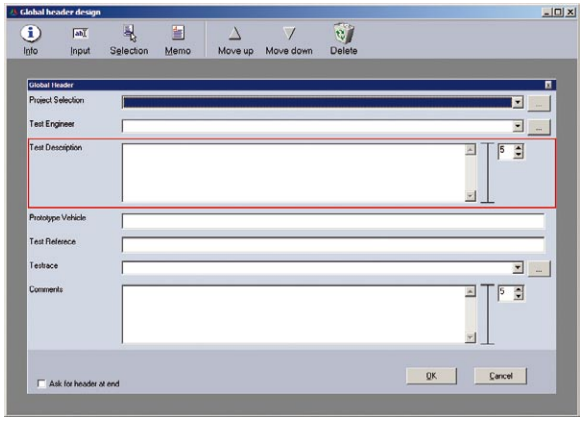
Within the sequencer you can access all relevant DEWESoft features - apply actions and formulas and make decisions, wait for interaction or a preset delay and define your customized sequences. So it's possible to define different sequences and fit them together in a single sequence, where the sub sequences are done sequentially. The sequences can be controlled by the user or by an event caused by a trigger of a certain channel.



Global Header

The global header adds additional information to the measurement project for documentation. Entries like project name, test engineer, test description, unit under test and comments etc. can be configured. The setup of the header file can be stored and used as a standard header file.

All data and setup parameters are stored in the data file. This allows a traceable measurement procedure.



CAN Input

Synchronous CAN interfaces are required for the communication with the ADMA (gyro sensor) and the vehicle bus. CAN bus data can be visualized and recorded.

The CAN setup dialog allows to set up the required CAN channels as measurement channels. These channel are treated like physical measurement channels and can be used for visualization, mathematics or to trigger an event.

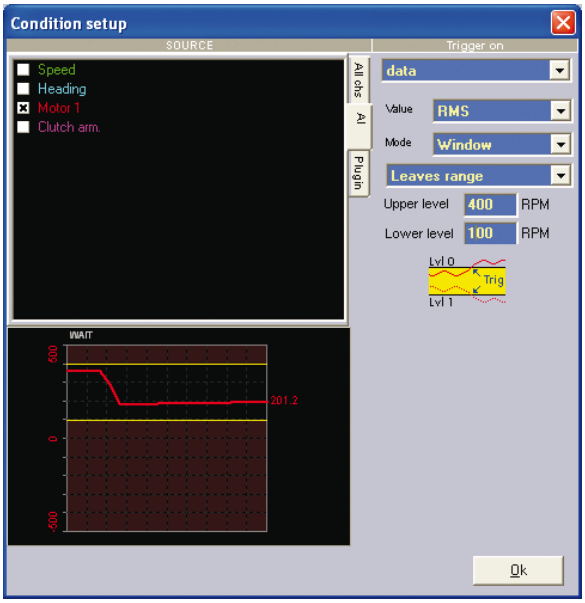
Triggers and Alarms

DEWESoft includes a versatile TRIGGER section, which includes with following types of trigger method:

- *Simple edge*
- *Filtered edge*
- *Window trigger*
- *Pulse width trigger*
- *Window and pulse width*
- *Slope Trigger*

The same type of dialog is available to set up an alarm event.

All of these sources are available to STOP the acquisition or configure a condition where no data will be stored. It's also possible to enter a pre-aquisition time, a post-acquisition time and a holdoff time.



Multisensor Input

Each channel of a multisensor input supports different sensor types via MSI (Modular Smart Input) modules. These interfaces are automatically detected and configured by the software.

- *Thermocouple*
- *PT100, PT1000, etc.*
- *Voltage*
- *Acceleration*

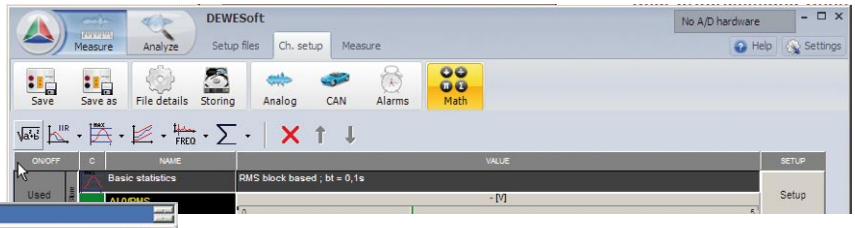
Sensor Database

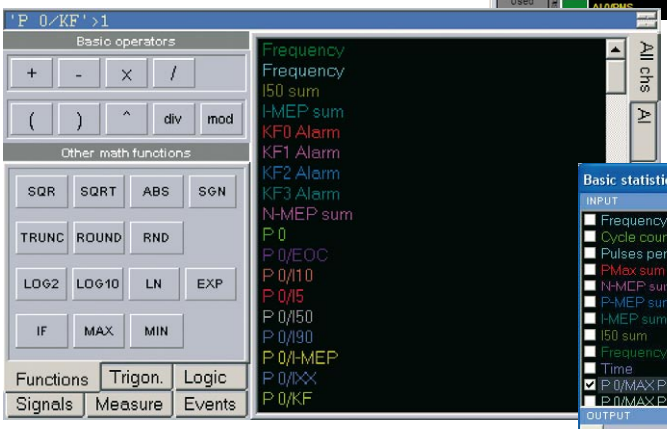
The entire channel setup and scaling is just a click away, which keeps a comprehensive list of sensors and all their parameters, including scaling, units and calibration date info.

If necessary it is possible to zero the sensor or even to renew the calibration parameters. This guarantees the reproducibility, traceability and quality of your measurement results.

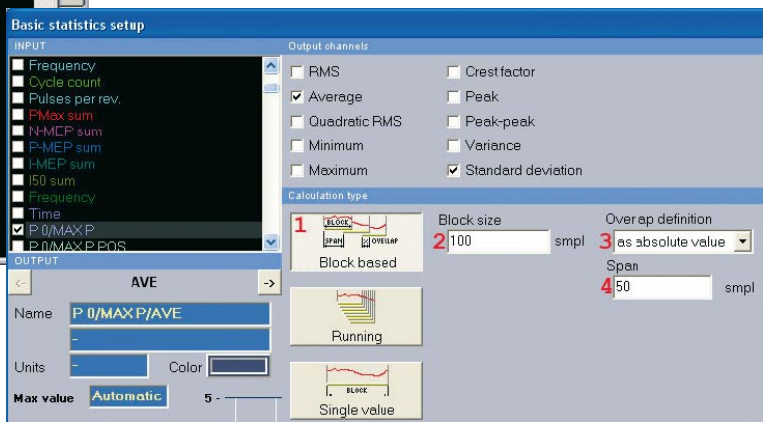
User-programmable Online Mathematics and Filters

Additional channels are created by the use of mathematics, filters and statistics functions. These channels can be used and displayed like any other channel, including triggering, and more.





Type-in any formula and use either measured channels or calculated results as variables.



The block-based statistics offers many values as single values or as running averaged values.

Statistics:

This screenshot shows the statistical functions like RMS, Average, Quadratic RMS, Minimum, Maximum, Crest Factor and many more …

Filter Functions:

Filtering is possible for an individual channel or for multiple inputs. All important filters like Butterworth, Chebychef or Bessel filters are available as low pass, high pass, band pass and band stop. Also integration and derivation can be configured.

Data Visualization

One of the most powerful and yet easy to use aspect of DEWESoft is the creation of displays. Each of the standard displays mentioned above can be modified in seconds, as easily as clicking the DESIGN button and clicking widgets from the screen design tool bar!

- *CAPS display*
- *Digital meter*
- *Analog meter*
- *Discrete displays*
- *Bar graphs*
- *Recorder*
- *Oscilloscope*
- *Video*
- *XY-chart*
- *FFT chart*
- *GPS*
- *Text*
- *Pictures*
- *And many more*

Analyze Mode - REPLAY, EXPORT, SHARE DATA

You can replay any captured data file, zoom in with the recorder graph cursors, make measurements, print in full color to any printer, and export the data to a wide variety of formats compatible with today's popular analysis software package, like FlexPro®, Matlab, Excel, DIAdem, UNV, Famos, Nsoft, Text and many more.

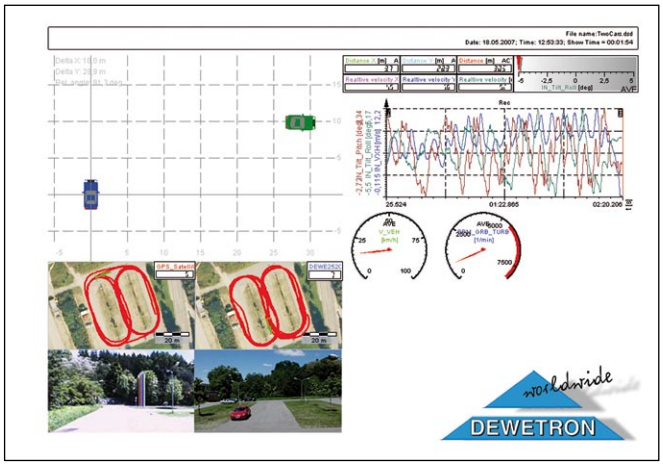
You can even export the whole measurement view to an AVI video file from your recorded data to create „moving documentation."

NO LICENSE is needed to use DEWESoft in the ANALYZE mode, so you can install the software on all your computers, or even distribute it to your customers, and they can view to the results. In this way, all of your colleagues and customers can replay your data files and do all of the functions that you can – just by sharing the data file!

FlexPro® Report

FlexPro® combines the power of a high-end data analysis tool with the ease of use and familiar interface of Excel. But unlike Excel, there are no limits to the size of a file that FlexPro® can open, analyze, chart, and print! Tightly integrated with DEWESoft, FlexPro® is a worthy option for any DEWETRON data acquisition system.

Using a FlexPro® template, your report is generated after the measurement sequence. Programming is as simple as usage of Excel or Word and at the same time very fast, even when dealing with large data volumes.The template defines all tables and graphes you want to see within your report – this has only to be done once.



Once you have defined the calculations and the layout, you have a template that you can be reused for future tests. Simply import the data from a new test into FlexPro® and update your documents with a mouse click.

DEWETRON CAPS Hardware Configuration

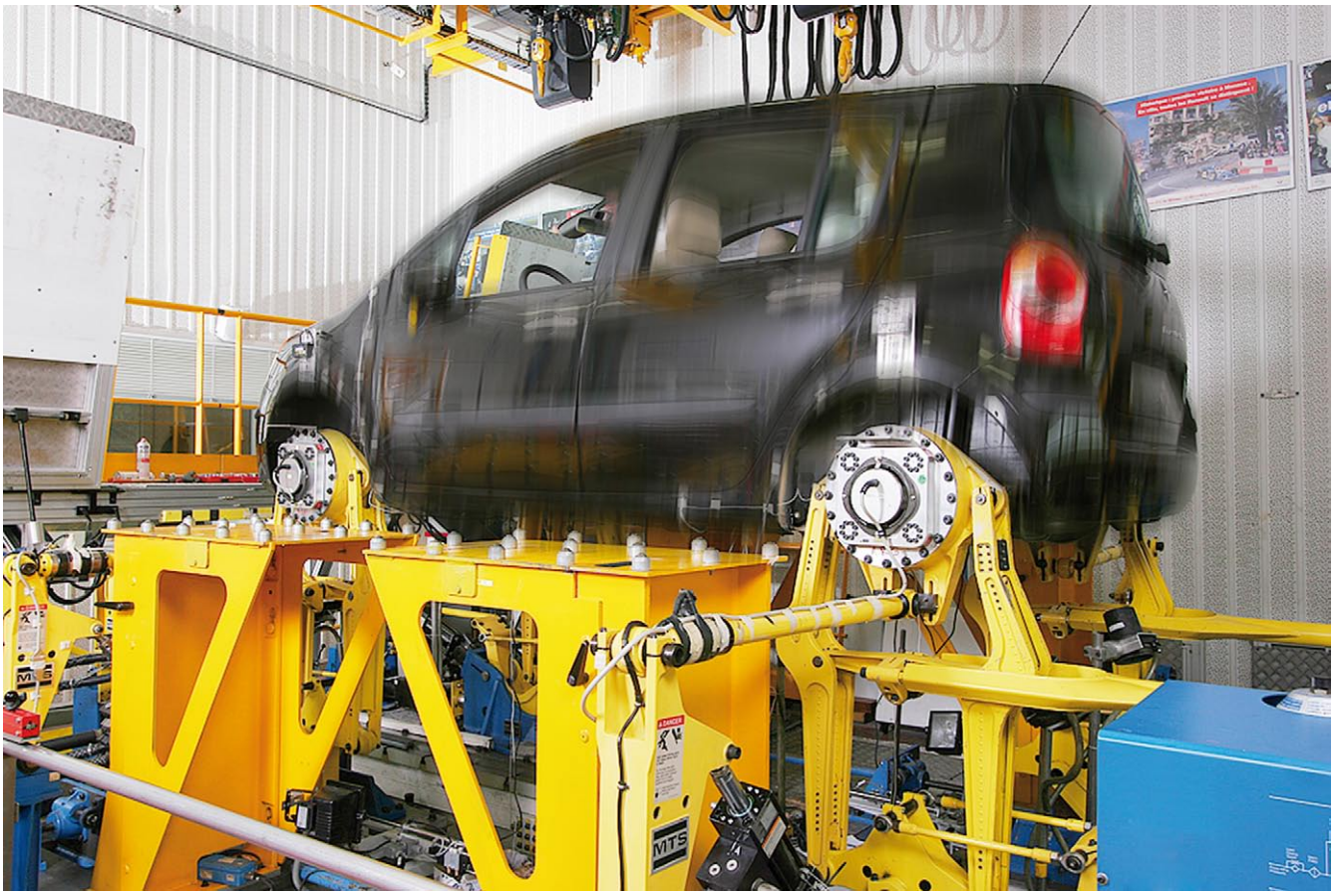


	DEWE-211-CAPS-16	DEWE-501-CAPS-32	DEWE-510-CAPS-16
Application	Standard system, 16 analog inputs	Fully battery powered, 32 analog inputs	Fully battery powered, slots for isolated DAQ modules
Analog input channels	16 MDAQ inputs	32 MDAQ inputs (max. 64)	16 DAQ series modules
Digital channels	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI
Channel expansion	No	Yes	Yes
CAN interfaces	2	4	4
Video	DEWE-CAM or USB DirectX	DEWE-CAM or USB DirectX	DEWE-CAM or USB DirectX
Display	External MOB-DISP-x	External MOB-DISP-x	External MOB-DISP-x
Power supply	8 – 30 V_{DC}, external AC adapter	Battery powered, 18 - 24 V_{DC}, external AC power supply	Battery powered, 18 - 24 V_{DC}, external AC power supply
Dimensions (W x D x H)	317 x 252 x 92 mm 12.48 x 9.92 x 3.62 in.	439 x 209 x 181 mm 17.28 x 8.23 x 7.13 in.	439 x 308 x 181 mm 17.28 x 12.13 x 7.13 in.
Weight	Typ. 5 kg (11 lb.)	Typ. 9 kg (19.8 lb.)	Typ. 8 kg (17.6 lb.)
MDAQ series modules are available for almost all kinds of sensors			

Re-inventing Data Acquisition

DEWETRON Ges.m.b.H. • Parkring 4 • A-8074 Graz-Grambach
Tel (0043) 316 3070 0 • Fax (0043) 316 3070 90 • sales@dewetron.com

worldwide DEWETRON



Road Load Data

The DEWETRON RLD system is used to record road load data during real test drives or at test rigs – either for a whole vehicle or certain components. The measured data can be replayed on a testbed to simulate all forces and vibrations in the laboratory. As an option, DEWETRON RLD systems can be equipped with a real time analog output for testbed integration.

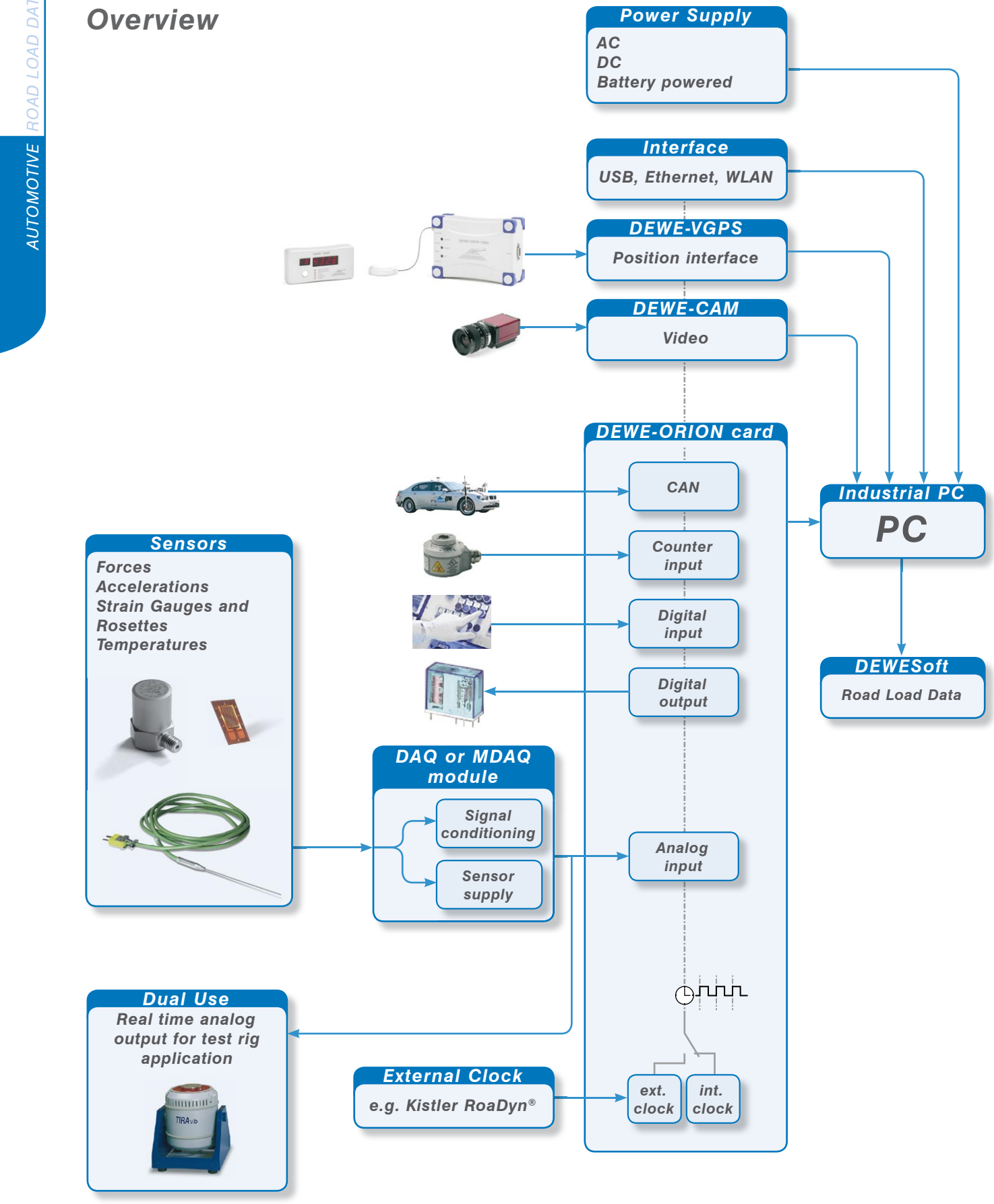
DEWETRON devices offer a rugged and portable design for in-vehicle use and fulfill the requirement for high channel count. The devices cover a wide range of input types like voltage, strain, temperature, counters, GPS, Video, CAN and OBD II.

For testbed simulation the aquired data is exported to RPC III file format.

Key Features

- *High channel count (16 to 1000 channels)*
- *22-bit aliasing free sampling*
- *Multiple inputs (voltage, acceleration, strain, etc.)*
- *Support for Kistler RoaDyn® measurement wheels*
- *Flexible filtering capabilities*
- *Realtime mathematics*
- *Export to different file formats (supports RPC III)*
- *Battery powered, portable system for in-vehicle use*
- *Easy mounting, setup, alignment, and calibration*
- *Real time analog output*

Overview


Power Supply
AC
DC
Battery powered
Interface
USB, Ethernet, WLAN
DEWE-VGPS
Position interface
DEWE-CAM
Video
DEWE-ORION card
CAN
Counter input
Digital input
Digital output
Analog input
Industrial PC
PC
DEWESoft
Road Load Data
Sensors
Forces
Accelerations
Strain Gauges and Rosettes
Temperatures
DAQ or MDAQ module
Signal conditioning
Sensor supply
Dual Use
Real time analog output for test rig application
External Clock
e.g. Kistler RoaDyn®
ext. clock
int. clock

CAN-Bus Data/OBD II

Synchronous data from CAN-bus

- *CAN DBC export and import*
- *J1939 decoding*

Analog Channels

Strain, temperature, acceleration, force, torque, etc.

Wheel Force Measurement

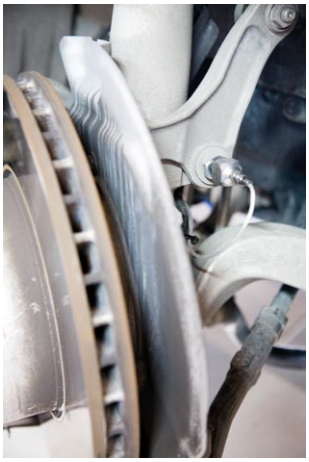
Telemetric recipient for all wheel forces

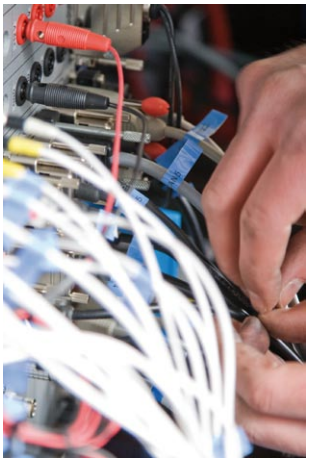
Video

Synchronized video information

GPS Information

Position data





Road Load Data Application

Road load data measurement is used in material research, process and parts approvals and vehicle testing. The data collection is done on the test track on the road or on a test rig. This data is used to calibrate simulation models and to develope and optimize control loops.

The measured data can be replayed on a testbed to simulate all forces and vibrations in laboratory boundaries. Systems and components are tested under specific customer and environmental conditions (e.g. higher temperature, corrosive atmosphere, etc.) using road load data inputs as well as duty cycle inputs correlated to real world conditions on a test rig. To optimize mechanical components it is necessary to know the loads that the product undergo during its lifetime. Therefore precise and synchronous measurement of a high number of sensors is required.

The basic requirement for roadload data measurement systems are:

- *Simultaneous and aliasing free recording*
- *High channel count*
- *Connectivity for a broad range of sensors - including a flexible power supply for sensors*
- *Sensor database, TEDS functionality*
- *Shunt calibration*
- *Amplifier and sensor blance*
- *Offline instrument setup*
- *Online overload detection and failure detection for e.g. damaged sensors*
- *Various trigger options*
- *Powerful online mathematics*
- *Fast and efficient data analysis*
- *Traceability of the measurement results*
- *Compact and rugged hardware design*

Workflow

Upload the XML setup and choose the sensors from the sensor database. The setup can be done offline. For measurement you connect your sensors and fine-tune the setup. Some sensors need a zero adjustment before measurement. With a few simple clicks you adjust the prepared visualization screens to your needs – and the test starts.

Features to support your workflow:

- *Offline Setup*
- *Sequence Control*
- *Sensor Database*
- *TEDS*
- *Global Header*
- *Data Import and Export*

All relevant data like the measurement jobs, sensor database, setup files, measurement data and results can be stored in a common measurement directory. This fast and efficient way to support the measurement process solves logistical problems of sensors and of the measurement job.

Fast View Technology

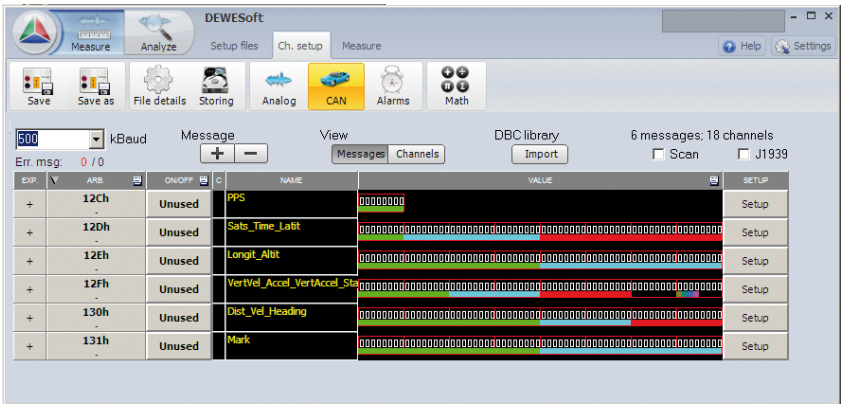
The fast-view technology allows viewing of gigabytes of data within seconds, zooming to specific events or video sequences of your measurement. For further data processing export to many different file formats is included.

CAN Input

Synchronous recording of data from the vehicle CAN bus or from sensors with CAN interface.

- *CAN .dbc import*
- *J1939 decoding*

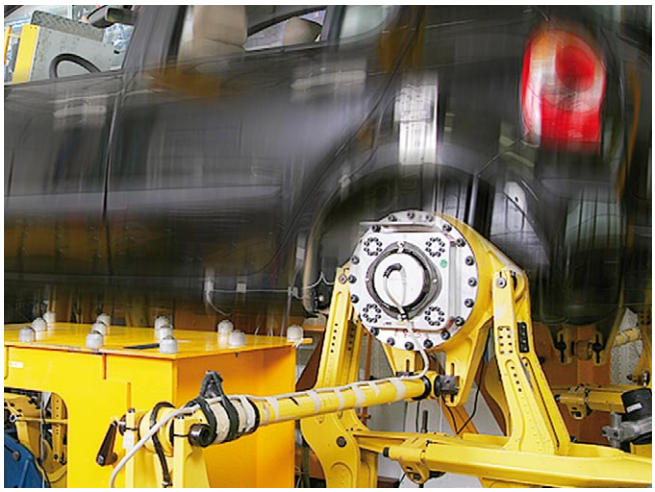
The CAN setup dialog allows to set up the required CAN channels as measurement channels. These channel are treated like physical measurement channels and can be used for visualization, mathematics or to trigger an event.



Dual Use - Real Time Analog Output for Test Rig Application

Dual-Use allows to use the DEWETRON RLD System also on the testbed.

The same measuring situation as on the road is measured on the test rig. Additionally, the system provides realtime conditioned and filtered (typ.±10 V) analog output signals of each input signal.



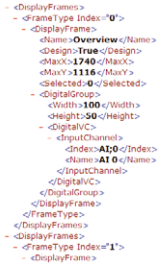
DEWESoft NET

DEWESoft Net allows the communication between different DEWETRON instruments. Each unit can be configured as stand alone, as master or as slave. It's also possible to use any PC to control a measurement unit remotely.

For road load data measurement DEWESoft Net is used to combine several instruments and to increase the total amount of measurement channels

Offline Setup

To standardize and to simplify the setup procedure of a DEWETRON measurement system, it is possible to do this task using your office PC. Together with the sensor database, the setup can be performed independent from the measurement hardware. This feature allows you to use a central setup database. A standard office PC using DEWESoft 7 can export XML based file format with all this setup information. Simply loading this file on a DEWETRON measurement system adjusts all settings for this setup which is required for the measurement. The set-up time of the whole system can be significantly reduced and this also avoids user errors.



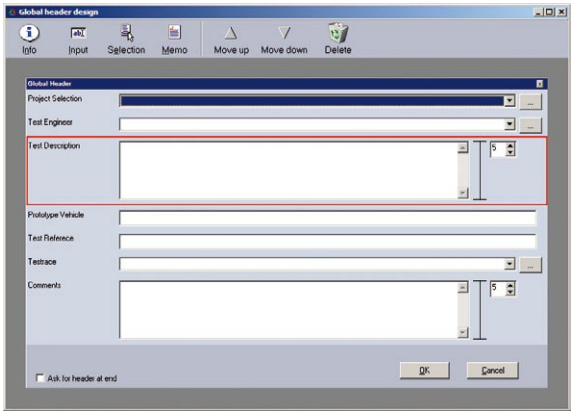
Sequence Control

The sequencer is a tool to predefine process steps in a sequential format. The interface can be graphically programmed or in a code oriented view. The sequence is stored with the system setup so a measurement can be repeated at any time under the same conditions (traceability). It is possible to manage these sequences centrally to guarantee a standardised and defined measurement procedure.

Global Header

The global header adds additional information to the measurement project for documentation. Entries like project name, test engineer, test description, unit under test and comments etc. can be configured. The setup of the header file can be stored and used as a standard header file.

All data and setup parameters are stored in the data file. This allows a traceable measurement procedure.



Sensor Database and TEDS

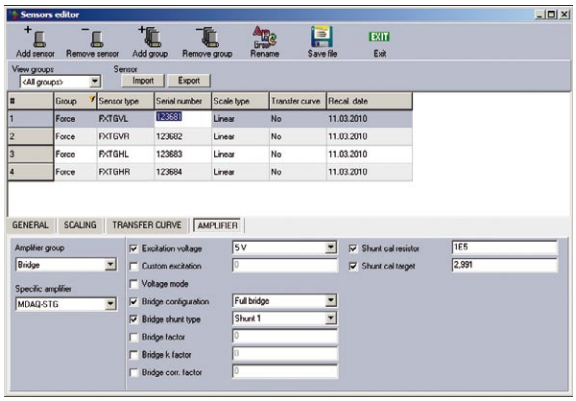
The entire channel setup and scaling is just a click away, which keeps a comprehensive list of sensors and all their parameters, including scaling, units and calibration date info.

- *Linear scaling and offset*
- *Non linear scaling*
- *Polynomial scaling*
- *Calibration table*

The entire channel setup and scaling is just a click away. If necessary it's possible to zero the sensor or even to renew the calibration parameters. This guarantees the reproducibility, traceability and quality of your measurement results.

*To make the sensor setup even more automated, our signal conditioning modules support TEDS, which is the new „smart sensor interface". TEDS is an acronym for **T**ransducer **E**lectronic **D**atasheet. It is a table of parameters (manufacturer ID, model number, serial number, version, and many more) that identifies the transducer.*

The screenshot shows a view to the sensor database dialog.

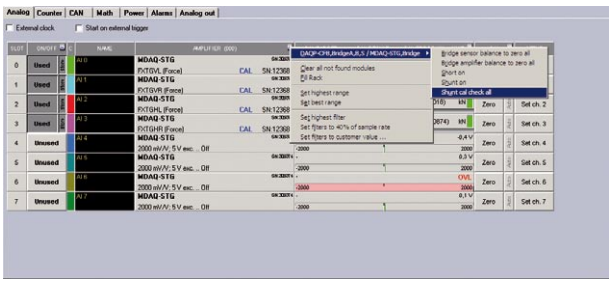


Shunt Calibration

Shunt calibration is a very useful feature to quick check the measurement chain of bridge amplifiers.

The automated procedure starts per mouse click and in parallel all amplifiers start the calibration procedure: Red and green indicators showthe result of the calibration.

- *Shunt check of all sensors*
- *Red or green indicator to show the calibration result*

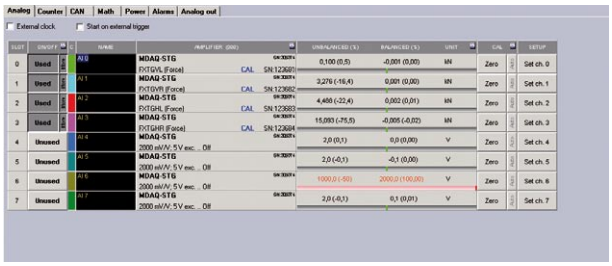


Amplifier and Sensor Balance

The amplifier balancing is integrated within the amplifier module – automatically the input is shorted and the offset of the amplifier is checked. This feature is a quick check of the amplifier and allows to measure absolute output from from a strain gage.

Amplifier balancing - for all amplifiers at a time:

- *Automated amplifier balancing*
- *Check of the amplifier offset*
- *Quick overview of adjust value*
- *Absolute strain gage measurement*



The sensor balancing allows a quick zero adjustment of all sensors. In static conditions the offset of the amplifiers are adjusted, to compensate the offset of the strain gage.

Sensor balancing - for all sensors at a time:

- *Automated sensor balancing*
- *Quick overview of adjust value*
- *Easy to detect fatigue of material*

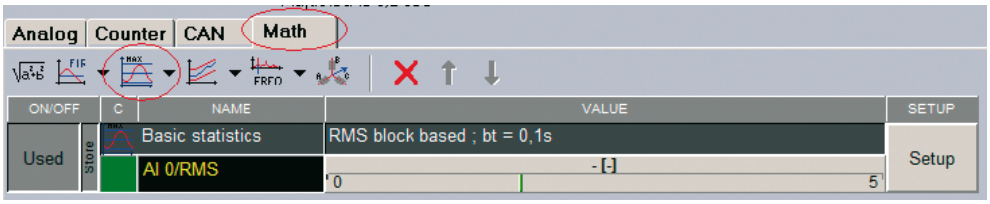
Multisensor Input

Each channel of a multisensor input supports different sensor types via MSI (Modular Smart Input) modules. These interfaces are automatically detected and configured by the software.

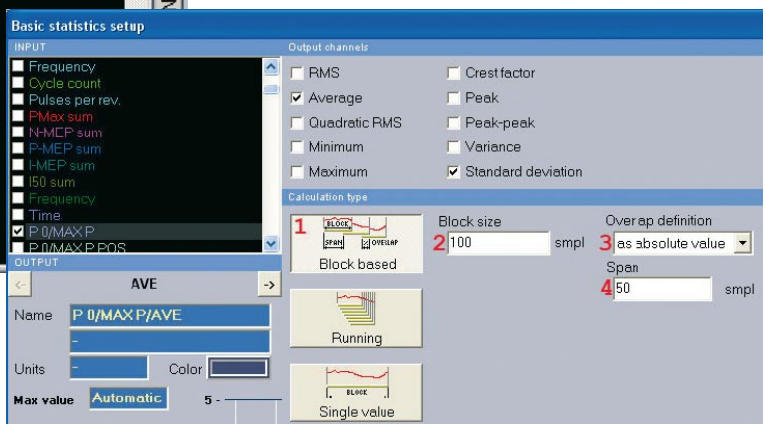
- *Thermocouple*
- *PT100, PT1000, etc.*
- *Voltage*
- *Acceleration*

User-programmable Online Mathematics and Filters

Additional channels are created by the use of mathematics, filters and statistics functions. These channels can be used and displayed like any other channel,including triggering, and more.



Type any formula and use either measured channels or calculated results as variables.



The block-based statistics offer many results as single values or as running averaged values.

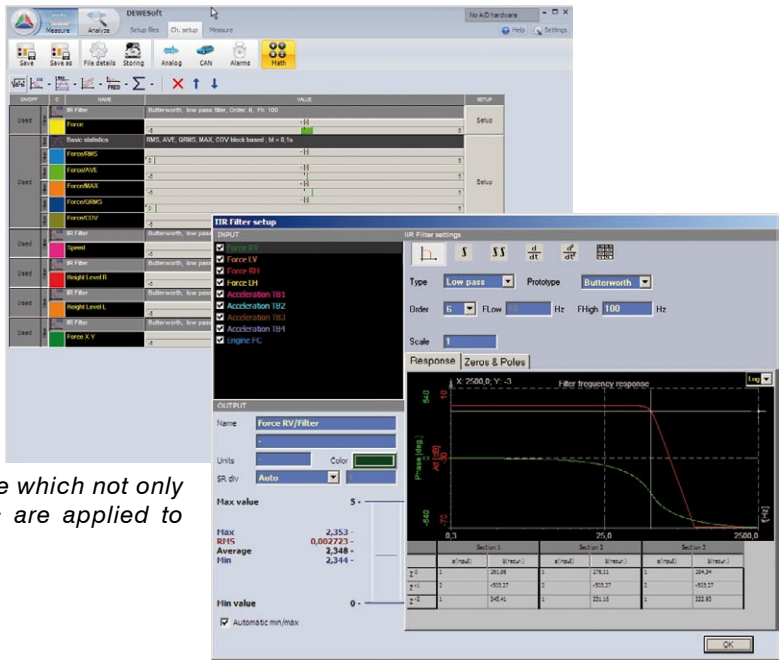
Basic Statistics:

- *RMS*
- *Average*
- *Quadratic RMS*
- *Minimum*
- *Maximum*
- *COV - Coefficient of Variation*
- *Crest Factor*
- *Peak*
- *Peak-Peak*
- *Variance*
- *Standard Deviation*

Filter Functions:

- *Low pass, high pass, band pass, band stop*
- *Butterworth*
- *Chebychef*
- *Bessel*

- *Integration*
- *Derivation*
- *Response or polar visualization*



*FIR (**F**inite **I**mpulse **R**esponse) digital filters have no measurable delay. Multiple input channels can be routed to the same MATH channel or FILTER channel - a huge convenience which not only saves time but ensures that the same settings are applied to multiple channels.*

Further Mathematical Functions:

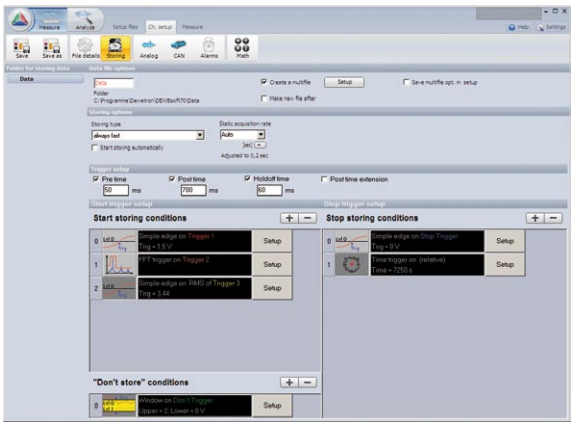
For each selection, a new channel is created to be used for trigger, events or result calculation.

- *Math formula channels*
- *Rosette calculation*
- *Digital programmable IIR (Infinite Impulse Response) filters*
- *Basic statistics – multi-channel input and output of basic statistics*
- *Reference curve – create a reference curve with a tolerance and then test incoming signals against it*
- *Exact Frequency – calculates the frequency of incoming signals with up to 0.001 Hz accuracy*

Triggers and Alarms

DEWESoft includes a versatile TRIGGER section, which includes with following types of trigger method:

- *Simple edge*
- *Filtered edge*
- *Window trigger*
- *Pulse width trigger*
- *Window and pulse width*
- *Slope Trigger*



The same type of dialog is available to set up an alarm event.

All of these sources are available to STOP the acquisition or configure a condition where no data will be stored. It's also possible to enter a pre-aquisition time, a post-acquisition time and a holdoff time..

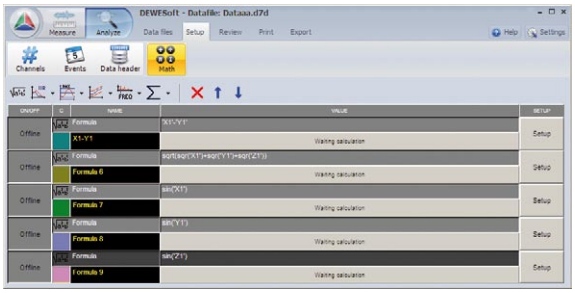
Data Visualization

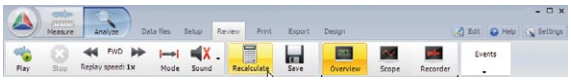
One of the most powerful and yet easy to use aspect of DEWESoft is the creation of displays. Each of the standard displays mentioned above can be modified in seconds, as easily as clicking the DESIGN button and clicking widgets from the screen design tool bar!

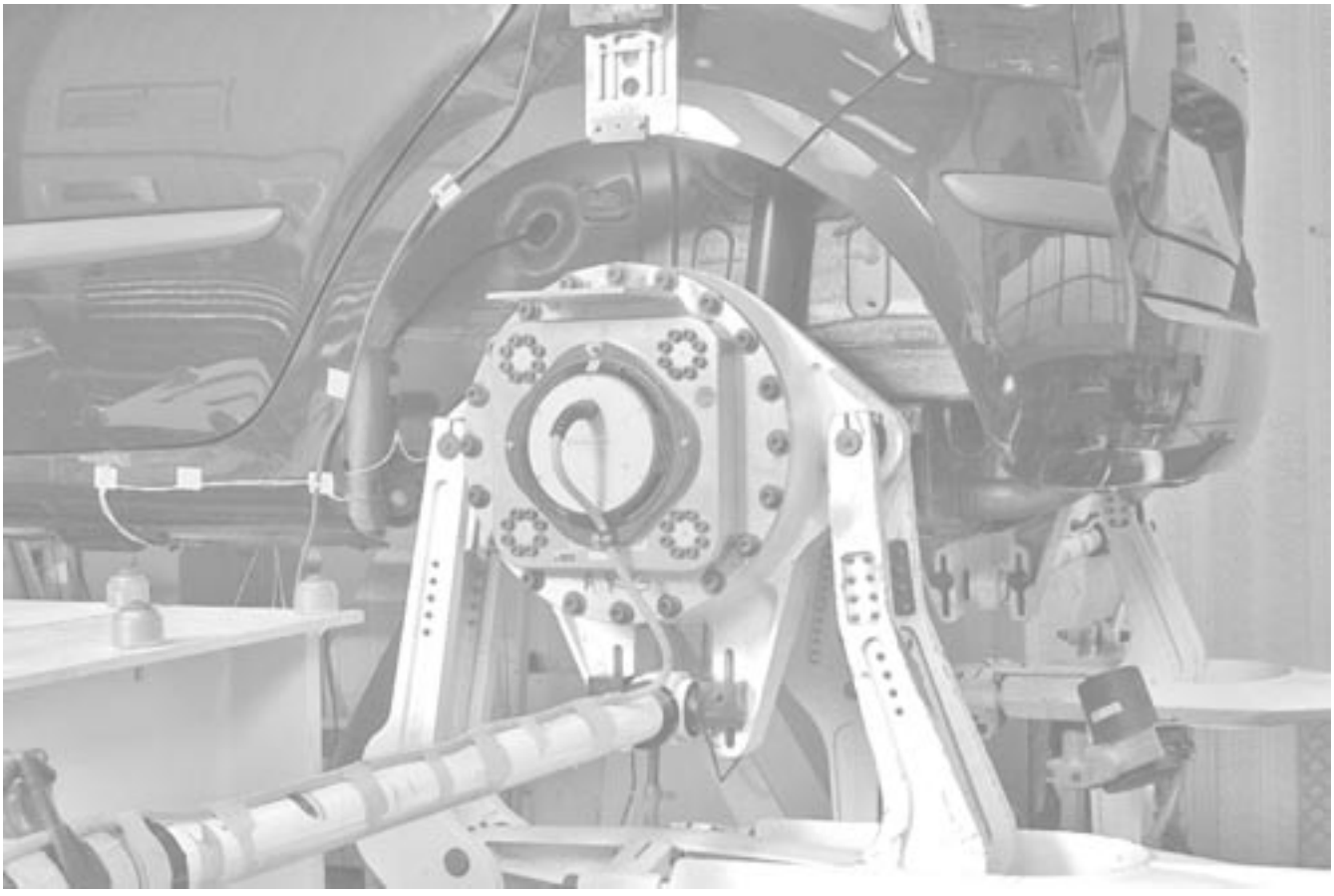
- *CAPS display*
- *Digital meter*
- *Analog meter*
- *Discrete displays*
- *Bar graphs*
- *Recorder*
- *Oscilloscope*
- *Video*
- *XY-chart*
- *FFT chart*
- *GPS*
- *Text*
- *Pictures*
- *And many more*

DEWESoft Postprocessing

DEWESoft 7 allows recalculating all calculated data. Based on the measured values you can change the whole setup of your measurement – add new channels and change the settings of for mathematical channels. All parameters are recalculated and saved in the database.





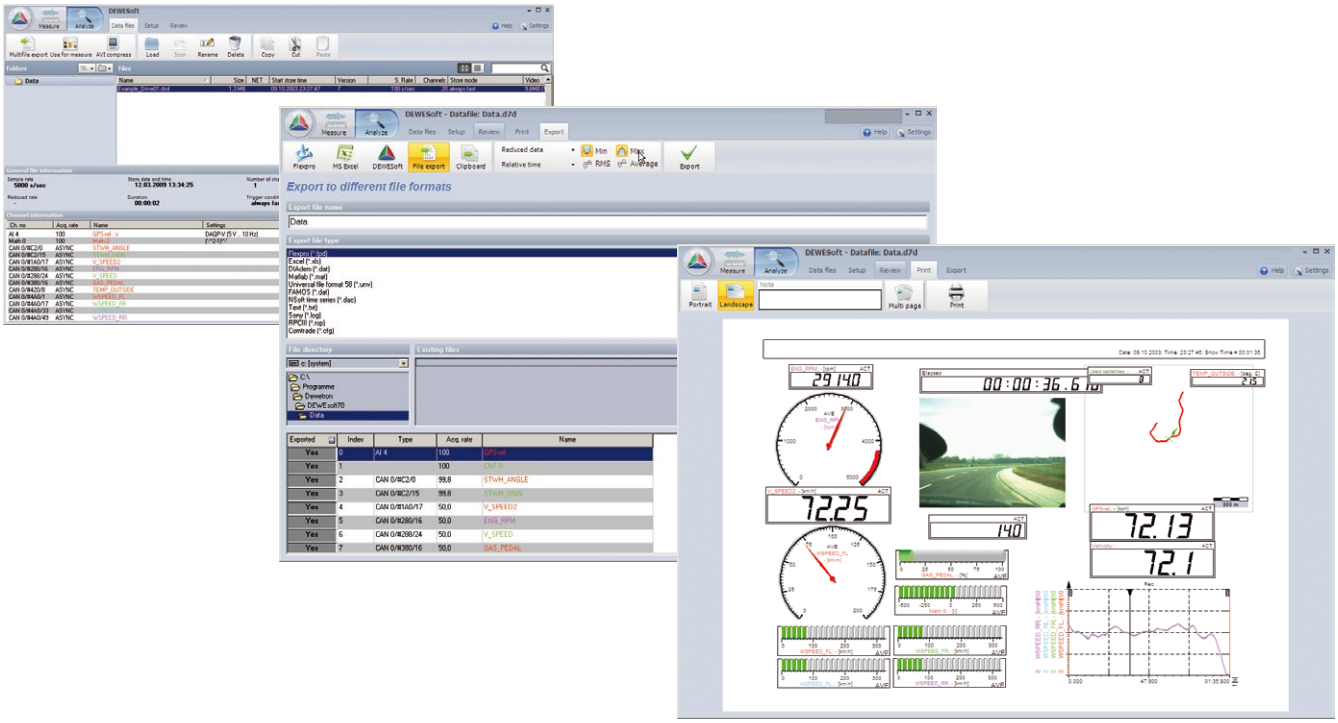


Analyze Mode - Replay, Export, Share Data

You can replay any captured data file, zoom in with the recorder graph cursors, make measurements, print in full color to any printer, and export the data to a wide variety of formats compatible with today's popular analysis software package, like FlexPro®, Matlab, Excel, DIAdem, UNV, Famos, Nsoft, Text and many more.

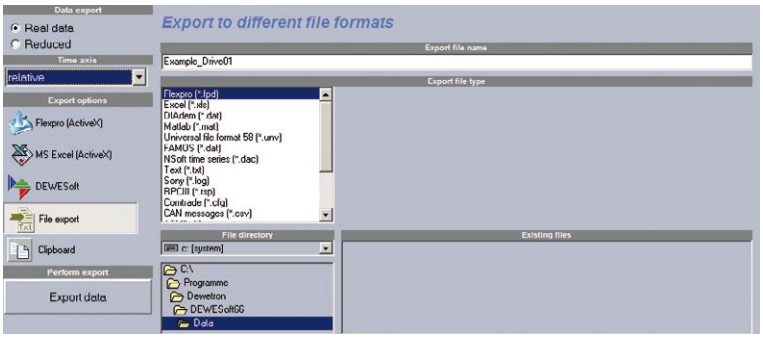
You can even export the whole measurement view to an AVI video file from your recorded data to create „moving documentation."

NO LICENSE is needed to use DEWESoft in the ANALYZE mode, so you can install the software on all your computers, or even distribute it to your customers, and they can view to the results. In this way, all of your colleagues and customers can replay your data files and do all of the functions that you can – just by sharing the data file!



The export dialog allows selecting different export file formats.

- *RPC III*
- *ComTrade*
- *WAV*
- *ATI*
- *SDF*
- *CAN*
- *AVI*
- *Clipboard*
- *Google Earth*
- *FlexPro*
- *MS Excel*
- *Diadem*
- *Matlab*
- *UNV*
- *Famos*
- *Nsoft*
- *Text*
- *And many more*



DEWETRON RLD Hardware Configuration

	DEWE-211-RLD-16	DEWE-501-RLD-64	DEWE-501-PCI-64	DEWE-2600-RLD-64
Application	Smallest RLD system, 16 analog inputs	AC-DC-UPS power, 64 analog inputs	64 channels expansion for DEWE-501-RLD	Fully battery powered, 64 analog inputs
Analog input channels	16 MDAQ inputs	64 MDAQ inputs	64 MDAQ inputs	64 MDAQ inputs
Digital channels	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI
Channel expansion	No	Yes	No	Yes
CAN interfaces	2	4	Up to 4 (opt.)	4
Video	DEWE-CAM or USB DirectX	DEWE-CAM or USB DirectX	No	DEWE-CAM or USB DirectX
Display	External MOB-DISP-x	External MOB-DISP-x	No	15" 1024 x 768
Real time analog output	Option	Option	Option	Option
Power supply	8 - 30 V_{DC}, external AC adapter	Battery powered, 18 - 24 V_{DC} or 11 - 33 V_{DC} (UPS battery 1 min.)	Battery powered, 18 - 24 V_{DC} or 11 - 33 V_{DC} (UPS battery 1 min.)	Battery powered, 18 - 24 V_{DC}, external AC power supply
Dimensions (W x D x H)	317 x 252 x 92 mm 12.48 x 9.92 x 3.62 in.	439 x 209 x 181 mm 17.28 x 8.23 x 7.13 in.	439 x 209 x 181 mm 17.28 x 8.23 x 7.13 in.	417 x 246 x 303 mm 16.42 x 9.69 x 11.93 in.
Weight	Typ. 5 kg (11 lb.)	Typ. 9 kg (19.8 lb.)	Typ. 8 kg (17.6 lb.)	Typ. 14 kg (31 lb.)
MDAQ series modules are available for almost all kinds of sensors				

Re-inventing Data Acquisition

DEWETRON Ges.m.b.H. • Parkring 4 • A-8074 Graz-Grambach
Tel (+43) 316 3070 0 • Fax (+43) 316 3070 90 • sales@dewetron.com

worldwide DEWETRON

Basic Brake Test

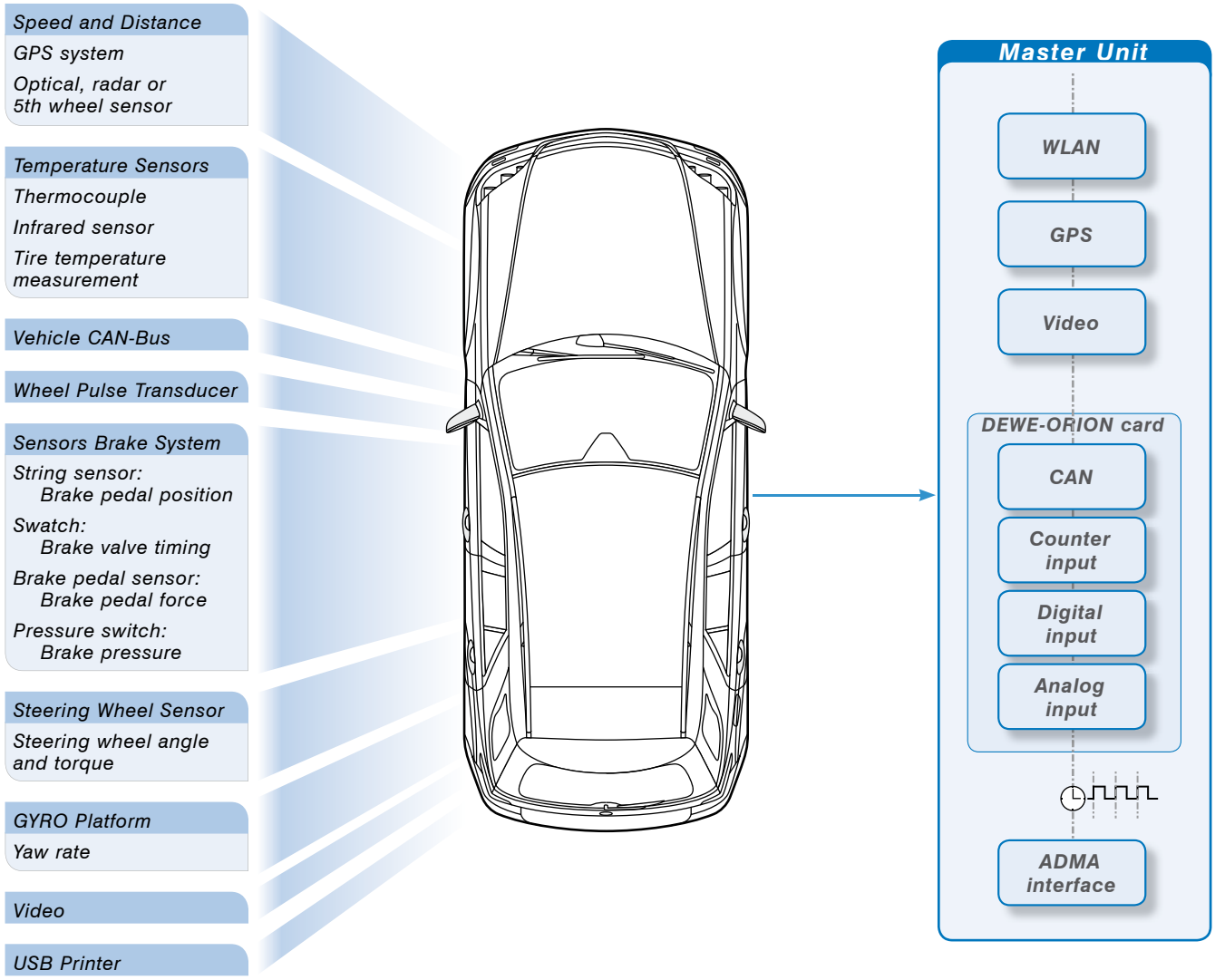
The DEWETRON Brake Test system covers all kind of braking tests and ABS tests – due to its flexibility it also covers test vehicles using regenerative braking. Online checks for validation, visualized online results including post-processing and reporting make the DEWETRON Brake Test system a complete all-in-one solution.

The Brake Test system is based on a 100 Hz GPS system which is very simple and easy to set up. It is not sensitive to road surface conditions .The classical sensors like 5th wheel can be hooked up for comperative testing.

Brake testing is a wide field of different requirements and a flexible and multifunctional solution guarantees a safe investment. Therefore the same equipment is capable to make also tire tests, acceleration tests, odo calibration, fuel consumption, etc. in a very efficient way.

Key Features

- *Integrated 100 Hz GPS receiver*
- *Quick and easy test setup*
- *Automated workflow with DEWESoft sequencer*
- *Automated report generation*
- *Synchronized data acquisition of GPS, analog input, CAN, counter and video data*
- *Multisensor input (voltage, strain, bridge, ...)*
- *Export to different file formats*


Speed and Distance
GPS system
Optical, radar or 5th wheel sensor
Temperature Sensors
Thermocouple
Infrared sensor
Tire temperature measurement
Vehicle CAN-Bus
Wheel Pulse Transducer
Sensors Brake System
String sensor:
Brake pedal position
Swatch:
Brake valve timing
Brake pedal sensor:
Brake pedal force
Pressure switch:
Brake pressure
Steering Wheel Sensor
Steering wheel angle and torque
GYRO Platform
Yaw rate
Video
USB Printer
Master Unit
WLAN
GPS
Video
DEWE-ORION card
CAN
Counter input
Digital input
Analog input
ADMA interface

CAN Bus Data/OBD II

Synchronous data from CAN-bus like

- *Speed*
- *Acceleration*
- *ABS status*
- *Wheel speed*
- *Brake signal*
- *Brake pressure*
- *Acceleration*
- *Steering wheel angle*

Online Mathematics

Distance, MFDD, further calculated channels

Video Information

Synchronized video information

Recorder

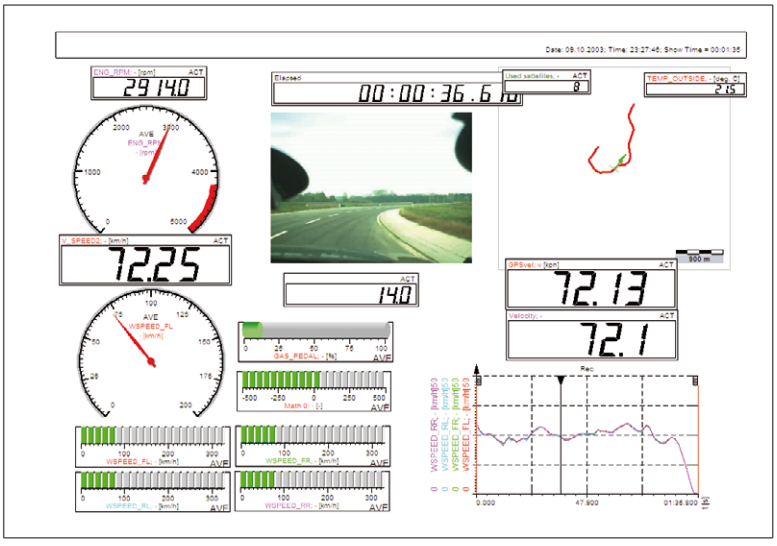
Speed graph over time

GPS Information

Overlay actual position data to a map of the test track

Post processing allows you to generate additional mathematical channels for result calculation. DEWESoft is able to generate reports and also export your measurement as a video clip.

For a more advanced interpretation, DEWESoft supports a wide range of export format such as FlexPro, DIAdem, etc.



Simple Brake Test Application

Brake testing is usually done according to standardized brake test procedures. Setting up a test sequence including the online check of the test boundaries allows performing the required tests for a standardized procedure. These tests are required for development and homologation of vehicles.

On the other hand, brake testing is a wide field of different requirements and a flexible and multifunctional solution guaranties a safe investment. The same equipment is also capable of performing tire testing, acceleration tests, odo calibration, fuel consumption, etc.

DEWETRON's measurement equipment is designed for highly robust data acquisition in the vehicle. All user interface and user interaction is done in an easy and economic way. Effective gadgets help the user to make the daily work simple and easy. Features like Offline Setup, Sensor Database, TEDS or Global Header and powerful Export Features integrate the measurement equipment in the whole process of testing.

The main steps performed for a brake test are supported with the DEWESoft sequencer:

- *Setup of the sensors*
- *Setup the brake test conditions*
- *Close the setup and start the test*
- *Accelerate the vehicle to the start velocity*
- *Press the brake pedal for maximum braking force*
- *Perform the measurement within the braking phase*
- *Validate the data and analyze*
- *Finally generating a report or export the data.*

The brake test requires simply the mounting of the GPS antenna and of the pedal switch. The DEWETRON measurement system can be mounted on the passanger seat via a belt using a snap closure. The display is mounted on the front screen via vacuum cups or on a telescopic pillar.

The channels for velocity, distance and acceleration need to be set up. The start and stop conditions of the test need to be defined in the brake test setup dialog. Starting the test aktivates the sequencer which guides you through the test and starts the measurement of the required data automatically.

For the simple brake test the vehicle accelerates to the defined speed. The sequencer now releases the brake phase which is detected by the switch on the brake pedal. The test is finished, when the car stands still and the software detected the stop chriteria. Now the report can be generated automatically and sent to a small printer

Workflow

Upload the XML setup and choose the sensors from the sensor database. The setup can be done offline. For measurement you connect your sensors and fine-tune the setup. Some sensors need a zero adjustment before measurement. With a few simple clicks you adjust the prepared visualization screens to your needs – and the test starts.

Features to support your workflow:

- *Offline Setup*
- *Sequence Control*
- *Sensor Database*
- *TEDS*
- *Global Header*
- *Data Import and Export*

All relevant data like the measurement jobs, sensor database, setup files, measurement data and results can be stored in a common measurement directory. This fast and efficient way to support the measurement process solves logistical problems of sensors and of the measurement job.

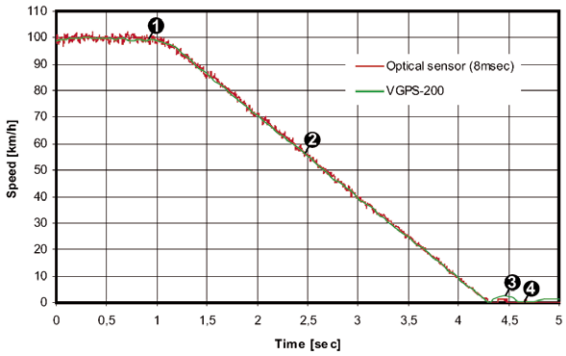
GPS System

GPS System is the easiest and up to now the most elegant way to measure speed and position with the required accuracy. Other devices such as optical, radar or 5th wheel are also supported with DEWETRON Brake Test systems. GPS is the preferred one because it is easy to install, easy to use and gives robust and precise data. GPS is not sensitive to the road surface, it also can be used off road on muddy streets, snow, ice etc.

The GPS receiver is integrated inside a DEWETRON measurement device, so only the antenna has to be put on top of the vehicle and connected to the measurement device.

Features of the DEWETRON GPS system:

- *Easy to install and use*
- *Real-time vehicle speed*
- *Lowest latency time*
- *No calibration required*
- *GPS is not sensitive to road surface – therefore can be used even off-road, snow, ice etc.*
- *Analog speed output and digital displacement output*



Comparing GPS data with conventional optical sensor data shows that signal accuracy and signal latency of the GPS signal is comparable – according its noise even better. A constant latency time of 8 ms of the optical sensor is corrected for this comparison.

A DEWETRON System can handle all types of those sensors whether it is an optical sensor, a radar sensor or a 5th wheel sensor.

VGPS 100 external

The advantage of a GPS system is that it can also be used to replace former mechanical or optical sensors. The VGPS 100 is an external GPS which provides an analog speed output and a digital displacement output.

Multisensor Input

Each input channel supports different sensor types via MSI (Modular Smart Interface) modules. These interfaces are automatically detected and configured by the software.

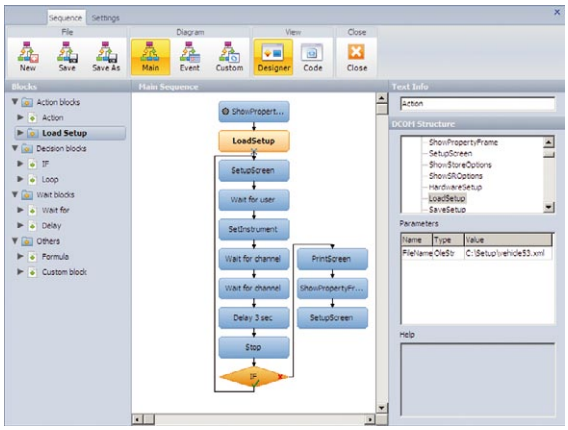
- *Thermocouple*
- *PT100, PT1000, etc.*
- *Acceleration*
- *Voltage*

Brake Test Sequence

The sequencer is a tool to predefine a process of steps in a sequential format. The interface can be graphically programmed or in a code oriented view. The sequence is stored in a file format. Therefore it is possible to manage these sequences centrally to guarantee a standardized and defined measurement procedure.

Within the sequencer you can access all relevant DEWESoft features. In addition you can apply actions, apply formulas and make decisions, wait for interaction or a preset delay and define your customized sequences. So it's possible to define different sequences and fit them together in a single sequence, where the sub sequences are done sequentially. The sequences can be controlled by the user or by an event caused by a certain channel.

For a specific test which consists of different steps and loops it's possible to configure such a test sequence. As shown in this simple example for brake testing.

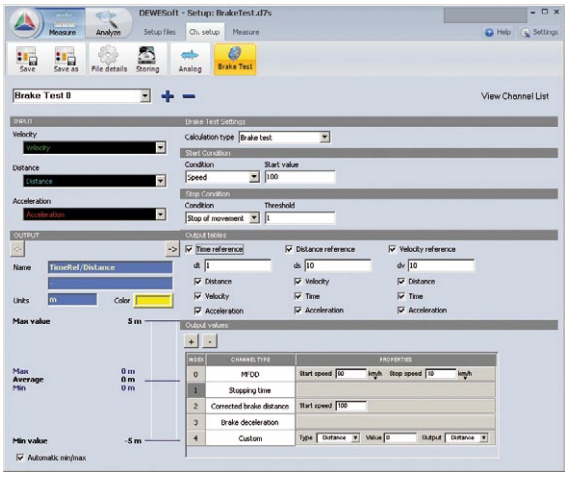


Brake Test Setup

The setup of the Brake Test is shown in this screenshot. Start and stop conditions are set and also the required channels can be setup.

For each output channel you can choose a name and choose the proper unit. You can also configure the color and preset a minimum and a maximum value used as a preset for its indicating instrument.

Clicking on the arrow you can scroll through all the brake test specific channels.

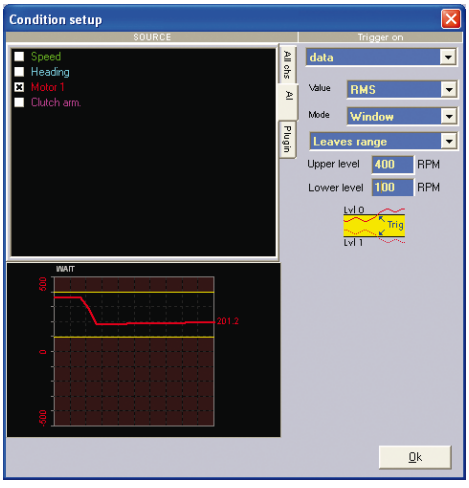


Triggers and Alarms

The STORE and STOP buttons control recording, but DEWESoft also includes a ver-satile TRIGGER section, which includes the following types of trigger method:

- *Simple edge (either rising or falling slope)*
- *Filtered edge (edge plus a rearm level; either slope)*
- *Window trigger (two levels; entering or leaving logic)*
- *Pulse width trigger (longer or shorter than duration logic)*
- *Window and pulse width (completely selectable as above)*
- *Slope Trigger (either rising or falling slope with steepness selection)*

These sources are also available to STOP the acquisition...or simply enter a post-acquisition time. No matter how you set it up, you can always add PRE and POST time to the recording, to add vital seconds or even minutes to either end of the acquisition. The same type of dialog is available to set up an alarm event.



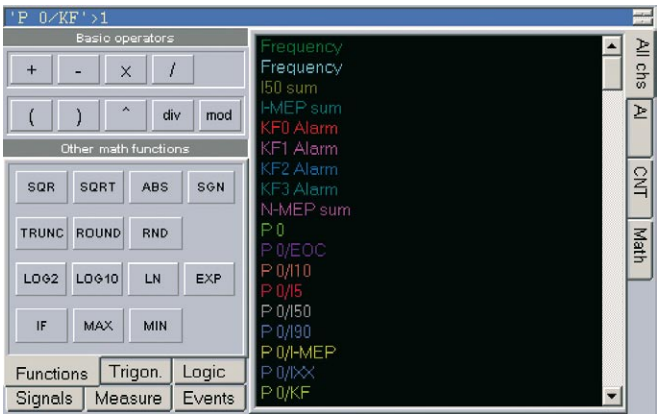
Calculated Parameters

The math for those tests will be done in custom math module of DEWESoft. The values which need to be calculated are interpolated tables of v, a, t, s (velocity, acceleration, time and distance) where the reference could be time, velocity or distance in predefined steps.

The additional parameters which are calculated are:

- *Start speed when pushing brake pedal*
- *Stopping time*
- *Corrected brake distance, calculated as Sc=Sm*Vd²/Va²*
- *Mean fully developed deceleration MFDD (calculation see ECE R13-H)*
- *Brake deceleration over complete measurement*
- *Derivation of acceleration, used to check the passenger comfort*

$$MFDD \quad d_m = \frac{v_b^2 - v_e^2}{25.92(S_e - S_b)} \quad m/s^2$$



Where:

v_o *initial vehicle speed in km/h*

v_b *vehicle speed at 0.8 v_o in km/h*

v_e *vehicle speed at 0.1 v_o in km/h*

S_b *distance travelled between v_o and v_b in meters*

S_e *distance travelled between v_o and v_e in meters*

The speed and distance shall be determined using instrumentation having an accuracy of ± 1 % at the prescribed speed for the test. The dm may be determined by other methods than the measurement of speed and distance; in this case, the accuracy of the dm shall be within ± 3%.

USB Printer for printing results

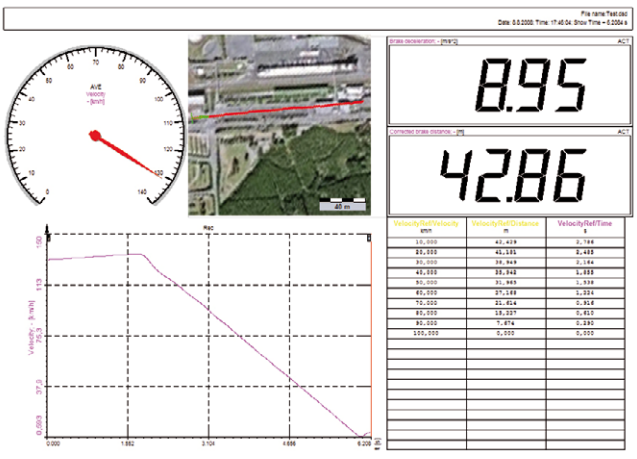
This printer is used to print the most important result parameters direct after the test and makes the documentation very easy.

Analyze Mode - Replay, Export, Share Data

You can replay any captured data file, zoom in with the recorder graph cursors, make measurements, print in full color to any printer, and export the data to a wide variety of formats compatible with today's popular analysis software package, like FlexPro®, Matlab, Excel, DIAdem, UNV, Famos, Nsoft, Text and many more.

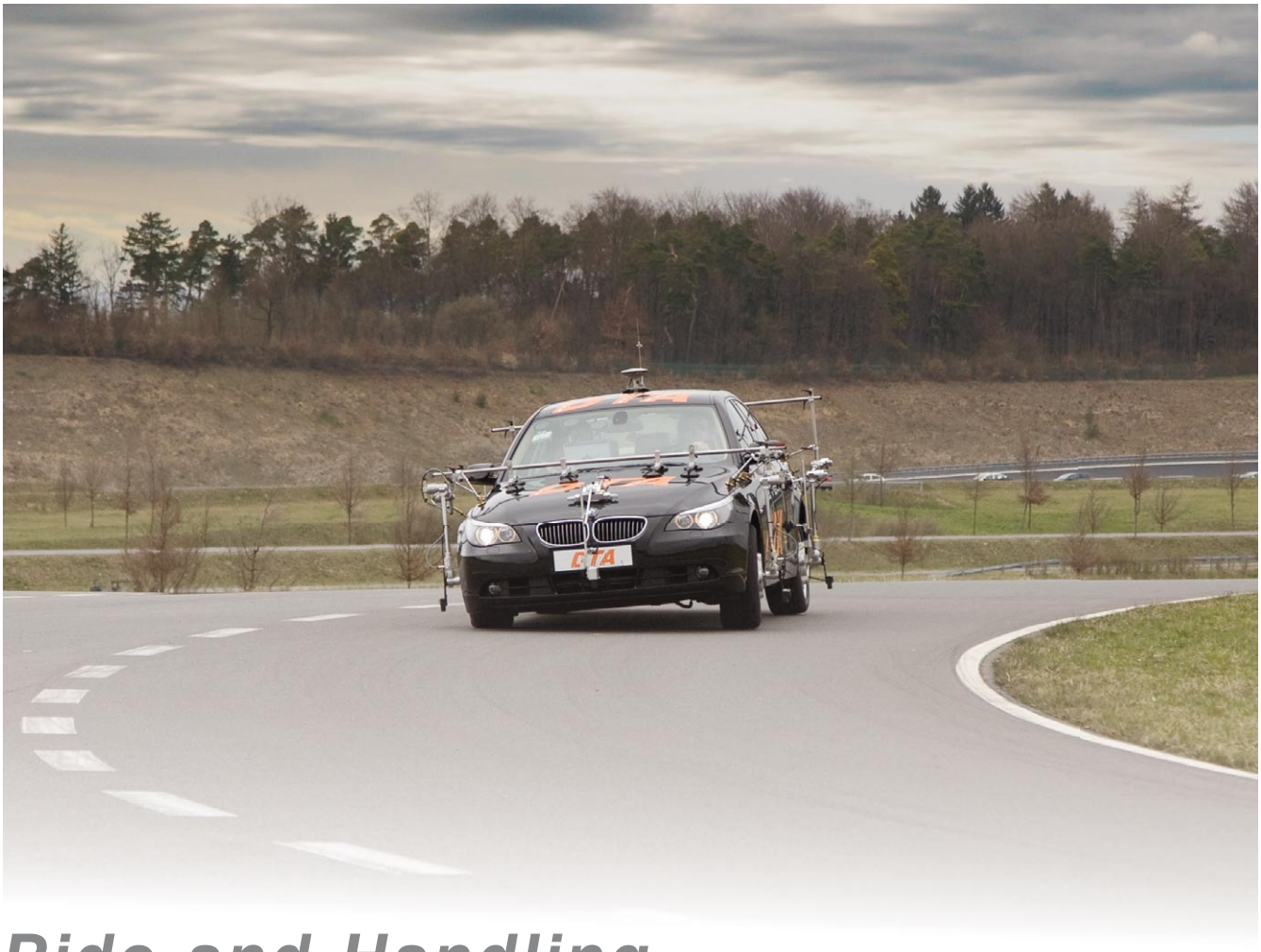
You can even export the whole measurement view to an AVI video file from your recorded data to create „moving documentation."

NO LICENSE is needed to use DEWESoft in the ANALYZE mode, so you can install the software on all your computers, or even distribute it to your customers, and they can view the results. In this way, all of your colleagues and customers can replay your data files and do all of the functions that you can – just by sharing the data file!



DEWETRON BT Hardware Configuration

	DEWE-101-BT	DEWE-211-BT
Analog input channels	8 dynamic inputs	16 MDAQ inputs
Digital channels	8 CTR or 24 DI	8 x DIO + 2 CTR or 8 DI
Channel expansion	No	No
CAN interfaces	2	2
Video	USB DirectX	DEWE-CAM or USB DirectX
Display	External MOB-DISP-x	External MOB-DISP-x
Power supply	8 – 36 V_{DC}, external AC adapter	8 – 30 V_{DC}, external AC adapter
Dimensions (W x D x H)	249 x 150 x 82 mm 9.8 x 5.9 x 3.2 in.	317 x 252 x 92 mm 12.48 x 9.92 x 3.62 in.
Weight	2 kg (5.5 lb.)	Typ. 5 kg (11 lb.)
MDAQ series modules are available for almost all kinds of sensors		



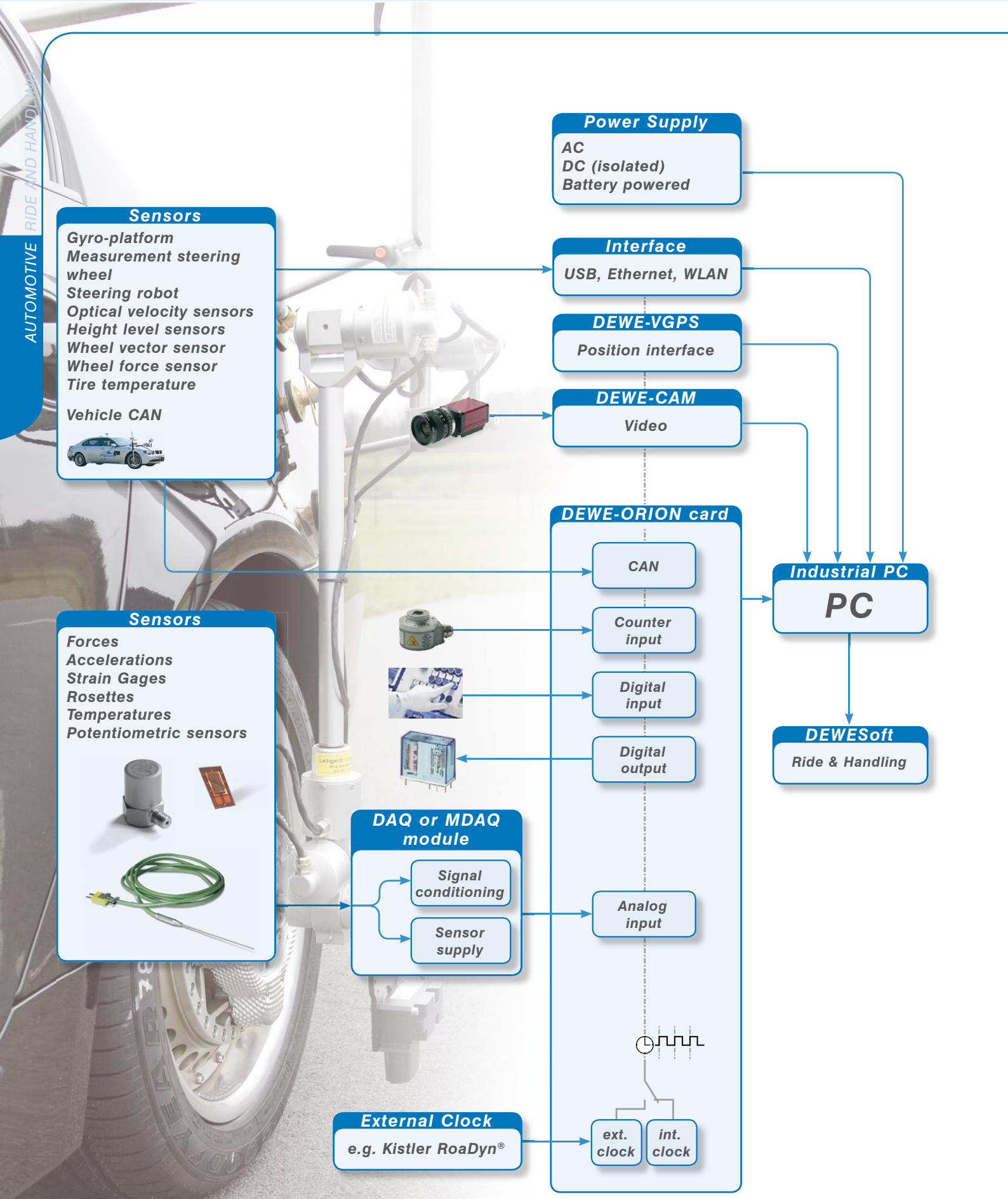
Ride and Handling

DEWETRON systems offer a rugged and portable design for in-vehicle and fulfill the requirement of a high channel count for vehicle dynamics investigations. The system covers a wide range of input types e.g. for voltage, strain, temperature and also for GPS, Video, CAN and OBD II.

In addition to the application of Ride and Handling testing, the system is capable of being expanded with additional hardware and software features. Further automotive measurement tasks such as hybrid testing on the power train, brake test, together with synchronized video are also possible.

Key Features

- *Synchronized multichannel data acquisition without phase errors*
- *Proven package due to DTA*
- *Guaranteed compatibility of the whole system*
- *Compact and rugged equipment for in-vehicle use*
- *Easy mounting, setup, alignment, and calibration*
- *Multisensor inputs (voltage, acceleration, strain, etc.)*
- *Aliasing free sampling and flexible filtering capabilities*
- *Real-time Mathematics*
- *Support for Kistler RoaDyn® measurement wheels*
- *Export to different file formats*


Power Supply
AC
DC (isolated)
Battery powered
Sensors
Gyro-platform
Measurement steering wheel
Steering robot
Optical velocity sensors
Height level sensors
Wheel vector sensor
Wheel force sensor
Tire temperature
Vehicle CAN
Interface
USB, Ethernet, WLAN
DEWE-VGPS
Position interface
DEWE-CAM
Video
DEWE-ORION card
CAN
Counter input
Digital input
Digital output
Industrial PC
PC
DEWESoft
Ride & Handling
Sensors
Forces
Accelerations
Strain Gages
Rosettes
Temperatures
Potentiometric sensors
DAQ or MDAQ module
Signal conditioning
Sensor supply
Analog input
External Clock
e.g. Kistler RoaDyn®
ext. clock
int. clock

CAN-Bus Data/OBD II

Synchronous data from CAN-bus

- *CAN DBC export and import*
- *J1939 decoding*

Video

Synchronized video information

Wheel Force Measurement

Telemetric recipient for all wheel forces

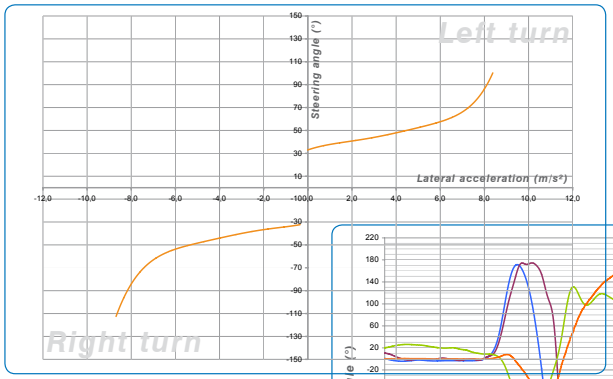
Analog Channels

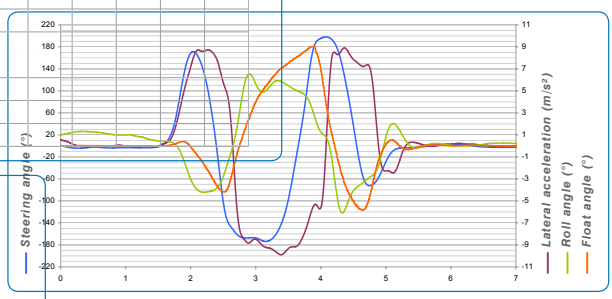
Strain, temperature, acceleration, force, torque, etc.

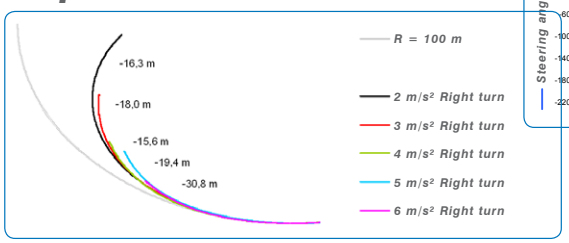
GPS Information

Position data

Reports







Ride and Handling Application

Cars and trucks are designed on computers, and built by robots under computer control. But there is no substitute for testing the car with a human being, under a wide variety of road conditions and environments. That's where ride handling tests start. Most vehicle manufacturers have their own test track or proving grounds, where they can put their creations to the test. What normal people would consider „subjective criteria" like how a car „feels" under certain conditions must be precisely quantified and then tested over and over again within an optimization loop, on every vehicle.

Standardized tests guarantee reproducible and comparable results. Those standards are available and supported with our measurement system. This is furthermore important for a globalised comparison of test results. For the measurement process – efficient setup time and simple system handling is a key to fulfill efficient measurement tasks. Our unique DEWESoft, the portable packages and rugged construction makes DEWETRON products popular for ride handling, drivability, vehicle dynamics, and related applications.

Typical tests for Ride and Handling are:

- *Stationary circle test (DIN ISO 4138)*
- *ISO Lane Change Test (ISO 3888-1/2)*
- *Braking from stationary circle test (ISO 7975)*
- *VDA-evasion test according to ISO 3888-2*
- *Load change from stationary circle test according to ISO 9816*
- *Steering angle step and sinus test according to ISO 7401, 13674-1,-2 (with steering robot)*
- *Fishhook Test (NCAP)*
- *FMVSS-126 (Sine with Dwell)*

Ride and Handling – often also called vehicle dynamics - is a wide range of applications and investigations in the development process of an vehicle and its components. One goal of the investigations is an objective assessment of the vehicle behavior and the drivability. Furthermore also the development of control loops and the parameterization for the chassis control is within the view of the ride and handling application.

Ride and Handling Sensor Installation

Depending on the measurement goal, many different sensors are required for different tests. With a DEWETRON Ride and Handling System you can implement all established sensors available on the market. Together with the DTA (Drivability Testing Alliance) our system compatibility is proven. The table shows the required the minimum sensor equipment for each standardized tests. The following table is a suggestion for the sensor equipment of each test. The table beside shows the physical parameters of the main measurement systems. The synchronous and aliasing-free acquisition of the physical channels is guaranteed – furthermore all mathematical processing of additional channels can be done online.

	Measurement Wheel	Wheel vector sensor	Measurement Steering Wheel	Height Level Sensor	Inertial Platform	GPS/DGPS	Wheel Temperature	Strain Gauge	Brake Pressure	Brake Temperature	Synchronous data acquisition
Brake Test	○		○	○	○	●	○		●	●	●
ISO Lane Change Test (ISO 3888-1)	○	○	●	●	●	●					●
VDA-evasion test (ISO 3888-2)	○		●	●	●	●					●
Stationary circle test (DIN ISO 4138)	○	○	●	○	●	●					●
Braking from stationary circle test (ISO 7975)	○	○	●	○	●	●	○		●	○	●
Load change from stationary circle (ISO 9816)	○		●	●	●	●					●
Fishhook Test (NCAP)	○		●	●	●						●
Vehicle Transfer Function	○	●	●	●	●						●
Road Load Data	●	○	●	●	●	○	●	●	●	●	●

Synchronous measurement

Synchronous measurement is absolutely essential for the measurement quality. All the sensors within this complex system have their own timing behavior. Within a DEWETRON system all the channels are strictly synchronous. This guarantees the measurement quality required for a correct interpretation of the measured results.

DTA – Drivability Testing Alliance

The DTA is a consortium to offer the complete spectrum of acquisition and evaluation of vehicle drive-ability. It is founded by Corrsys-Datron, DEWETRON, GeneSys, Kistler and TÜV SÜD Automotive.

CORRSYS DATRON Sensorsysteme GmbH — *Optical sensors, Wheel Motion sensors*

GeneSys Elektronik GmbH — *GPS / Inertial Platform*

KISTLER measure. analyze. innovate. — *Wheel Force, Acceleration sensors*

TÜV SÜD Automotiv Automotive — *Wheel Temperature sensors, Testing*

Sensor assembly of a Vehicle

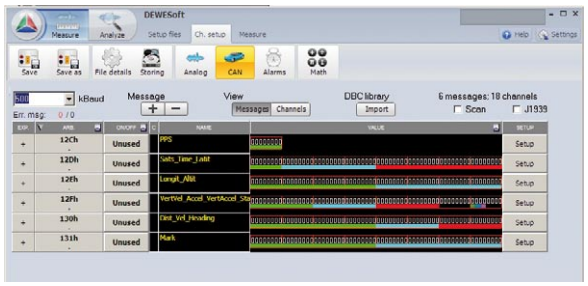
Adapting and calibrating all sensors is a major effort for Ride and Han-dling tests on a vehicle. Therefore the compatibility of the sensors – the signals, the plugs, the data acquisition, the initialization routine and further software features – therefore the proven compatibility plays an essential role for a complete test system.

Due to the proven compatibility of all sensors and the DEWETRON measurement system, the time to assemble the car can be optimized to a minimum. This will ensure cost effective wiring and assembly of the complete system.

CAN Input

Synchronous CAN interfaces are required for the communication with the ADMA (gyro sensor) and the vehicle bus. CAN bus data can be visualized and recorded.

The CAN setup dialog allows to set up the required CAN channels as measurement channels. These channel are treated like physical measurement channels and can be used for visualization, mathematics or to trigger an event.



Offline Setup

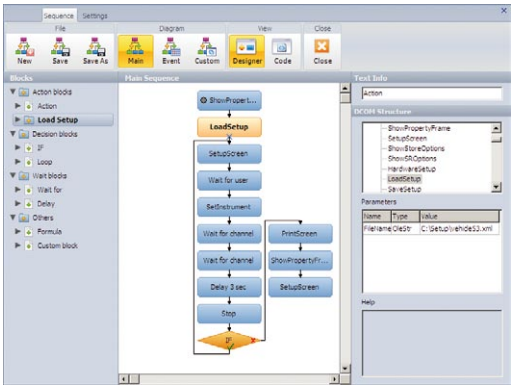
Especially in large channel count situations a standard PC can be used to create the measurement setups off-line independent from the measurement hardware.

Multisensor Input

Each channel of a multisensor input supports different sensor types via MSI (Modular Smart Input) modules. These interfaces are automatically detected and configured by the software.

- *Thermocouple*
- *PT100, PT1000, etc.*
- *Voltage*
- *Acceleration*

Sequence Control



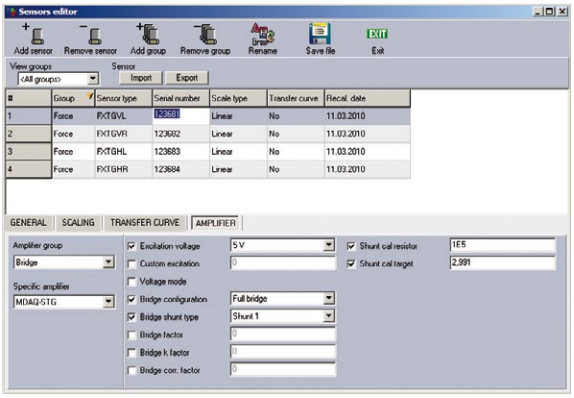
The sequencer is a tool to predefine process steps in a sequential format. The interface can be graphically programmed or in a code oriented view. It is possible to manage these sequences centrally to guarantee a standardized and defined measurement procedure.

Within the sequencer you can access all relevant DEWESoft features - apply actions and formulas and make decisions, wait for interaction or a preset delay and define your customized sequences. So it's possible to define different sequences and fit them together in a single sequence, where the sub sequences are done sequentially. The sequences can be controlled by the user or by an event caused by a trigger of a certain channel.

Sensor Database and TEDS

The entire channel setup and scaling is just a click away, which keeps a comprehensive list of sensors and all their parameters, including scaling, units and calibration date info.

- *Linear scaling and offset*
- *Non linear scaling*
- *Polynomial scaling*
- *Calibration table*



The entire channel setup and scaling is just a click away. If necessary it's possible to zero the sensor or even to renew the calibration parameters. This guarantees the reproducibility, traceability and quality of your measurement results.

*To make the sensor setup even more automated, our signal conditioning modules support TEDS, which is the new „smart sensor interface". TEDS is an acronym for **T**ransducer **E**lectronic **D**atasheet. It is a table of parameters (manufacturer ID, model number, serial number, version, and many more) that identifies the transducer.*

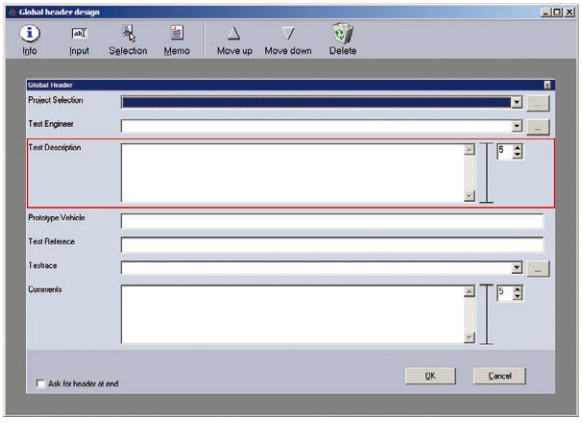
The screenshot shows a view to the sensor database dialog.

DEWESoft Net

DEWESoft Net allows the communication between different Dewetron Systems. The system can be configured as stand alone, as master or as a slave unit. It's also possible to use another PC for remote control.

Cascading two or more devices in the vehicle – DEWESoft Net can synchronic and interface the devices. For testing in two or more vehicles, using a master slave configuration, the data can be send via WLAN to the master.

Global Header



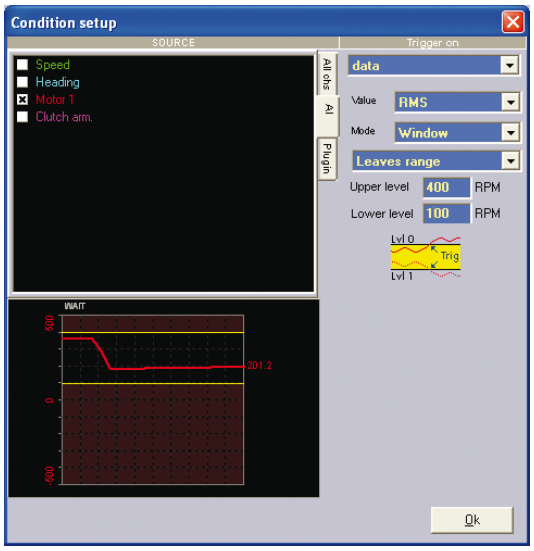
The global header adds additional information to the measurement project for documentation. Entries like project name, test engineer, test description, unit under test and comments etc. can be configured. The setup of the header file can be stored and used as a standard header file.

All data and setup parameters are stored in the data file. This allows a traceable measurement procedure.

Triggers and Alarms

DEWESoft includes a versatile TRIGGER section, which includes with following types of trigger method:

- *Simple edge*
- *Filtered edge*
- *Window trigger*
- *Pulse width trigger*
- *Window and pulse width*
- *Slope Trigger*



The same type of dialog is available to set up an alarm event.

All of these sources are available to STOP the acquisition or configure a condition where no data will be stored. It's also possible to enter a pre-aquisition time, a post-acquisition time and a holdoff time.

Data Visualization

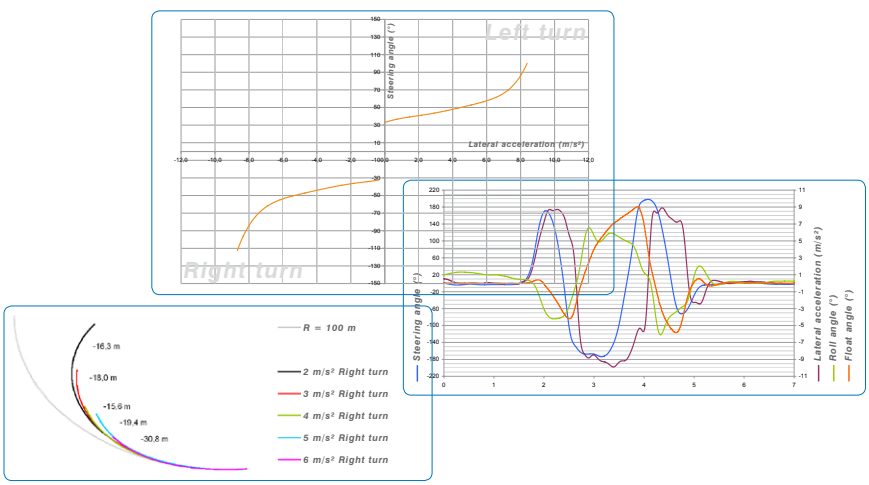
One of the most powerful and yet easy to use aspect of DEWESoft is the creation of displays. Each of the standard displays mentioned above can be modified in seconds, as easily as clicking the DESIGN button and clicking widgets from the screen design tool bar!

- *Pictures*
- *Digital meter*
- *Analog meter*
- *Discrete displays*
- *Bar graphs*
- *Recorder*
- *Oscilloscope*
- *Video*
- *XY-chart*
- *FFT chart*
- *GPS*
- *Text*

FlexPro Report

FlexPro® combines the power of a high-end data analysis tool with the ease of use and familiar interface of Excel. But unlike Excel, there are no limits to the size of a file that FlexPro can open, analyze, chart, and print! Tightly integrated with DEWESoft, FlexPro is a worthy option for any DEWETRON data acquisition system.

Using a FlexPro template, your report is generated after the measurement sequence. Programming is as simple as usage of Excel and Word and at the same time very fast, even when dealing with large data volumes.The template defines all tables and graphes you want to see within ypur report – this has only to be done once.



Once you have defined the calculations and the layout, you have a template that you can be re-use for future tests. Simply import the data from a new test into FlexPro and update your documents with a mouse click.

DEWETRON RAH Hardware Configuration

	DEWE-211-RAH-16	DEWE-501-RAH-64	DEWE-501-PCI-64	DEWE-2600-RAH-64
Application	Smallest RAH system, 16 analog inputs	AC-DC-UPS power, 64 analog inputs	64 channels expansion for DEWE-501-RAH	Fully battery powered, 64 analog inputs
Analog input channels	16 MDAQ inputs	64 MDAQ inputs	64 MDAQ inputs	64 MDAQ inputs
Digital channels	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI
Channel expansion	No	Yes	No	Yes
CAN interfaces	2	4	Up to 4 (opt.)	4
Video	DEWE-CAM or USB DirectX	DEWE-CAM or USB DirectX	No	DEWE-CAM or USB DirectX
Display	External MOB-DISP-x	External MOB-DISP-x	No	15" 1024 x 768
Power supply	8 - 30 V_{DC}, external AC adapter	Battery powered, 18 - 24 V_{DC} or 11 - 33 V_{DC}	Battery powered, 18 - 24 V_{DC} or 11 - 33 V_{DC} (UPS battery 1 min.)	Battery powered, 18 - 24 V_{DC}, external AC power supply
Dimensions (W x D x H)	317 x 252 x 92 mm 12.48 x 9.92 x 3.62 in.	439 x 209 x 181 mm 17.28 x 8.23 x 7.13 in.	439 x 209 x 181 mm 17.28 x 8.23 x 7.13 in.	417 x 246 x 303 mm 16.42 x 9.69 x 11.93 in.
Weight	Typ. 5 kg (11 lb.)	Typ. 9 kg (19.8 lb.)	Typ. 8 kg (17.6 lb.)	Typ. 14 kg (31 lb.)
MDAQ series modules are available for almost all kinds of sensors				

Pass-by Noise

The DEWETRON Pass-by Noise system is a flexible package of measurement hardware and powerful software. Online checks for validation, visualized online results including post-processing and reporting makes the pass-by noise system an all-in-one test solution.

Supported standards:

- *ISO 362*
- *SAEJ1470*
- *Customer specific test procedures*

The system can be expanded with additional hardware and software features to fulfill many additional measurement applications.

Key Features

- *Flexible Pass-by Noise system for multi purpose use*
- *Integrated 100 Hz VGPS speed sensor*
- *Automated report generation*
- *Reuse of existing sensors*
- *Fully battery powered*
- *Re-use of existing sensors*
- *Multisensor input (voltage, strain, bridge,etc.)*
- *TEDS support for microphones*
- *CAN and OBD interface*

Speed and Distance
GPS system

Optical, radar or 5th wheel sensor

Temperature Sensors
Thermocouple

Infrared sensor

Tire temperature measurement

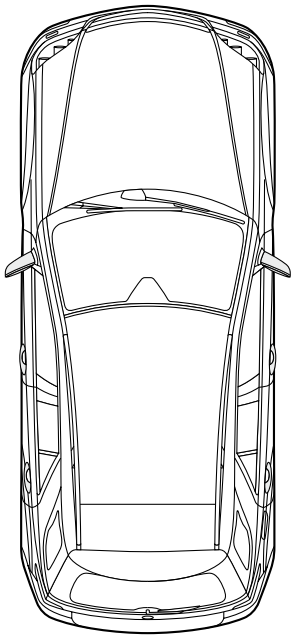
Vehicle CAN-Bus

Sensors Brake System
String sensor:
Brake pedal position

Swatch:
Brake valve timing

Brake pedal sensor:
Brake pedal force

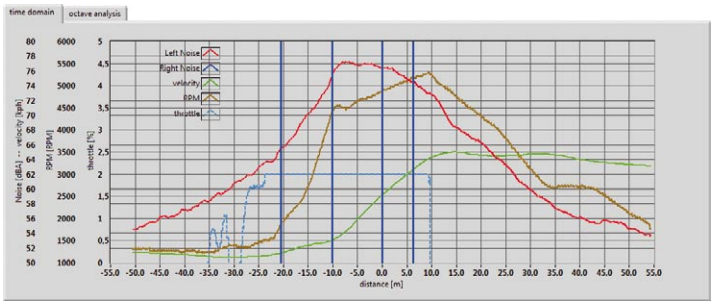
Pressure switch:
Brake pressure



Pass-by noise test acquires online the noise level of the car measured by two calibrated EN class1 microphones

The measurement is triggered by optical event markers.

One measurement device needed in the vehicle another one onsite. These two devices are synchronized via GPS clock operating in master slave mode.



The report according the regulation is created automatically after the measurement

Microphone Input
Noise level – left and right channel, shown in an oszilloscope and as FFT Spectrum

CAN-Bus Data
Synchronous data from CAN-bus

Analog Input
Vehicle speed, speed deviation, RPM, etc.

GPS
Position data

Video
Synchronized video information

Pass-by Noise Application

Community noise regulations put stringent requirements on road vehicle noise emission. Regulations apply to cars, trucks, buses, motorcycles, and scooters. Manufacturers have to certify the compliance of a vehicle according to international standards..

The measurement setup of noise emission of passing road vehicles is defined by international standards. Also environmental conditions like ground temperature is is considered in the standards. For different categories (two-wheelers, passenger cars, LCV, HCV, trucks, busses etc) different procedures exist.

For a pass-by noise test two synchrinized measurement systems are needed - one insite the vehicle and one onsite. The synchronization of the two measurement devices is done via GPS clock

Online data exchange is done via WLAN communication. The configurations of both units can now be done from the master measurement unit. DEWESoft Sequencer supports the measurement procedure step by step. During the measurement all mathematical calculations are done in the background. At the end of a testrun the results are e.g.: dBA levels, spectra, rpm, speed etc. Further offline analysis such as FFT, histogram, order analysis etc. are possible.

Similar fields of applications which can be covered with DEWETRON-PBN systems:

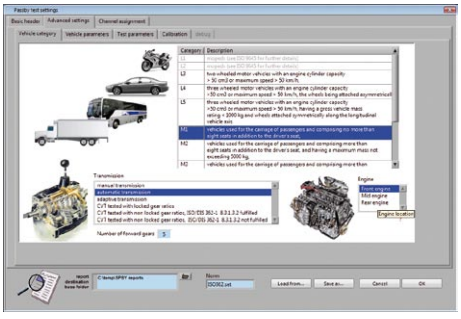
- *Sound pressure level emitted by stationary roadvehicles*
- *Noise investigations from power train*
- *Tyre-to-road sound emission*
- *Intake and exhaust noise*
- *Engine and gearbox acoustics*
- *Tire acoustic*
- *Psychoacoustic*
- *Media flow acoustics*
- *Air condition measurement*

Pass-by Noise Setup

The DEWESoft sequencer guides you through the measurement.

- *Configuration of sequence*
- *Configuration of gear setting during test run*
- *Definition of evaluation parameters*

Acording to the standards the test needs to be done in certain gears. The integrated gear selection wizard helps to find the proper gears for the test. With the master slave configuration, all data is available for the master and also the control from the slave can be done via the master device.



Vehicle Category

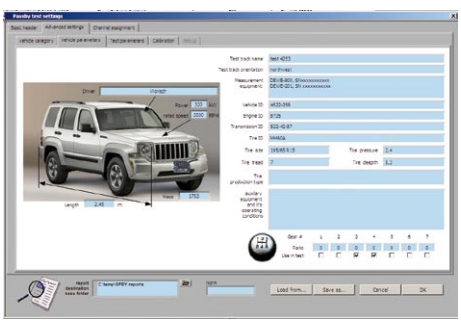
Select the proper category for your vehicle according to the classification of the standard. Choose the engine type and the position of the engine:

Transmission:

- *Manual, automatic, adaptive and CVT transmission*

Engine position:

- *Front, mid and rear engine*



Vehicle Parameters

All necessary data such as vehicle destignation, driver name, engine, transmission, tires, etc. are required for the report.

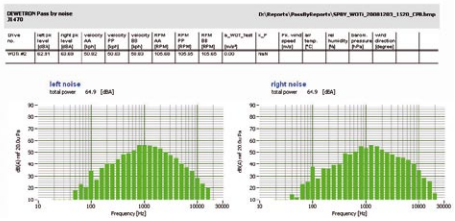
Test Parameters

The software checks the validity of the tests according the limits which are set up in this dialog. The software accepts all test runs within this tolerances.

- *Entry speed or rpm*
- *Noise level deviaton*
- *Gust wind speed*
- *Air temperature*

Reporting

The reports for the tests are predefined. The reports are generated as bmp files after the measurement. These files can be converted to pdf or printed to paper.



Calibration Check

The calibration of the microphones are requested before and after the test. This is done with a sound level calibrator.

DEWESoft Net

DEWESoft Net allows the communication between different DEWETRON instruments. Each unit can be configured as stand alone, as master or as slave. It's also possible to use any PC to control a measurement unit remotely.

Pass-by noise testing requires the master-slave communication via WLAN to send the measured data to the master unit. This allows controlling the maneuver from the master device. The relevant data are sent to the master, where they are visualized and processed.

DEWE GPS Clock

- *Synchronized measurements on decentralized instruments*
- *Continuous synchronization to absolute GPS time*
- *High stable clock output even when satellite connection is interrupted*

With this clock generator, DEWETRON provides fully synchronized data acquisition on decentralized solutions independent from their distance. The DEWE-GPS-CLOCK synchronizes continuously to the absolute GPS time of available satel-lites.

PBN Hardware Configuration

	DEWE-211-PBN	DEWE-510-PBN	DEWE-800-PBN
Application	In-vehicle, DC powered	On-site-system, battery powered	On-site-system, AC powered
Analog input channels	16 MDAQ inputs	16 DAQ series modules	16 DAQ series modules
Digital channels	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI	8 x DIO + 2 CTR or 8 DI
Channel expansion	No	Yes	Yes
CAN interfaces	2	2	2
Video	DEWE-CAM or USB DirectX	DEWE-CAM or USB DirectX	DEWE-CAM or USB DirectX
Display	External MOB-DISP-x	External MOB-DISP-x	External
Power supply	8 – 30 V_{DC}, external AC adapter	Battery powered, 18 – 24 V_{DC}, external AC power supply	115 / 240 V_{AC}
Dimensions (W x D x H)	317 x 252 x 92 mm 12.48 x 9.92 x 3.62 in.	439 x 308 x 181 mm 17.28 x 12.13 x 7.13 in.	437 x 443 x 181 mm 17.2 x 17.44 x 713 in.
Weight	Typ. 5 kg (11 lb.)	Typ. 8 kg (17.6 lb.)	Typ. 12 kg (26.4 lb.)
MDAQ and DAQ series modules are available for almost all kinds of sensors			

Re-inventing Data Acquisition

DEWETRON Ges.m.b.H. • Parkring 4 • A-8074 Graz-Grambach
Tel (0043) 316 3070 0 • Fax (0043) 316 3070 90 • sales@dewetron.com

worldwide DEWETRON

DEWETRON Company Profile

DEWETRON Ges.m.b.H. with headquarters in Graz / Austria was founded in 1989. Starting as a distributor of measurement components, DEWETRON today is a full service provider of market leading Test and Measurement Instruments and Solutions. With more than 200 employees in more than 25 countries around the world, we offer one stop shopping and service for demanding test and measurement applications.

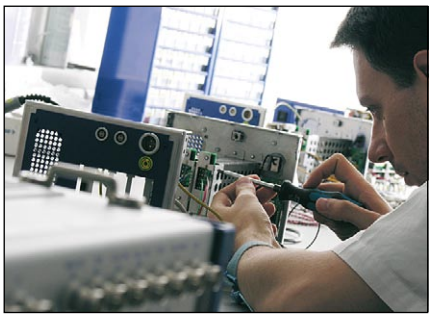
DEWETRON develops and produces high-precision PC based test and measurement equipment with robust housings for portable and laboratory use. Beside powerful logging and recording systems, DEWETRON offers several dedicated measurement instruments for multiple applications. The scalability, modularity and innovative platform technology of the equipment and software allows the systems to be deployed in almost all areas of research and development in the Automotive, Transportation, Aerospace & Defense, Power & Energy industries as well as in General Purpose Test and Measurement applications.

DEWETRON is seen as reliable test and measurement partner by our customers. Our business success is the outcome of focusing and maintaining long-term positive business relationships and living up to the trust placed in us. Test and measurement engineers and technicians from many well known companies rely on the 20 years expertise of DEWETRON.

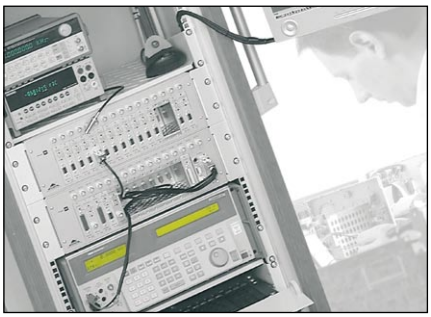
DEWETRON is ISO 9001:2000 and ISO 14001:2004 certified. Environmental and quality management is more than just a compliance issue for us; it is an integral part of our business operations. We continuously strive to combine innovation and business success with stringent quality standards and rigorous quality procedures.

Since 1998 DEWETRON is part of the AUGUSTA Technologie AG, Munich, which is stock listed in the Frankfurt Prime Standard. AUGUSTA AG is an industrial holding with majority interest in 6 high-technology companies. In 2008, AUGUSTA AG employed more than 600 employees and generated sales revenues of approximately EUR 130 million.

DEWETRON worldwide headquarters in Graz-Grambach / Austria

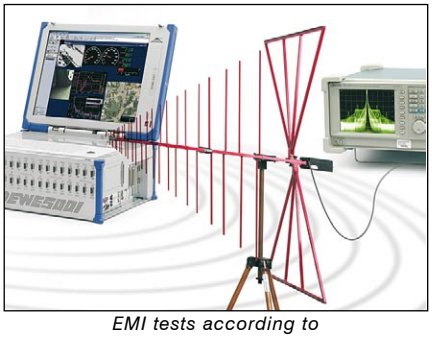


Production and quality control

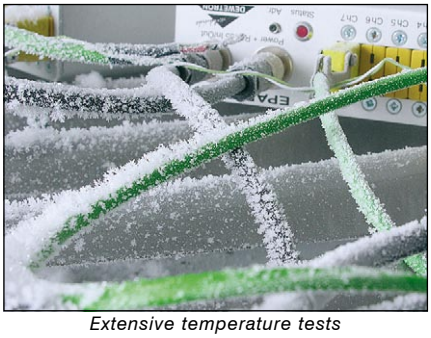


Calibration laboratory

Development of customer defined data acquisition solutions



EMI tests according to CE and other standards



Extensive temperature tests (-40 to +70 °C)

Product and application training in our in-house Training Center

DEWETRON offices worldwide

North & South America

- Argentina
- Brazil
- Canada
- Chile
- Colombia
- Costa Rica
- Ecuador
- Mexico
- Peru
- USA

Europe

- Austria
- Benelux
- Czech Republic
- Finland
- France
- Germany
- Italy
- Spain
- Sweden
- Switzerland
- Turkey
- United Kingdom

Asia & Pacific

- Australia
- China
- India
- Japan
- New Zealand
- Singapore
- South Korea
- Taiwan
- Thailand
- Vietnam

Headquarters:

DEWETRON Ges.m.b.H. • Parkring 4 • 8074 Graz-Grambach • AUSTRIA
☎ (0043) 316 3070-0 • 🖷 (0043) 316 3070-90 • ✉ sales@dewetron.com

Find your local distributor on
www.dewetron.com

worldwide
DEWETRON
www.dewetron.com