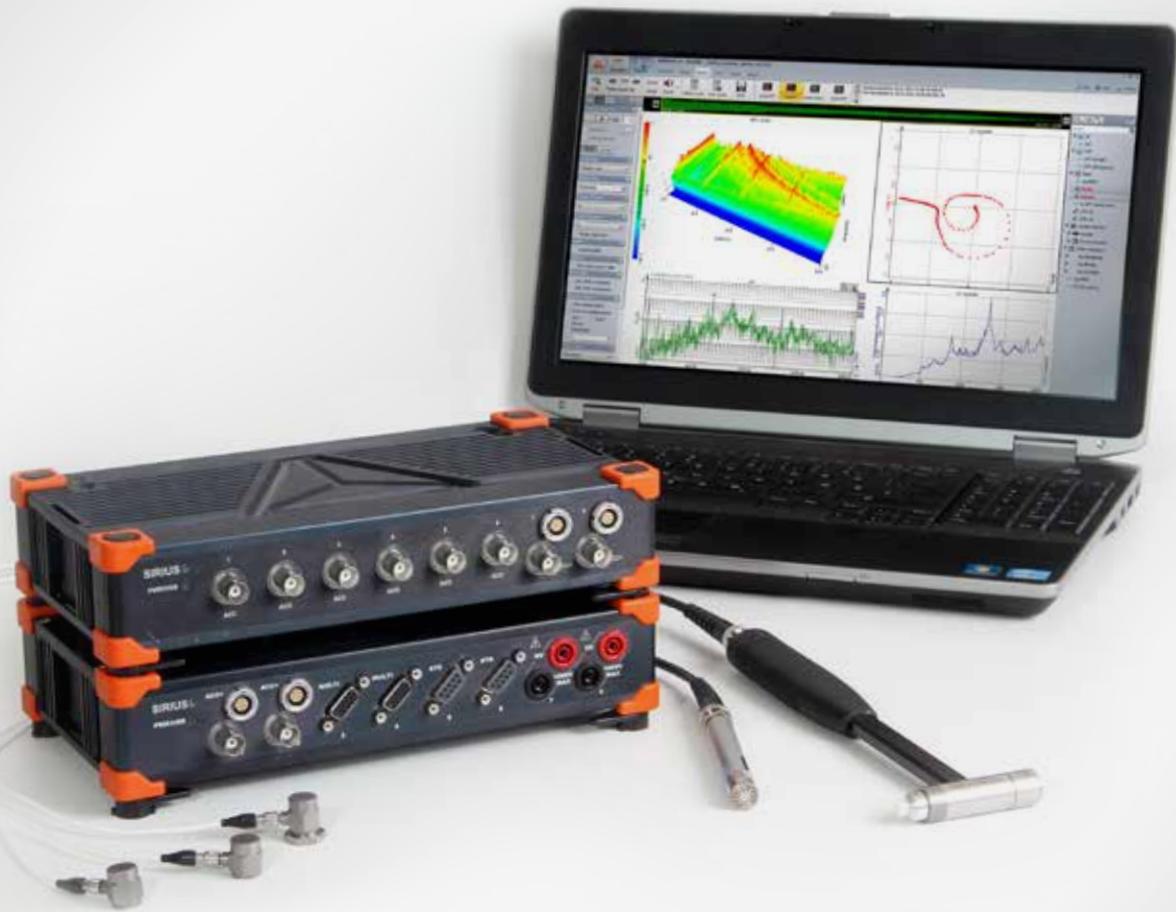
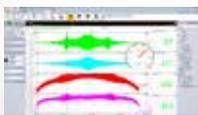


# Dynamic Signal Analysis



**NOISE & VIBRATION**



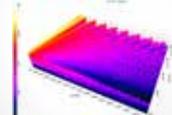
**ROTATING MACHINERY**



**STRUCTURAL ANALYSIS**



**ACOUSTIC ANALYSIS**



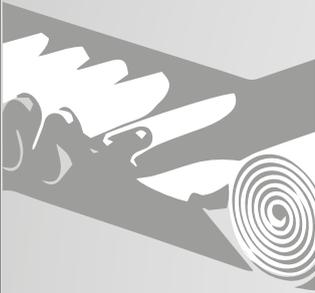
**DEWESoft**<sup>®</sup>  
measurement innovation

# For every application

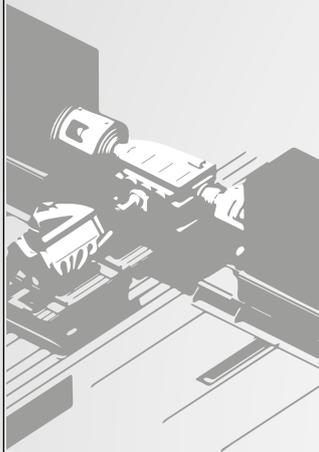
Since more than 15 years DEWESoft provides solutions for a wide range of applications. The package covers Instruments and Software from single devices up to networked high

channel count systems. The NVH analyser solution fits perfectly to your need in field, laboratory or test bed.

## SERVICE & DIAGNOSIS



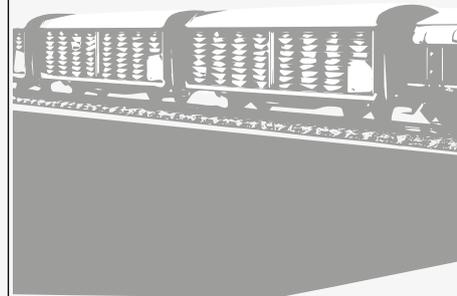
## TEST BED



## CONTROL ROOM



## DISTRIBUTED SYSTEMS



## SERVICE & SUPPORT

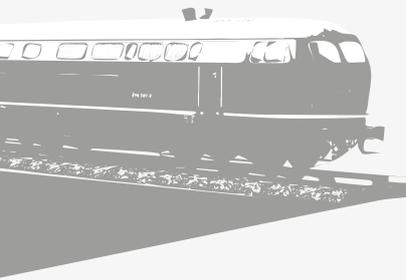


Call our team of experienced engineers to help you with your questions related to specific measurement applications.

## TOTAL CARE



Maintenance package, Service Centers worldwide for annual ISO calibration



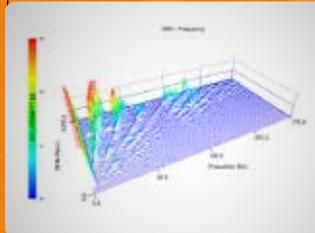
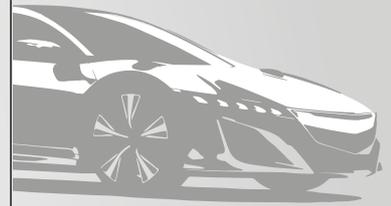
**HIGH CHANNEL COUNT**



**OFFICE:  
PREPARATION,  
ANALYSIS & REPORT**



**IN VEHICLE  
USE**



**CUSTOMIZATION**



From customizing the front connector to fit to your sensors, up to implementing software / application features.

**TRAINING**



In-house or in your company, on every topic, according to your needs.

# Instruments

## SIRIUSm



## SIRIUSi



## SIRIUSi + SBOX

SIRIUSi + SBOX can also be separate slices for more flexibility



## R2DB



### Mobile 4 channel analyser

- 4 channel IEPE/Voltage
- 1 Encoder/Tacho input
- USB interface
- USB powered

### Isolated mobile 8 channel analyser

- 8 channel IEPE/Voltage
- 2 Encoder/Tacho inputs
- USB interface
- 1 CAN port

### Standalone instrument with integrated SBOX computer

#### SIRIUSi:

- Isolated mobile 8 channel IEPE/Voltage analyser with 2 Encoder/Tacho inputs
- 1 CAN port

#### SBOX:

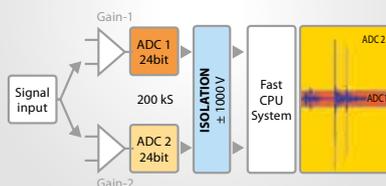
- High performance industrial PC
- Core i7 CPU 2GHz
- 4 GB RAM
- 240/960 GB removable SSD
- 4 x USB 3.0 ports, 2 x USB 2.0, HDMI, VGA, GigE, WLAN
- Built-in GPS (option)

### Mobile all-in-one instrument with integrated SBOX computer, display and hot-swappable batteries

- Isolated mobile 16 channel IEPE/Voltage analyser with 4 Encoder/Tacho inputs
- 2 CAN ports
- 192 Wh battery capacity

## HIGH DYNAMIC

This new technology solves the often faced problem that the signal is higher than expected and therefore clipped. DEWESoft® DUAL CORE ADC technology always gives you the full possible measuring range, because the signal is measured with a high and a low gain at the same time!



## CUSTOMIZABLE FRONT-END

Select your amplifier configuration! Example:

- 3 x High-Voltage input 1200 V
- 1 x IEPE/Voltage + Encoder/Tacho
- 2 x IEPE/Voltage
- 2 x MULTI (Strain gage/Voltage, sensor excitation, Tacho, Analog out)



## IEPE SENSOR CHECK

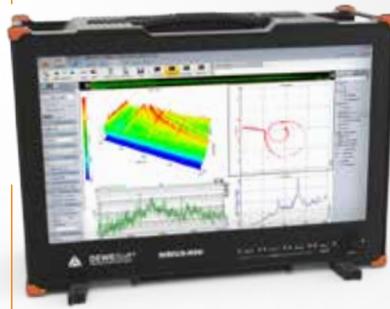
The LED ring around the connector will light green/red depending if sensor impedance is ok.



## R8



## R8DB



## KRYPTON



**Compact portable all-in-one instrument with integrated SBOX computer**

**Configurable standalone rack with**

- ▶ 1 to 8 plug-in modules, up to 64 ch IEPE/Voltage and 64 Encoder/Tacho inputs
- ▶ 8 CAN ports

**Highest data throughput:**

- ▶ 64 channels @ 200 kS/s, 24 bit (up to 64 ch @ 1 MS/s, 16 bit)
- ▶ Rack-mount option available

**Compact portable all-in-one instrument (same as R8) with built-in display and hot-swappable batteries**

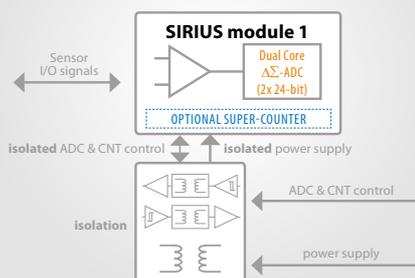
- ▶ Multi-touch high-brightness 17" display
- ▶ Other specs same as R8
- ▶ 192 Wh battery capacity

**Ethercat modules for easy channel expansion**

- ▶ Temperature: 100 Hz
- ▶ Voltage: up to 10 kHz
- ▶ 8 or 16 ch isolated
- ▶ IP 67 dust and water proof
- ▶ -40...+85 °C operating temperature
- ▶ synchronised with other hardware
- ▶ 100 m cable from module-to-module
- ▶ One single cable for power, sync and data

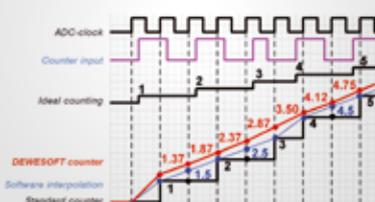
### FULLY ISOLATED

The „worry-free“ solution provides isolation on the sensor side (channel-to-GND, as well as channel-to-channel) and even isolated sensor excitation! Less noise, no ground loops, best signal quality!



### SUPER-COUNTERS

To achieve highest accuracy, DEWESoft uses a special technique to determine the count and exact time of the input edge on a 102 MHz timebase. This allows the usage even for most demanding applications such as torsional vibration.



### EVERYTHING FROM A SINGLE SOURCE

All instruments are completely manufactured in-house, starting from the CNC-milled rugged aluminium housings over dedicated front-end electronics hardware, up to the intuitive, but powerful software combining all the features to the solution for your application.



# Software: DEWESoft X2



The DEWESoft X2 data acquisition software is the solution to acquire signals simultaneously from different sources (even with different sampling rates), and to display and store them into one file. With the postprocessing feature, all the powerful mathematic and analysis functions can also be used on the already stored data.

With the focus on our own powerful hardware, the release of the innovative DEWESoft® X software leads to improved, intuitive operability, shortened setup time and reduced setup mistakes. This avoids repeating measurements, which saves time and money.

- ▶ *Intuitive User Interface*
- ▶ *Quick reload of datafiles*
- ▶ *Analysis & Export without license*
- ▶ *Easy export to a lot of formats*
- ▶ *Free updates (no annual license costs)*
- ▶ *Free Audio replay*
- ▶ *Powerful Signal Processing (Math) -> correlation, cepstrum, array math, less need for additional post-processing software*
- ▶ *Filtering (FIR, IIR, FFT filter, integration, derivation, ...)*
- ▶ *Calculations also possible on stored data „offline-math“*
- ▶ *TEDS support (intelligent sensors, read and write)*
- ▶ *Add file informations to the datafile (data header)*

## INPUTS



## STORING

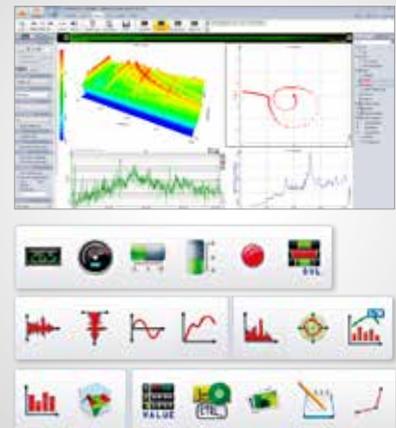
DEWESoft X2 offers extensive trigger features for the start/stop of the measurement, in addition with pre- and post-time. You can also use math formulas to generate more complex conditions. Triggers possible on any channel (analog, digital, math...!)

### Trigger Types

-  *Simple edge (either rising or falling slope)*
-  *Window trigger (two levels; entering or leaving logic)*
-  *Pulsewidth trigger (longer or shorter than duration logic)*
-  *Window and Pulsewidth (completely selectable as above)*
-  *Slope Trigger (rising or falling slope with steepness selection)*

## USER INTERFACE

Design your own measurement instrument. Freely arrange your displays by the use of a wide range of various instruments (Recorder, Scope, FFT, XY recorder, ...).



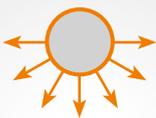
## OUTPUTS

### Analog out (FGEN):

- ▶ Alarm output: use triggers on any input channel. Conditions can be: simple edge, filtered edge, window, pulsewidth, window and pulsewidth, slope, delta or any math condition
- ▶ Control channel: change the analog output voltage manually during the measurement
- ▶ Sound output: replay any channel via the soundcard
- ▶ File replay: replay the stored channels on the analog out
- ▶ CAN output: send init commands to sensors, or output calculation results of DEWESoft

## PUBLISHING AND EXPORT

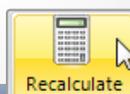
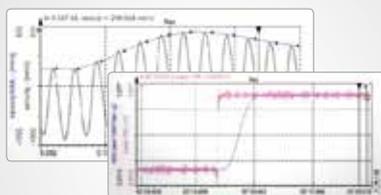
If the powerful integrated post processing features of DEWESoft™ are not enough, you can even export the data to several different file formats.



Microsoft Excel®, Flexpro®, Text, ASCII, MATLAB®, Diadem®, UNV, FAMOS, NSOFT, Sony®, RPC III, Comtrade®, WAV, Google Earth® KML, BWF, ATI, SDF, WFT, CSV, TDM, TDF, and more ... implementation of custom file formats on request.

## DATA-PROCESSING

**Realtime data processing - See everything in real time!** Over the past years we have covered lots of application areas with expert modules, so that the user is only a click away from the total solution. But many more applications can be covered using the powerful mathematic features. **Post-Processing – change/add everything later in the office!** Only store the raw data, and back in the office add all the calculations (like filters, statistics, FFT's, logical conditions,...)

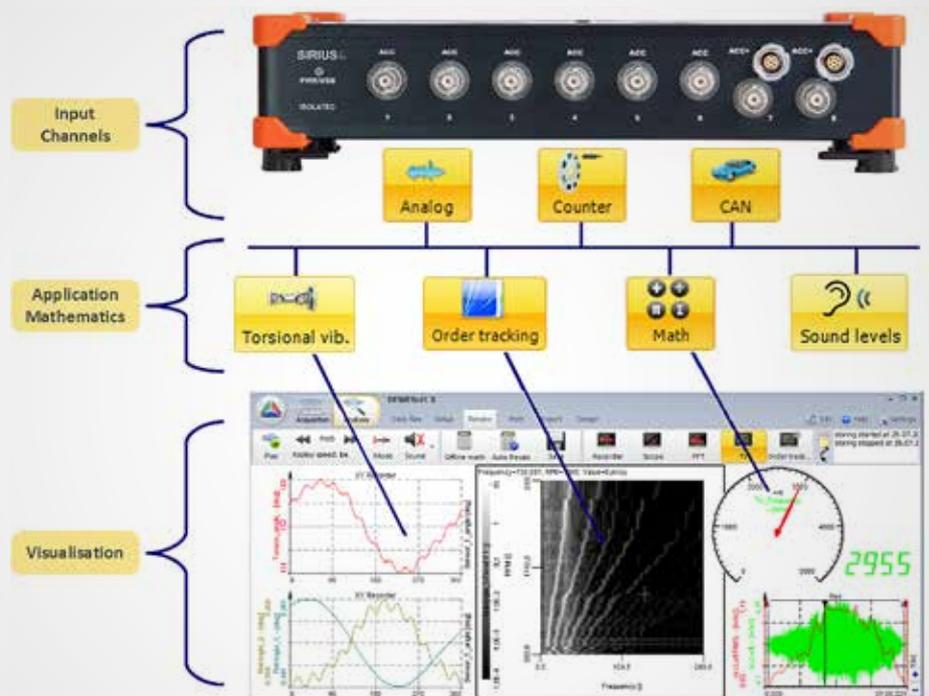


File name	Sample rate	Size	Comments	Version
Signal_ScanData_2011.dad	80000 Hz	0.44 MB	AI 8, Filter: 23	12 SP3 AC27
Signal_ScanData_2011.dad	80000 Hz	7.44 MB	AI 8, Filter: 23	12 SP3 AC27
Signal_ScanData_2014.dad	80000 Hz	50.8 MB	AI 8, Filter: 23, Math: 20	12 SP3 AC27
Signal_ScanData_2015.dad	80000 Hz	52.0 MB	AI 8, Filter: 23, Math: 20	12 SP3 AC27
Signal_ScanData_2016.dad	80000 Hz	7.28 MB	AI 8, Filter: 23, Math: 20	12 SP3 AC27
Signal_ScanData_2017.dad	80000 Hz	7.8 MB	AI 8, Filter: 23, Math: 20	12 SP3 AC27
Signal_ScanData_2018.dad	80000 Hz	6.3 MB	AI 8, Filter: 23	12 SP3 AC27
Signal_ScanData_2019.dad	80000 Hz	6.3 MB	AI 8, Filter: 23	12 SP3 AC27
Signal_ScanData_2020.dad	80000 Hz	5.3 MB	AI 8, Filter: 23	12 SP3 AC27
Signal_ScanData_2021.dad	80000 Hz	2.8 MB	AI 8, Filter: 23	12 SP3 AC27
Signal_ScanData_2022.dad	80000 Hz	3.3 MB	AI 8, Filter: 23	12 SP3 AC27

Apply offline changes on multiple datafiles at once.

## THE DEWESOFT CONCEPT

THE MULTIFUNCTIONAL INSTRUMENT FOR EVERY APPLICATION.



The DEWESoft amplifiers on the **analog frontend** build the solid base to convert any physical input (strain, acceleration, force, temperature, current, ...) into accurate digital signals for the software.

All other signals such as digital, counter, CAN bus, video data, serial interface... are acquired fully synchronized. **DEWESoft always stores the raw signals!**

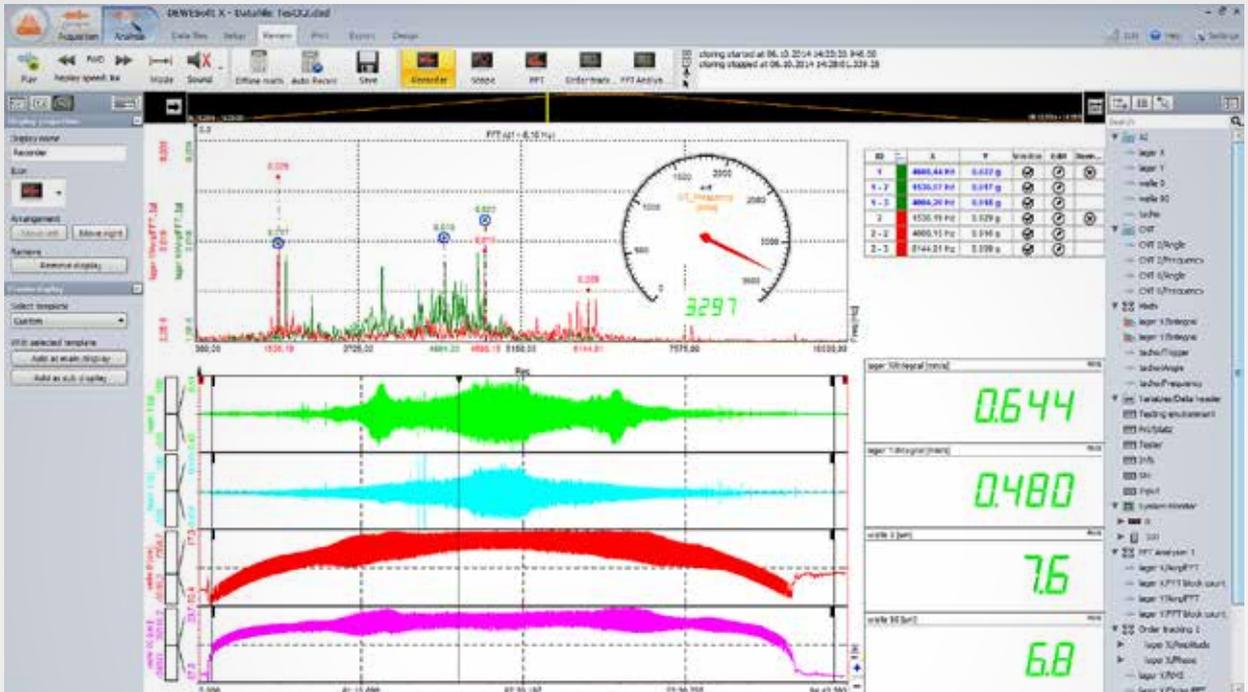
The channels arrive on the digital **„backbone“**, where they can be used for further mathematical calculations (filtering, statistics) and in modules such

as Torsional Vibration, Ordertracking, Sound Level... The math results can be used as input for other modules and vice versa! Calculations in realtime, as well as on stored data.

The results can then be linked to powerful, configurable instruments (like Digital meter, Analog meter, Recorder, Scope, FFT, XY graph, Orbit plot, 3D graph...) with lots of properties.

Very often the math modules provide specialized instruments, which results in a turn-key solution for a range of applications.

# Noise & Vibration



**General NVH applications combine the data of miscellaneous sensors (as accelerometers, microphones, strain gauges, load cells etc.), display and correlate them. DEWESoft enables you to capture all sources synchronously, even if they have different output rates. Besides the possibility of online data evaluation in real time, the powerful post-processing feature allows to only collect the raw data at the proving ground, and do all the calculations in the office on the stored data.**

**Recorder:** allows to show raw time data. This always give you the ability to post-process data later, also sub-sampling of data is possible if necessary.

**FFT Analyser:** provides all main functions for spectral analysis with advanced averaging, selectable resolution (64000 lines and more) or direct specification of the bandwidth (e.g. 0,01 Hz). Multiple channels can be displayed in one FFT instrument for easy comparison.

- ▶ Multipurpose Cursors
- ▶ Envelope
- ▶ Auto- & Cross-Correlation
- ▶ Cepstrum
- ▶ Short Time FFT
- ▶ and many more...

**Global level** (Broad band, 10-1000Hz for ISO 2372, customer specific GL). This scalar indicator characterizes the signal content given for acceleration, velocity or displacement at a specific bandwidth.

**Octave Band Analysis** is given in constant percentage band filters in compliance with IEC61260.

**Time Domain Analysis:** In vibration and acoustics the raw data contains a lot of information. With the basic statistical math you can have a first step to make a diagnosis: Min, Max, RMS, AVG, Peak-to-Peak, Crest factor and more... even Min, Max, RMS of array data, such as an FFT spectrum, can be added easily.

Statistical Calculations either time or sample based, from one value per dataset (overall), over block based (e.g. every 0.1 sec) or running to triggered blocks, that start/stop on certain conditions (even on another channel).

**Multi-domain analysis:** Recorder (time-domain), FFT (frequency-domain), XY recorder (channel vs channel, e.g. angle-domain) and many more dedicated instruments provide data visualisation according to your needs. Reference curves for all various domains provide a useful tool for Acceptance tests.

**Filters:** Chose between IIR low pass/high pass/band pass/band stop filters with selectable 1 to 10th order, different characteristics, custom coefficients, Zeroes & poles plot, or FIR filters (no phase delay) or frequency domain filters.

## FFT ANALYSER

### CURSOR FUNCTIONS

### MAX MARKER

F	A	PH	Marker	Unit	Scale
1.0	0.0000	0.0000			
1.0	0.0000	0.0000			
1.0	0.0000	0.0000			
1.0	0.0000	0.0000			
1.0	0.0000	0.0000			

Usually every analysis starts with the peak search. Simply find the highest peaks in the spectrum with one click and list them in the cursor table. So you can quickly verify if values are similar to kinematic frequencies.

### HARMONIC MARKER

In the analysis of rotational machinery this marker is used for discovering axial or angular misalignment, loose hydraulic bearing or stator field asymmetry. Simply drag the cursor over the spectrum and all harmonics will follow.

### SIDEBAND MARKER

Useful for detecting armature field faults, such as bar breakage, fracture or looseness and gear deformation.

### RMS MARKER (GLOBAL LEVEL)

Allows to monitor the RMS level for multiple different bandwidths in order to know the global level for analysing faults like unbalance, misalignment, bearing ...

### COMPARE DATA FILES

Easily compare data files by importing them, the time alignment can be done by manual time shift, on trigger time, or on absolute time. Overlay the signals for e.g. consecutive vibration tests into one FFT analyser for post-processing.

# Rotating machinery

NOISE & VIBRATION

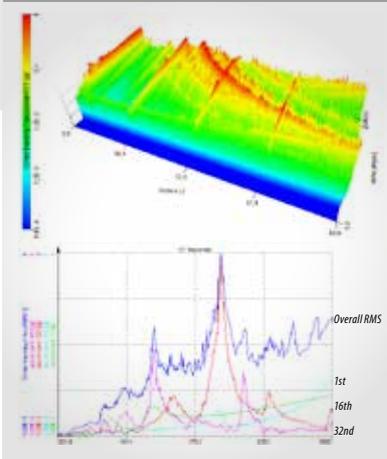
ROTATING MACHINERY

STRUCTURAL ANALYSIS

ACOUSTIC ANALYSIS



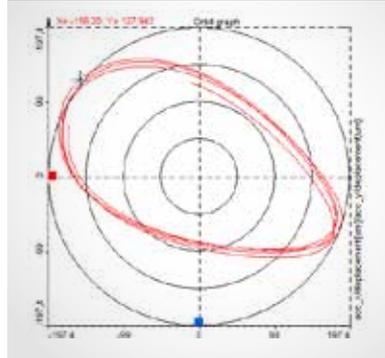
## ORDERTRACKING



The Ordertracking module is the main function for measurements with varying speeds. Any input can be used: microphone, accelerometer, even the output of the torsional vibration module.

Clearly separate engine related harmonics from other frequencies like structural resonances. The high precision digital counters of the Dewesoft instrument provide accurate and repeatable measurements. Result are represented in 3D, color spectrogram but also in 2D view for selected order and phase extraction over RPM.

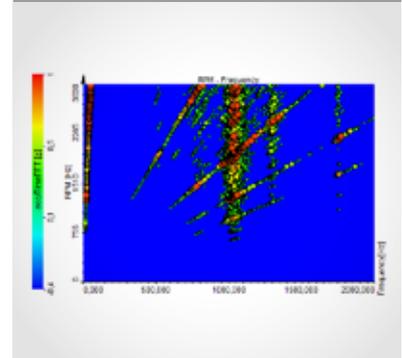
## ORBIT GRAPH



For displaying the axis movement DEWESoft offers the orbit plot.

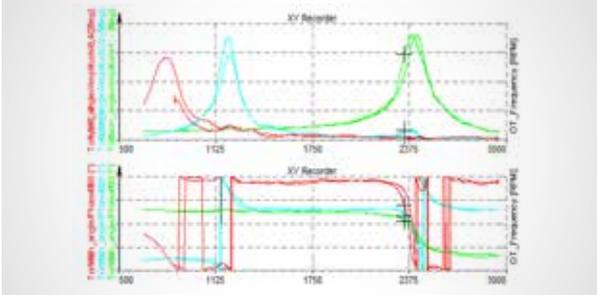
Integration/double integration can easily be done directly in the channel configuration setup, for calculation of displacement based on accelerometer input. The output of the Ordertracking module can be used for displaying single orders as well as cyclic averages.

## CAMPBELL PLOT



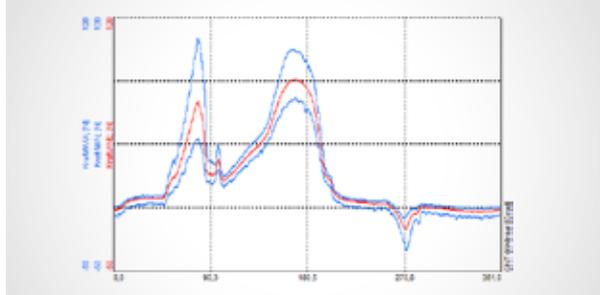
This instrument works based on classification of the measured values, with several options like rainbow, greyscale and adjustable classes. It can be applied on TimeFFT as well as OrderFFT.

### TORSIONAL VIBRATION



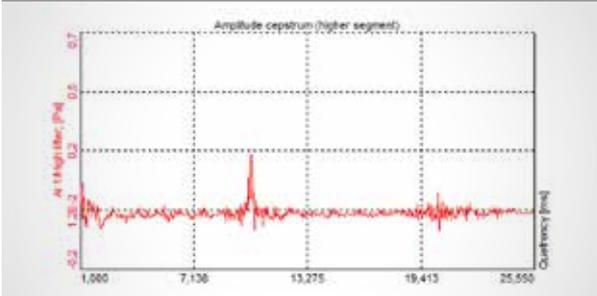
With the high-precision digital counters of the DEWESoft instruments, based on an 102 MHz time base, rotational and torsional vibration angles and velocities (with two encoders) can also be exactly determined at high RPM speeds. Constant angle offset, uncentered mounting and sensor errors can be compensated, gearbox ratios are supported and additional filters can be applied.

### MULTI-DOMAIN



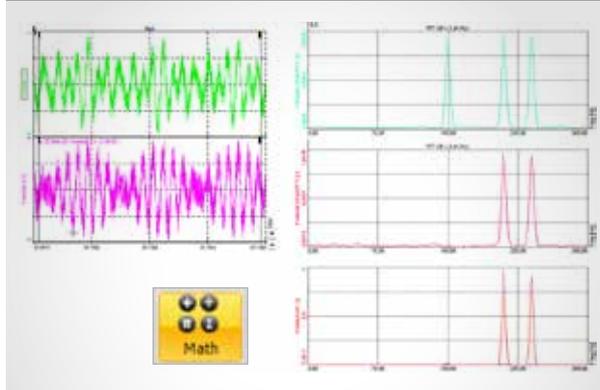
Analyse machines with repetitive processes and resample the data to any other channel base (e.g. angle-domain) to calculate e.g. concentricity errors of shafts (min, max, avg...) per cycle or over all cycles.

### CEPSTRUM



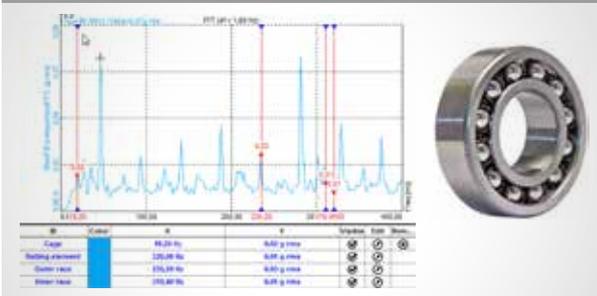
The cepstrum calculation (also used to determine characteristics in speech analysis) helps to identify vibration signatures, such as frequencies in gearbox and bearing analysis. DEWESoft provides mirror spectrum, low and high frequency output.

### AUTO & CROSS CORRELATION



For quantification of signals related to each other or to get the relevant information out of noisy data, the powerful DEWESoft mathematics provides all the necessary tools. Similar to Matlab you can work and calculate with the array data to display the result already during measurement.

### BEARING FAULT (ENVELOPE)



Easily identify the bearing fault frequencies with the help of automatic markers in the spectrum. Defects on the cage, rolling element, outer or inner race (FT, BSF, BPFO, BPFI) and also their harmonics can be seen. Just select manufacturer and bearing type via the bearing data-base. The bearing data base can also be edited to be completed by the user.

### BALANCING



To cancel out the vibration caused by the first order (unbalance), DEWESoft offers the balancing module. It is very easy to setup, just specify tacho sensor an accelerometer(s). It acts as a sequence: First record the actual status, then add a trial mass, last step is to add the calculated correction mass at the appropriate angle. Steps can be repeated if required. Depending on the rotating part, both single-plane and dual-plane balancing is supported. All results and the raw data are stored in the datafile.

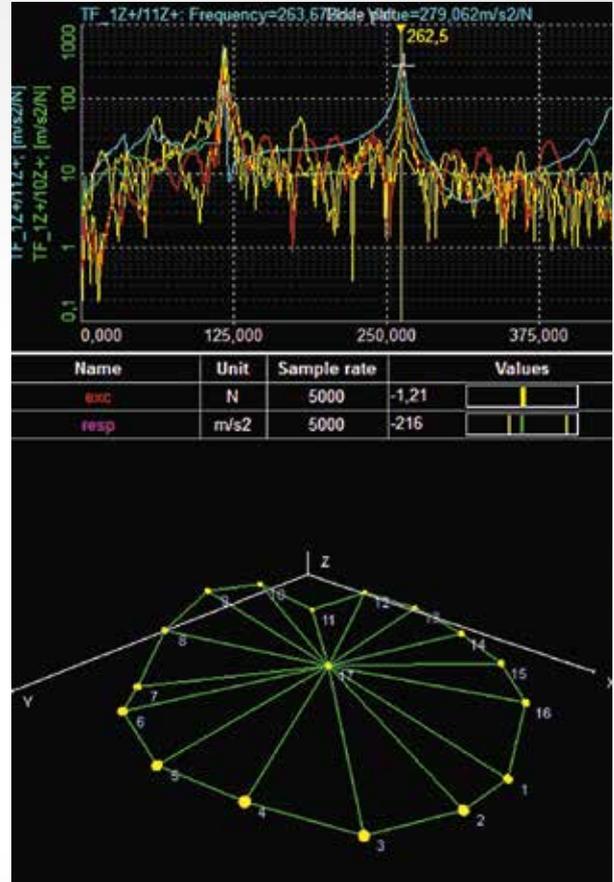
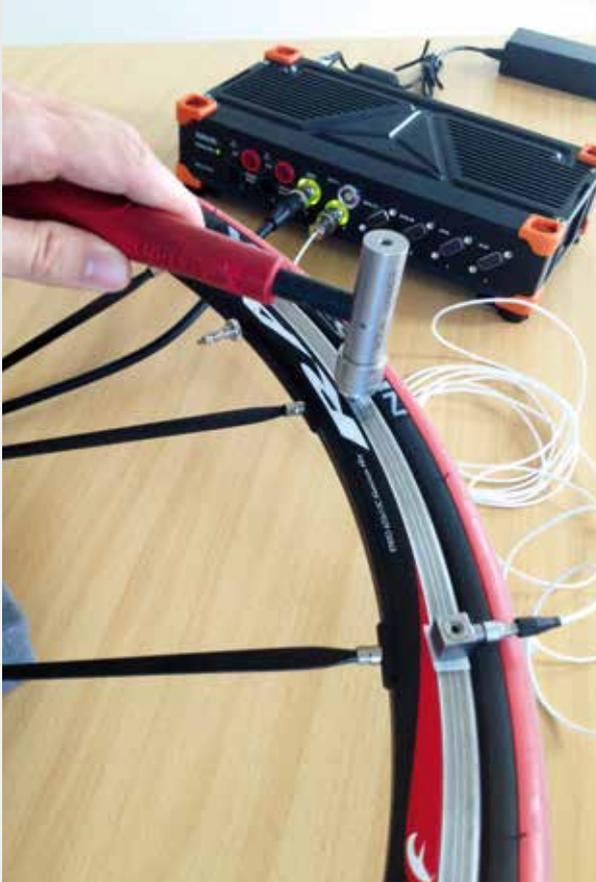
# Structural Analysis

NOISE & VIBRATION

ROTATING MACHINERY

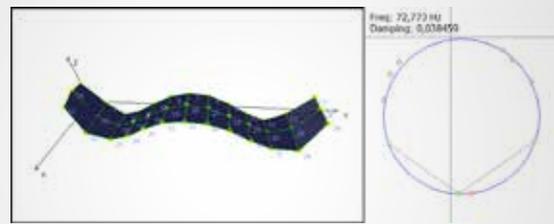
STRUCTURAL ANALYSIS

ACOUSTIC ANALYSIS



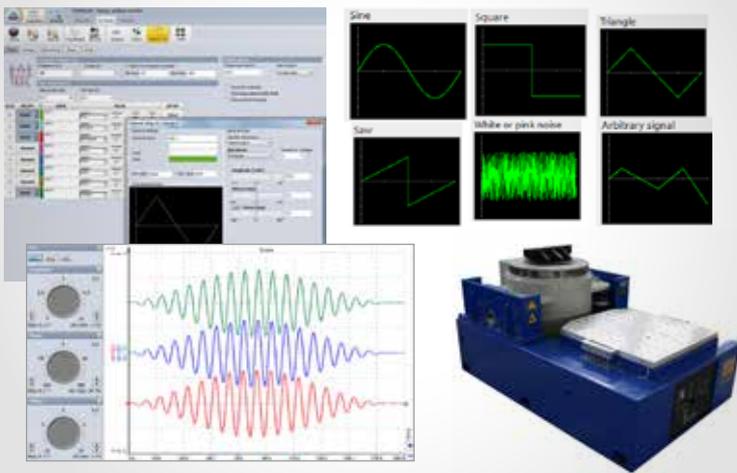
- **Frequency response function (FRF)**
- **Coherence**
- **Excitation and response spectra, windowing**
- **Double hit detection**
- **Reject hits**
- **Averaging of hits**
- **SISO, MISO, SIMO, Response group alignment**
- **Mode indicator function (MIF)**
- **Circle-fit method for extracting modal parameters (to check with simulation)**

## MODAL ANALYSIS, IMPACT TEST



DEWESoft provides an efficient solution, time for setup and measurement is very short. The structure can be imported or drawn in the geometry editor, hereby the points are defined. For measurement move the modal hammer or the response accelerometers, whatever you prefer. In analyse mode click on the resonant frequencies and check the animated shape.

### MODAL ANALYSIS, SWEEP SINE (OPT-FGEN)



For a running FRF the structure is usually excited with a shaker. For bigger structures DEWESoft supports the generation of multiple shaker signals (amplitude, phase, waveform and frequency). Shaker control have to be done externally.

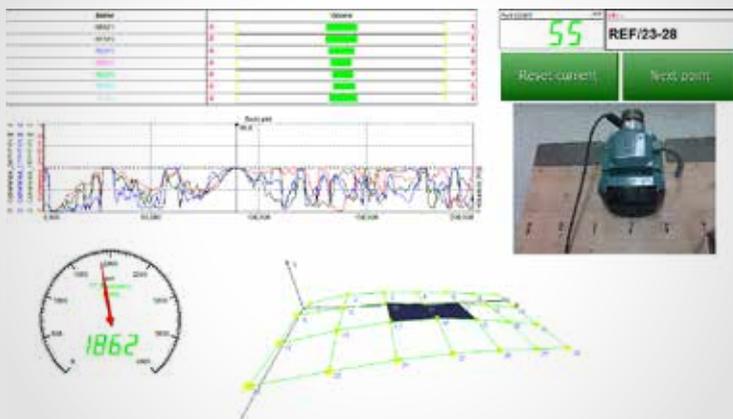
DEWESoft® offers an integrated function generator (OPT-FGEN), which is fully software controlled. Various time patterns like fixed, sweep, step sweep, burst, chirp, noise and arbitrary table are configurable. Alternatively the FRF also works when the shaker is remotely controlled.

### LARGE STRUCTURES, HIGH CHANNEL COUNT (OPT-NET)



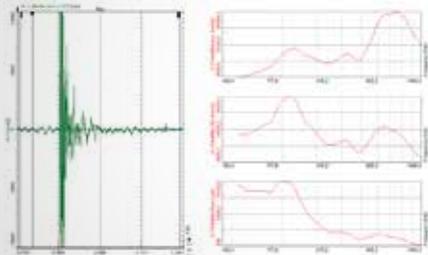
For exciting bigger structures a high number of response channels is needed. With the modular concept of DEWESoft, synchronisation of multiple systems is very easy. From 8 channel instruments with USB interface up to 128 channels with a high performance industrial computer integrated in one box and data transferred over Ethernet (OPT-NET).

### OPERATING DEFLECTION SHAPES (ODS)



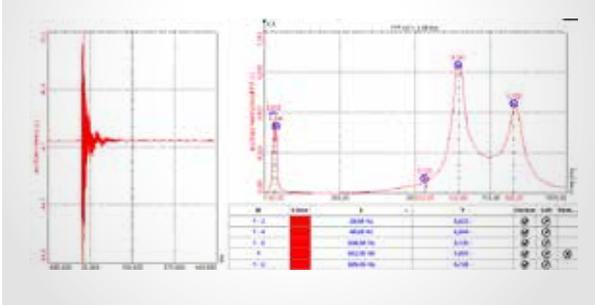
The spectral ODS measurement is useful wherever it's not possible to measure the excitation source, and the structure is excited by the machine and it's operation state(s).

## SHOCK AND DROP TESTS (SRS)



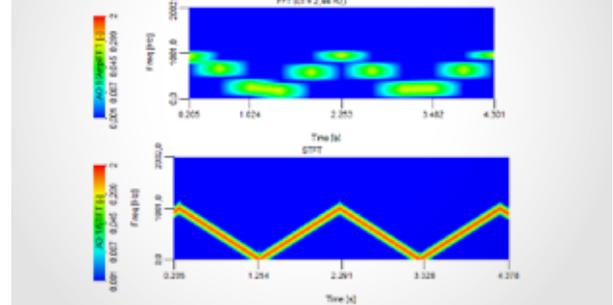
The **Shock response spectrum (SRS)** shows the maximum responses of a series of uniformly damped single-degree-of-freedom (SDOF) systems caused by a shock waveform applied on the structure. After setting damping, resolution (1/3, 1/6, 1/12, 1/24, 1/48 octave) and primary section, the spectra are calculated out of the time domain signals. After the time domain signals are recorded, the data is analysed by the DEWESoft® SRS plugin. The simple user interface offers a convenient straight forward procedure for fast results.

## BUMP TEST



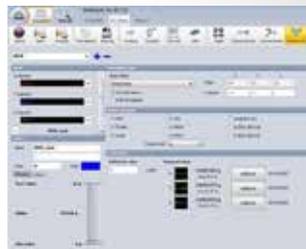
This is a quick test done to determine the resonance (natural) frequencies of a structure. No modal hammer is needed, only one accelerometer, just knock on the structure. Of course the impact tip influences the usable frequency range, but for a quantification measurement this is fine. With the FFT Analyser the FFT spectra over a certain time window (impact +/- pre/post time) can be averaged.

## SHORT-TIME FFT



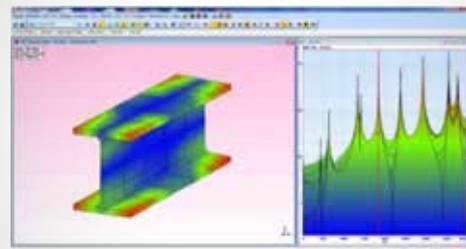
High frequency bursts are almost impossible to accurately analyse by standard FFT, because the calculation takes too long (during calculation the signal is quickly changing). For this reason DEWESoft® mathematics offers the STFT – short term Fourier transform –, which can have smaller blocks but still the same resolution as standard FFT. Therefore it's much faster.

## HUMAN BODY VIBRATION



This module measures the effect of vibration to the human body, the extracted parameters allow the judgement of risk. DEWESoft supports whole-body and hand-arm measurement according to the standards ISO 5349, ISO 8041; ISO 2631-1; ISO 2631-5.

## FINITE ELEMENT ANALYSIS



For further investigation and analysis in modal packages, like ME-Scope, the FRF complex data (Real/Imag/Ampl/Phase), coherence, excitation and responses can be exported to the UFF (Universal File Format).

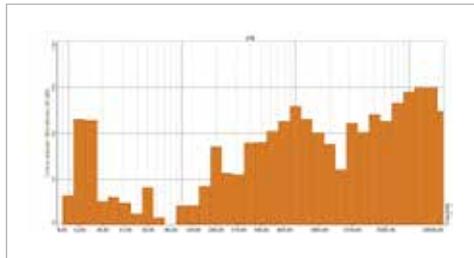
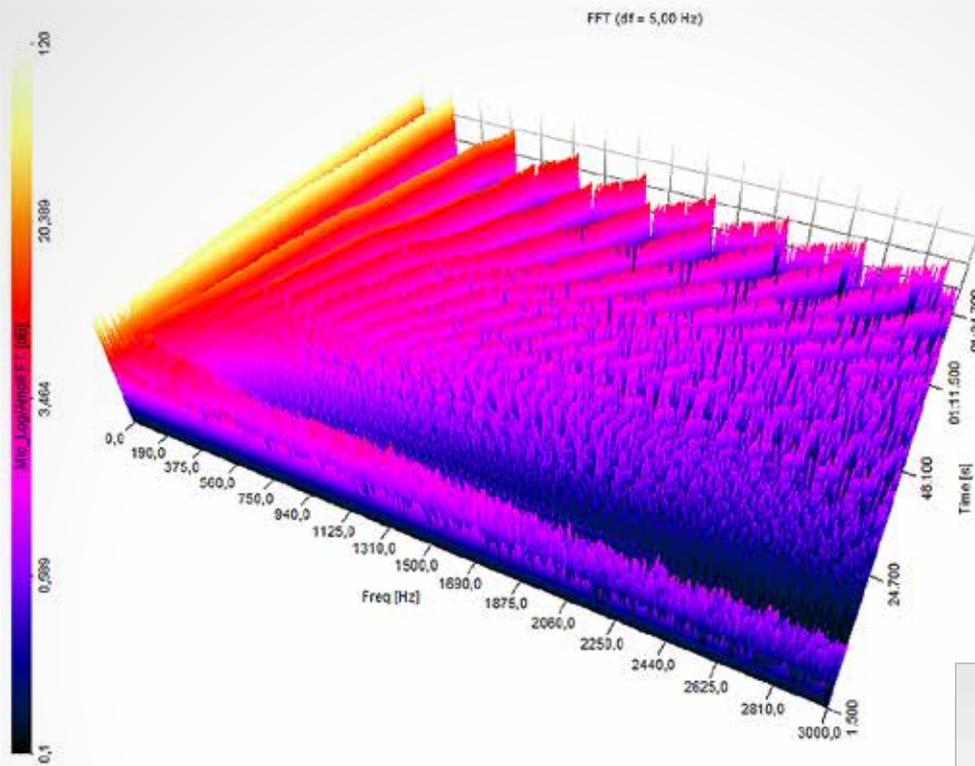
NOISE & VIBRATION

ROTATING MACHINERY

STRUCTURAL ANALYSIS

ACOUSTIC ANALYSIS

# Acoustic Analysis

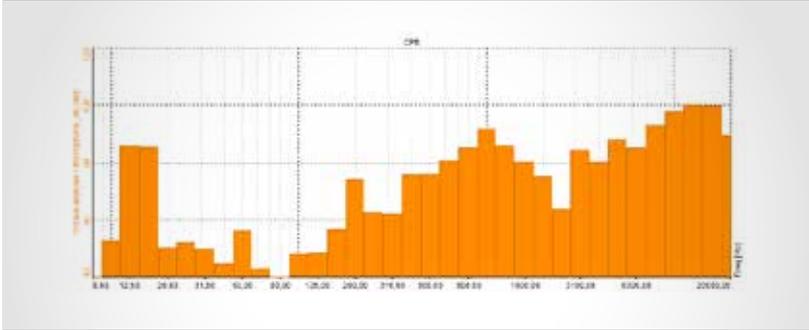


## Sound level

**The multi-channel sound level meter is very easy to use.  
Simply click the parameters you want to see in real-time.**

- ▶ Lp Sound pressure level
- ▶ LAeq, LCpk, ...
- ▶ Real time narrow band FFT
- ▶ A-, B-, C-, D- frequency weighting
- ▶ Fast-, slow-, impulse time weighting
- ▶ Percentile levels (e.g. LA10, LA90, ...)
- ▶ Automatic scaling with Reference calibrator (according to ISO 60942) supported

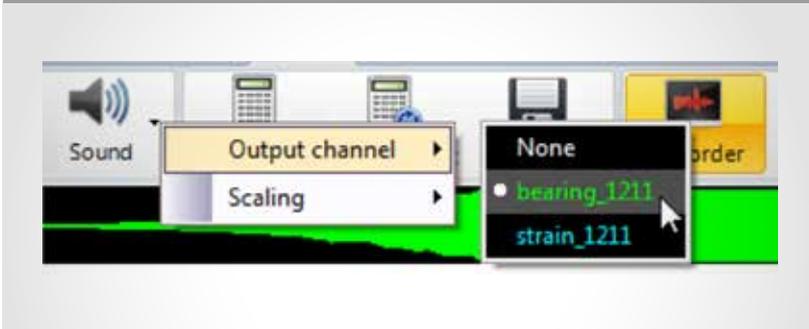
CPB (1/N OCTAVE ANALYSIS)



The constant percentage band filters work in real-time (True Octave) and provide 1/1, 1/3, 1/6, 1/12, 1/24 band octave spectrum.

With the array statistic mathematics it's easy to extract max / min / avg values over the whole spectrum or a specific frequency range.

FREE AUDIO REPLAY



Replay any stored channel of the data-file via the loudspeakers.

Export to WAV format can also be done free of license.

TRIGGER



On Sound events to start/stop the measurement. Furthermore you can also trigger on a certain frequency band in FFT, on reduced data (RMS of accelerometer) or on time.

Trigger types such as simple edge, window, pulsewidth, slope, ... are possible.

STANDARDS



DEWESoft provides real time sound level calculations according to the international standards IEC61672, IEC 60651, IEC 60804.

Any combination of Frequency and Time weighting can be calculated. The statistical values are calculated over the whole range or with the custom specific entered block size.

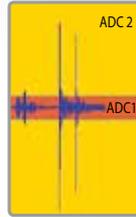
NOISE & VIBRATION

ROTATING MACHINERY

STRUCTURAL ANALYSIS

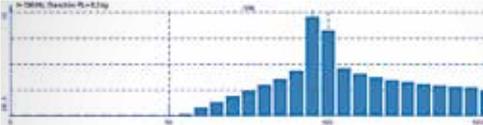
ACOUSTIC ANALYSIS

## HIGH DYNAMIC RANGE



In combination with the SIRIUS instrument (dual-core ADC technology) up to 160 dB dynamic range and up to 200 kS/s sampling rate are provided.

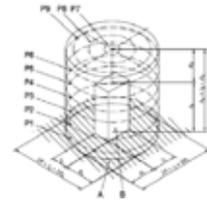
## SOUND POWER



With the additional module DEWESoft supports the calculation of the Sound power by measurement of the Sound level. According to standard ISO 3744 (semi-/anechoic chamber) and ISO 3745 (free field) the microphones are placed around the sound source. The microphone positions are calculated by software (depending on size of the object and configuration (such as sphere, hemisphere, cylinder...)). The measurement is done synchronously for all channels to save time. If there are less microphones available than requested by the standard, you can build groups, the routine enables you to change positions between measurements. The user is guided step-by-step, next to background noise measurement (K1, K2) there is also a repeatability check and the visualisation by third-octave band analysis for the report.

**Main Features:**

- ▶ Sound Power
- ▶ ISO 3744 and ISO 3745
- ▶ 1/n Octave band
- ▶ C1, C2 correction (temperature, air pressure)
- ▶ K1, K2 background noise measurement
- ▶ Sound level
- ▶ Warning messages during routine
- ▶ Repeatability check
- ▶ Changing of markers for background noise in Post-processing



## PASS-BY NOISE



The acoustic emission of any vehicle passing by (cars, ships, aircrafts) can be measured in addition to any other data (CAN bus, other sensors, video). The flexible R&D system includes the GPS receiver and Software Polygon plugin in the package, which allows exact determination of position, even on sea where it's hard to place reference points. The user can chose between a simple system installed on the track only or with additional synchronised measurement device inside the car transferring the data to the track system (OPT-NET).

# Accessories

## DEWESOFT® DSA SENSORS

### VIBRATION SENSORS

	I1A-50G-1	I3A-50G-1	I1TI-50G-1	C1T-5000G-1	I3T-500G-1	I3T-50G-1	IH-500N-1
							
<b>Number of axis</b>	single	triaxial	single	single	triaxial	triaxial	single
<b>Sensitivity</b>	100 mV/g	100 mV/g	100 mV/g	50 pC/g	10 mV/g	100 mV/g	50 mV/lbf (=11,24 mV/N)
<b>Range</b>	50g	50g	50g	5000g	500g	50g	100 lbf (=444,82 N)
<b>Type</b>	IEPE	IEPE	IEPE	charge	IEPE	IEPE	IEPE
<b>Frequency range</b>	+/- 5 %: 0.3 to 5000 Hz	+/- 10 %: 2 to 5000 Hz	+/- 10 %: 0.3 to 10 000 Hz	+/- 8 %: up to 5000 Hz	Axis 1 & 2: 1.5 to 5,000 Hz (+15/-5%) Axis 3: 1.5 to 10,000 Hz (+15/-5%)	+15/-10%: 0.3 to 10,000 Hz	75 kHz resonance frequency
<b>TEDS</b>	yes	yes	no	no	no	no	yes
<b>Features</b>	miniature size	case isolated, triaxial	case isolated, industrial	high temperature	lightweight; triaxial	low noise; triaxial	modal hammer with TEDS
<b>Dimensions</b>	10,2 x 10,2 x 10,4 mm	15,5 x 15 x 15 mm	17,5 x 42,2 mm	12,7 x 24,4 mm	12,4 x 9,1 x 9,1 mm	21 x 12 x 11 mm	221 x 71 mm
<b>Weight</b>	4,3 g	10 g	44 g	25 g	4 g	5,6 g	100 g (head)
<b>Temperature range</b>	-51...+82 °C	-51...+82 °C	-51...+121 °C	-51...191 °C (up to 260 °C on request)	-51...+121 °C (up to 160 °C on request)	-51...+82 °C	-40...65 °C

### TACHO SENSORS

#### DS-TACH02



- ▶ optical tachometer probe with LED
- ▶ Stainless steel with 2.5m cable
- ▶ Up to 4kHz frequency
- ▶ Distance to object up to 1m,
- ▶ Power supply 3-15VDC, 45mA
- ▶ Visible red pointer,
- ▶ Control LED
- ▶ Operating temperature -10°C to +70°C
- ▶ Dimensions 73mm length, 16mm diameter
- ▶ L1B7m connector for SIRIUS and DEWE-43 counter input
- ▶ Incl. 30 cm reflector band

#### DS-TACH03



- ▶ optical tachometer probe with LASER (red class2)
- ▶ Stainless steel with 2.5m cable
- ▶ Up to 4kHz frequency
- ▶ Distance to object up to 7.5m,
- ▶ Power supply 3-15VDC, 0,13W
- ▶ Visible red pointer, Control LED
- ▶ Operating temperature -10°C to +70°C
- ▶ Dimensions 73mm length, 16mm diameter
- ▶ L1B7m connector for SIRIUS and DEWE-43 counter input
- ▶ Incl. 30 cm reflector band

### TACHO LEVEL CONVERTER

#### DS-TACH01



- ▶ Converts analog tachometer signal to TTL
- ▶ Fits to COUNTER input (Lemo 7pin) on DEWE-43 and SIRIUS
- ▶ ±100V input isolated, trigger threshold adjustable ±10mV ... ±2V

#### DS-TACH04



- ▶ Optical tachometer probe with LASER (red class2)
- ▶ with 5m optical fiber and trigger box
- ▶ Up to 100kHz frequency
- ▶ Distance to object 2-5mm
- ▶ Power supply 3-30VDC, 120mA
- ▶ Operating temperature -10°C to +70°C
- ▶ Dimensions M6 x 20mm 2.5m cable with
- ▶ L1B7m connector for SIRIUS and DEWE-43 counter input
- ▶ Incl. 1 m reflector band with 2mm black/white grid

## OPTION: ANALOG OUT (A08) – 4 FUNCTIONS



8 BNC connectors on rear side  
for analog output (on request also available on front side)

### Applications

- ▶ Standalone Digital Signal Amplifier
- ▶ Control channel
- ▶ Replay
- ▶ Function generator (Modal/shaker signal)
- ▶ Available for standard slices with 200 kS/s or HS-slice with 1 MS/s

## BATTERY PACKS FOR MOBILE SOLUTIONS

### BP2i



- ▶ For SBOX and up to 4 SIRIUS slices
- ▶ Supports 2 Li-Ion batteries each 96 Wh (total capacity: 192 Wh)
- ▶ Hot-swap functionality
- ▶ Status display
- ▶ Maximum output power: 160W
- ▶ Input voltage range: 10-36VDC
- ▶ Output voltage: 21V (powered), 11-16V (battery)
- ▶ Wrong polarity protection

### BP4i



- ▶ For SBOX and up to 8 SIRIUS slices
- ▶ Supports 4 Li-Ion batteries each 96 Wh (total capacity: 384Wh)
- ▶ Hot-swap functionality
- ▶ Status display
- ▶ Maximum output power: 250W
- ▶ Input voltage range: 12-36 VDC
- ▶ Output voltage: 24V (powered), 11-16V (battery)
- ▶ Wrong polarity protection

## DS-DISP-12



- ▶ 12" industrial grade display
- ▶ 1280x800 HD resolution
- ▶ Rugged housing
- ▶ Multi-touch
- ▶ 700 cd/m<sup>2</sup> high brightness
- ▶ -20 ... +60 deg. C operating range

**DS-CAM-88c:** 640x480 @ 88 FPS,  
320x240 @ 167 FPS, 160x120 @ 289 FPS

## DS-CAM-88 / DS-CAM-120



- ▶ 88 / 120 fps @ VGA (640x480)
- ▶ Auto-Shutter
- ▶ Auto-Gain
- ▶ Auto-White-Balance
- ▶ Color
- ▶ Power-over-Ethernet option

**DS-CAM-300bw/c:**  
1920x1080 (HD) @ 100 FPS, 640x480 (VGA) @ 300 FPS  
**DS-CAM-600bw/c:**  
1920x1080 (HD) @ 300 FPS, 640x480 (VGA) @ 600 FPS

## DS-CAM-300 / DS-CAM-600



- ▶ 300 / 600 fps @ VGA
- ▶ Full HD resolution (1920x1080)
- ▶ Real-time onboard JPEG compression
- ▶ Power-over-Ethernet
- ▶ Best performance with SIRIUS SBOX
- ▶ IP67 version available
- ▶ Color or monochrome



16 remote AI channels over 50 m Ethernet cable (and 50 m sync cable) @ 185 kS/s

## USB-EXTENDER1



- ▶ Well-tested solution for USB extension
- ▶ Extends USB up to 100 m (328 ft.) over UTP cable
- ▶ Hub 4 x USB (supports USB 2.0 and USB 1.1)
- ▶ Transmits signals up to 480 Mbps
- ▶ Uses inexpensive CATx cable you may already have installed in your building
- ▶ True plug and play—no drivers needed

# Specifications

## INSTRUMENTS



	SIRIUSm	SIRIUSi	R2DB	R8DB
<b>OVERVIEW</b>				
example configuration	SIRIUSm-3xACC,1xACC+	SIRIUSi-6xACC,2xACC+	2 x SIRIUSir-6xACC,2xACC+	8 x SIRIUSir-6xACC,2xACC+
Analog inputs (Voltage or IEPE)	4	8	16	64
Tacho/Counter inputs	1	2	4	16
Analog outputs	-	- / 8 optional	- / 16 optional	- / 64 optional
Digital outputs	1	2	4	16
Connectors	BNC and Lemo	BNC and Lemo	BNC and Lemo	BNC and Lemo
<b>INPUT CHANNEL SPECIFICATIONS</b>				
Isolation	1000 V, fully isolated (Ch-to-Ch Isolation and Ch-to-GND Isolation, isolated sensor excitation)			
Sampling rate	up to simultaneous 200 kS/s (up to 1 MS/s optional with SIRIUS-HS)			
Bandwidth	75 kHz (up to 2 MHz optional with SIRIUS-HS)			
Vertical resolution	24 bit sigma-delta (dual-core) ADC with anti-aliasing filter			
Input range	+/-500mV to +/-10V			
Dynamic range	160 dB @ 10 kS/s			
Accuracy	±0.1 % of reading ±1 mV			
Input type	DC, AC 1 Hz (3/10 Hz SW), IEPE 4/8 mA excitation, sensor detection			
TEDS	supported in IEPE mode			
<b>INPUT OPTIONS &amp; MODULES</b>				
Custom Configuration	-	every single channel		
Voltage	+/-500mV to +/-10V	from +/-10mV up to +/-1600V		
IEPE/ICP sensors	-	DC, AC 1 Hz (3/10 Hz SW), IEPE 4/8 mA excitation, sensor detection		
Strain gauge (bridge)	-	Full-/half-/quarter bridge 3 or 4 wire, 120/350 ohm internal completion, custom shunt, high-precision voltage/current excitation		
Resistance	-	ranges: 100 ... 100 000 ohm		
Temperature (PT100 to PT2000)	-	-200 ... +850 °C; accuracy +/- 0,5°C		
Temperature (Thermocouple)	-	Type K, J, T, C with MSI adapters (fit on DSUB9)		
Potentiometer	-	Type K, J, T, R, S, N, E, C, U, B with KRYPTON modules, accuracy +/- 0,5°C		
LVDT	-	10 ... 10 000 mV/V @ 1 V Excitation		
Charge	-	differential LVDR or RVDT, inductive half-bridge LVDT, with MSI adapter		
Current	with external shunt	up to +/-100 000 pC; 150 dB dynamic; charge injection sensor test external shunt / loop-powered shunt		
<b>CAN BUS INTERFACE</b>				
Nr of CAN interfaces	-	1	2	8
Specifications	CAN 2.0b High Speed, up to 1 Mbaud, optical isolation			
Supported protocols	J1939, OBDII, CAN sensors support, CAN output			
Nr of channels	2000+			
<b>OUTPUT CHANNEL SPECIFICATIONS</b>				
Sampling rate	-	simultaneous 200kS/sec		
Vertical resolution	-	24 bit sigma-delta DAC		
Output range	-	+/- 10V		
Functions	-	File replay, conditioned sensor signal output, FGEN (software option)		
<b>TACHO/COUNTER SPECIFICATIONS</b>				
Timebase	102,4 MHz resolution			
Max input bandwidth	10 MHz			
Input filter	500 ns, 1µs, 2µs, 4µs, 5µs and 7.5µs selectable			
supported tacho inputs	optical tacho probe (1 pulse/rev), optical strip tape probe (with bl/wh tape, algorithm for determining number of pulses), 1-, 2-, 3- tracks encoder, geartooth with missing teeth (e.g. 60-2), CDM, CDM with zero, ... configured in Counter Sensor Database			
<b>INTER-SYSTEM SYNCHRONISATION</b>				
Time accuracy between devices	50 nsec, independent of used sampling rate			
Max. Sync-cable length	100 m (Clk/Trg), 200 m (IRIG)			
<b>SYSTEM</b>				
Flash disk	-	-	256 GB	128 GB internal + 240 GB removable (960 GB opt.)
Power supply	USB powered (5V, 2 USB cables)	9 - 36 V DC	9 - 36 V DC	12 - 36 V DC
PC interfaces	2 x USB 2.0	1 x USB 2.0	1 Gbit/s Ethernet, WLAN, USB3.0	
Weight	0,75 kg	1,5 kg	ca. 5 kg	ca. 12 kg
Dimensions (W x H x D) in mm	133 x 139 x 65	266 x 139 x 65	346 x 228 x 158	446 x 313 x 165 489 x 313 x 165 rack-mount
Dimensions (W x H x D) in inch	5,24 x 5,47 x 2,56	10,47 x 5,47 x 2,56	13,62 x 8,98 x 6,22	17,56 x 12,32 x 6,5 19,25 x 12,32 x 6,5 rack-mount
<b>HIGH CHANNEL COUNT SYSTEMS</b>				
Nr of channels	from 1 to 1000+			
Connections	1 Gb/s Ethernet network, synchronisation cable (IRIG)			
Data handling	live data transfer to Master Unit / local storage			
Operation modes	Master/Slave Measurement Unit, Master Client, View Client			
Software Addon	OPT-NET			
<b>EXTENSION MODULES FOR DISTRIBUTED DATA ACQUISITION</b>				
	KRYPTON 8XTH	KRYPTON 16XTH	KRYPTON 4XLV	KRYPTON 8XLV
Temperature inputs	8 universal, isolated	16 universal, isolated	-	-
Voltage inputs	-	-	4 isolated	8 isolated
Input range	TC types: K, J, T, R, S, N, E, C, U, B / Voltage: 1V and 100mV		+/- 100V	
Interface	LEMO 1B Ethercat cable (single cable connection power + sync + data)			
Power supply	6 to 50 V DC			
Environmental specifications	-40 ... +85 deg C, IP 67, > 100g shock proof			

## SOFTWARE (INCLUDED WITH INSTRUMENT)

### REALTIME DATA PROCESSING

#### GRAPHICS AND VISUALISATION

<b>User interface</b>	Freely configurable instrument screens; transparent mode to overlay instruments
<b>Time domain</b>	Recorder (1 to 16 ch per instrument, multiple instruments possible, realtime autoscaling), Scope (trigger, persistence, envelope), Analog/digital meter, tabular display, bar graphs, overload indicator
<b>Frequency domain</b>	FFT graph (adjustable line resolution up to 64k, Rectangular/Hanning/Hamming/Flat top/Triangle/Blackman/Exponent down windowing, lin/log/dB/reference/Acoustic A-weighting axis scaling, Amplitude/RMS/Power/PSD/RMS SD amplitude display) – 3D FFT Waterfall (zoom & rotate view, pick points with mouse, point/delta/time-domain cursors, history buffer, lin/log auto scaling, rainbow/greyscale, solid/line style) – Octave CPB plot (1/1, 1/3, 1/6, 1/12, 1/24 type; ANSI-IEC-true-octave/synthesized, Lin/A/B/C/D weighting, Lin/Exp/Pk avg with overlap)
<b>Multi domain</b>	XY recorder (Lissajous), 2D graph, Orbit graph, Bode plot (amplitude/phase/real/imaginary vs frequency)
<b>Application specific</b>	FRF geometry, Modal circle, Rotor balancer, Harmonic FFT, Vector scope – Auto-generating of displays with typical application setup

#### FORMULA

<b>Complex</b>	Array extraction of real/imag/abs/angle part, conjugate complex
<b>Arrays</b>	extract min/max and index positions in array, cut arrays, avg, sum, integrate create custom "constant" vector/matrix (e.g. reference or limit curve), copy/paste to/from clipboard or MS Excel
<b>Arithmetics</b>	addition, subtraction, multiplication, division, modulus, exponent, square root, abs, round, log2, log10, ln
<b>Trigonometrics</b>	sin, cos, tan, asin, acos, atan, pi
<b>Logic</b>	if-else conditions, NOT, AND, OR, XOR, bigger-than/smaller-than/equal operator
<b>Test signals</b>	sine, square, noise, time channel
<b>Others</b>	edge time measurement, stopwatch, edge counter, sample counter, latch value on condition

#### FILTERING

<b>IIR</b>	Low pass/high pass/band pass/band stop, 1 to 10th order, Butterworth/Chebyshev/Bessel, custom coefficients, Zeroes & poles plot
<b>FIR</b>	Low pass/high pass/band pass/band stop/all pass, selectable number of taps/order, Blackman/Rectangle/Hanning/Hamming/Kaiser/Flat top, Impulse and step response
<b>Frequency domain filter</b>	Low pass/high pass/band pass/band stop/Tracking/custom table, number of FFT lines, overlap, Rectangular/Hanning/Hamming/Flat top/Triangle/Blackman/Exponent down

#### STATISTICS

<b>Calculation base</b>	time based / sample based
<b>Types</b>	RMS, Quadratic RMS, Average, Median, Peak, Peak-Peak, Crest factor, Sum, Min, Time of Min, Max, Time of Max, Variance, COV, Standard deviation
<b>Data range</b>	Block-based, Running, Single-value, Triggered Blocks, Start-stop blocks
<b>Array statistics</b>	get min, index of min, max, index of max, avg, sum, variance over whole array data (e.g. FFT) or selected range Rainflow counting, SN curves, Counting, Classification

#### REFERENCE CURVES

<b>Types</b>	time, value, dual-value, vector, XY, frequency domain with interpolation
<b>Compatibility</b>	copy/paste to/from clipboard or MS Excel

#### TIME DOMAIN ANALYSIS

<b>integration/derivation</b>	single/double with adjustable filter, automatic unit conversion (e.g. acceleration to velocity to displacement)
<b>Latch value math</b>	hold and output value on trigger, actual/Avg/RMS/AC RMS/Min/Max
<b>Scope math</b>	cut time window on trigger, for array calculation, modes: auto/normal/free-run/single-shot, pre-/post-time, history
<b>Time-to-vector transform</b>	transforms time data to any other channel (resampling to e.g. angle-domain), calculation of min/max/avg over all cycles

#### FREQUENCY DOMAIN ANALYSIS

<b>FFT</b>	adjustable line resolution up to 64k, Rectangular/Hanning/Hamming/Flat top/Triangle/Blackman/Exponent down/Transient windowing, lin/log/dB/reference axis scaling, Acoustic-A,B,C,D-weighting, Amplitude/RMS/Power/PSD/RMS SD amplitude display, DC cutoff, Range: overall, peak-hold, lin/exp avg, on selected time range (automatic determination of number of FFT lines)
<b>Octave band (CPB)</b>	1/1, 1/3, 1/6, 1/12, 1/24 type; ANSI-IEC-true-octave/synthesized, Lin/A/B/C/D weighting, Lin/Exp/Pk avg with overlap
<b>STFT</b>	short term FFT, for fast changing signals and shock signals; specify custom block size, FFT has still same resolution but is able to follow quickly; custom block size; adjustable line resolution up to 64k, Rectangular/Hanning/Hamming/Flat top/Triangle/Blackman/Exponent down windowing; window overlap 0, 25, 50, 66, 75 %
<b>Cepstrum</b>	custom segment length; Rectangular/Hanning/Hamming/Flat top/Triangle/Blackman windowing; window overlap 0, 10, 25, 50, 66, 75, 90 %; two-sided FFT output; low lifter/high lifter, customizable split point;
<b>Auto- &amp; Cross-Correlation</b>	custom FFT size; Rectangular/Hanning/Hamming/Flat top/Triangle/Blackman/Exponent down windowing; tracking first harmonic; window overlap 0, 25, 50, 66, 75 %; coherence
<b>Waterfall FFT</b>	selectable history count, visualisation in 3D FFT graph (zoom & rotate view, pick points with mouse, point/delta/time-domain cursors, history buffer, lin/log auto scaling, rainbow/greyscale, solid/line style)
<b>Other functions</b>	Two-sided FFT, overall vibration level, exact frequency (extracts dominant frequency of spectrum)

#### MACHINERY DIAGNOSTICS

<b>Angle sensor math</b>	takes any periodic analog input signal and calculates angle and frequency; for use with tach probes; select sensor from database or define a new one; algorithm for auto-finding trigger and retrigger levels; filter 10us/50us/100us/1ms; averaging
<b>Sine Processing</b>	uses one-line DFT to extract amplitude and phase, by help of COLA signal; trigger level, start/end/delta frequency, sweep direction, number of periods; extract filtered/unfiltered RMS/Peak amplitude
<b>Tracking filter</b>	filter will dynamically tune to the driving frequency and output defined narrow-band RMS; select order, tracking bandwidth, sidelobe fall-off, frequency channel

#### STRAIN ROSETTES

<b>Inputs</b>	rosettes strain gauge consisting of three single elements in 45°, 60° or 120° configuration
<b>Outputs</b>	average strain, max shear strain, max strain in angle direction, min strain in angle +90 direction, angle of max strain (Mohr's circle)

#### TRIGGER FUNCTIONS AND STORING

<b>Highspeed data streaming</b>	200 MByte/s and more
<b>Storing modes</b>	fast/slow/fast on trigger, slow otherwise (= store reduced data when no trigger event, to save disk space)
<b>Options</b>	Start, Stop and Don't Store conditions; pre- and post-time, holdoff-time, multiple triggers in one file
<b>Trigger capabilities</b>	Data: Simple edge, Filtered edge, Window trigger, Pulsewidth trigger, Window and Pulsewidth, Slope, Delta; any math function can be used Time: define absolute time or time intervals to start/stop storing FFT: define FFT reference curve, start/stop when exceeded, e.g. triggering on a FFT

#### OUTPUTS

##### ANALOG OUTPUTS

<b>number of channels</b>	from 0 to 64+ channels, depending on amplifier configuration
<b>Specifications</b>	+/-10 V with 200 kHz rate (additional oversampling)
<b>File replay</b>	replay channels of a recorded datafile on the analog outputs
<b>Signal conditioning</b>	standalone usage as signal-conditioner without USB cable (option: A08); adjustable scaling
<b>Control channel</b>	realtime changing of channel value, various instruments like bar, turn knob, input box...
<b>Math channel output</b>	realtime output of any math channel (e.g. multiplication of 2 input channels, RMS, etc...)

<b>DIGITAL OUTPUTS</b>	
<b>number of channels</b>	from 0 to 128+ channels, depending on amplifier configuration
<b>Specifications</b>	open-collector (TTL with external pull-up resistor to 5V), fast outputs up to 2 ms
<b>Alarm</b>	Fast outputs up to 2 ms reaction time; various conditions: simple edge, filtered edge, window, pulsewidth, slope
<b>Control channel</b>	realtime manual changing of channel value, various instruments like button, switch
<b>Math channel output</b>	realtime status output of any math channel (e.g. logical conditions)
<b>ANALYSE, POST-PROCESSING &amp; REPORT</b>	
<b>Free Analyse &amp; Export</b>	For Analysis and Export no license is needed! Just install DEWESoft and load the stored datafile.
<b>Post-processing</b>	all functions listed below "Realtime data processing" also work "offline" on the stored datafiles. modify or add math, FFT's, statistics, instruments, etc... and design screen arrangement offline
<b>Batch processing</b>	apply operations (display and math changes) on a set of datafiles at once
<b>File import</b>	Compare data files by importing into each other, alignment by time shift, trigger time, absolute time
<b>Data header</b>	Add informations to the datafile (before or after measurement), easily find them by text search
<b>Reports</b>	print screen arrangement, split measurement on multiple consecutive pages, add Notes, Lines, Images
<b>EXPORT</b>	
<b>Export formats</b>	MS Excel, Flexpro, Text, ASCII, clipboard, Diadem, Matlab, FAMOS, Nsoft, Sony, RPC III, Comtrade, WAV, Google Earth KML, BWF (wave), ATI, SDF, WFT, CSV, TDM, TDF, UNV,
<b>Other exports</b>	video export of datafile measurement screen, Extract sensor list / channel configuration with all settings for documentation, copy any graph to clipboard to e.g. MS Word, MS Excel / custom file format on request
<b>DATA MANAGEMENT</b>	
<b>Projects</b>	save & reload presets for e.g. different users (folders & locations) / different measurement tasks with changing environment
<b>Setups</b>	save & reload complete measurement screens, math formulas, settings
<b>Datafiles</b>	File manager with outstanding search functionality, auto-grouping of measurements of the same session (multifiles), icon preview store consecutive files with auto-increasing number/adding date and time store changes done in post-processing to the datafile Revert datafiles to original state (remove post-processing changes)
<b>Security</b>	File locking: prevent files from modification by password protection Project locking: prevent users from entering DEWESoft settings
<b>TEDS / SENSOR DATABASE</b>	
<b>Hardware</b>	TEDS support for IEP sensors according to IEEE 1451.4 V 0.9, 0.91 and 1.0
<b>Custom sensors</b>	easy writing of TEDS for custom sensor data (sensor identification, scaling, calibration data)
<b>Security</b>	Prevent users from changing TEDS data
<b>VIDEO</b>	
<b>Features</b>	video instrument with zoom&pan and rotation by custom angle (easy camera mounting), post-synchronisation of any video file to the measurement data
<b>Settings</b>	adjust resolution and framerate, brightness, contrast, saturation, white balance
<b>Compression</b>	MPEG 4, DivX, Xvid, adjustable quality, selectable profiles, compression realtime or afterwards
<b>Supported models</b>	Direct X cameras (webcams), DS-CAM-88/-120/-300/-600 triggered cameras, various models color/monochrome, up to Full HD resolution/600 FPS, onboard JPEG compression, synchronous video data streaming, Photron Highspeed camera (Plugin) with onboard memory and up to 500 000 FPS FLIR thermo cameras (Plugin)
<b>SEQUENCER</b>	
<b>General</b>	easily build test procedures in form of a workflow diagram, control the software: load setup, start measurement, take actions based on realtime results, user interaction, etc.
<b>Functionality</b>	IF blocks, Loops, Start, Stop, Wait, Analyse, Custom blocks, Multimedia, Test routines, built-in debugger
<b>Applications</b>	endurance test, voice assist with measurement, automated test procedure, etc.

## APPLICATIONS

### SOFTWARE APPLICATIONS (INCL IN: DEWESOFT-X-DSA)

#### FFT ANALYSER

<b>General</b>	multiple independent FFT analysers at the same time
<b>Amplitude types</b>	Amplitude FFT (Ampl, RMS, Power, PSD, RMS SD), Complex FFT (Real/Imag/Ampl/Phase)
<b>Windowing</b>	Rectangular/Hanning/Hamming/Flat top/Triangle/Blackman/Exponent down/Transient
<b>Window overlap</b>	0, 10, 25, 50, 66, 75, 90 %
<b>Triggered FFT</b>	triggered time-range with pre- and post-trigger as input, auto calculation of window resolution, averaging of triggered FFT's, e.g. for bump test application
<b>DC cutoff</b>	None, 0.1, 0.2, 1, 2, 10 Hz
<b>Resolution</b>	0,01 Hz to 200 Hz (128 to 64k lines)
<b>Acoustic weighting</b>	A, B, C, D, lin (Z)
<b>Octave CPB</b>	1/1, 1/3, 1/6, 1/12, 1/24 type; ANSI-IEC-true-octave/synthesized, Lin/A/B/C/D weighting, Lin/Exp/Pk avg with overlap
<b>Visualisation</b>	amplitude axis with realtime autoscaling: lin/log/OdB/reference dB/Sound(A) dB, histogram/line view, frequency axis: lin/log
<b>Post-Processing</b>	possible to add/change all calculations offline on the stored raw data
<b>Spectrum markers</b>	Free, max, harmonic, sideband, RMS (selectable frequency range), damping marker, optional interpolation for highest accuracy
<b>Bearing markers</b>	Cage, Rolling element, Outer race, Inner race markers for bearing fault analysis chose bearing manufacturer and type from bearing database, XML import for custom type, Envelope detection with adjustable signal/envelope bands
<b>Other features</b>	multiple markers per FFT instrument, marker table with sortable columns (e.g. sort peaks by amplitude)
<b>ORDERTRACKING</b>	
<b>Frequency source</b>	Counter: optical tacho, proximity, pick-up probe (1 pulse/rev), optical strip tape probe (with bl/wh tape, algorithm for determining number of pulses), 1-, 2-, 3- tracks encoder, geartooth with missing teeth (e.g. 60-2), CDM, CDM with zero RPM channel: any analog speed channel, virtual (synthesized RPM channel, also in post-processing) Analog pulses: analog signal (e.g. 60-2) / analog tacho + angle sensor math
<b>Input channel for analysis</b>	any analog input channel, e.g. IEP accelerometer, microphone, etc...
<b>Visualisation</b>	3D graph, Order and Frequency spectrum, Waterfall FFT realtime extraction of single spectral lines of matrix Orbit plot, XY recorder, Bode plot, Nyquist plot of any order, any signal vs RPM
<b>Calculation criteria</b>	Runup / Coastdown / Both directions with RPM limits and Delta RPM and/or Delta Time Rectangular/Hanning/Hamming/Flat top/Triangle/Blackman/Exponent down FFT windowing
<b>Order FFT</b>	from 8 to 256 orders, resolution from 1 to 1/64
<b>Harmonics</b>	extract overall RMS and amplitudes/phases/Real/Imag of selectable orders (from sub-orders e.g. 0.1x, 1x, 2x, 3x to max order) in Time domain & RPM domain
<b>Post-Processing</b>	possible to add/change all calculations offline on the stored raw data
<b>Data export</b>	Complex data (Real/Imag/Ampl/Phase) in any format, see Software Export section

TORSIONAL VIBRATION	
<b>General</b>	high precision rotational and torsional vibration and slippage measurement, by use of 2 rotary encoders
<b>Frequency source</b>	optical strip tape probe (with bl/wh tape, algorithm for determining number of pulses), 1-, 2-, 3- tracks encoder, geartooth with missing teeth (e.g. 60-2), CDM, CDM with zero
<b>Angle accuracy</b>	up to 0,00075° at 10 000 rpm
<b>Angle resolution</b>	up to 0,06° at 10 000 rpm
<b>Features</b>	Rotational DC filter (0,1 to 10 Hz), compensation of uncentered encoder mounting
<b>Output channels</b>	Rotational angle/velocity, Torsional angle/velocity
<b>Visualisation</b>	angle based view, time domain
MODAL TEST	
<b>Impact hammer method</b>	roving hammer/roving accelerometer moving through points, averaging of multiple hits, double hit rejection, rejecting of hits (action buttons), grouping of sensors, adjustable excitation and response window
<b>Free-run mode</b>	Function generator (OPT-FG, OPT-FG-MUL) for shaker excitation (swept sine, burst, chirp. . .) Rectangular/Hanning/Hanning/Flat top/Triangle/Blackman/Exponent down windowing with overlap 0, 25, 50, 66, 75 % operating deflection shapes (Spectral ODS)
<b>Configurations</b>	SISO, MISO, SIMO with up to 1000+ channels (OPT-NET)
<b>Modal parameters</b>	Mode Indicator Function (MIF), extract exact frequencies and damping factors with Modal circle fit
<b>Post-Processing</b>	FRF from stored raw data, in free-run mode
<b>Geometry</b>	Geometry editor, load, save, import models in UFF (UNV) format
<b>Animation</b>	movement of nodes for selected frequency (place marker), change speed and amplitude
<b>Data export</b>	Complex data (Real/Imag/Ampl/Phase) in UFF (UNV) format or any other, see Software Export section
HUMAN BODY VIBRATION	
<b>General</b>	module for judging vibration levels for risk of damage to the human body
<b>Supported types</b>	whole body and arm
<b>Compliance</b>	to ISO 8041, ISO 2631-1, ISO 2631-5, ISO 5349 standards
SHOCK RESPONSE SPECTRUM (SRS)	
<b>Outputs</b>	maximax, primary, residual each absolute/positive/negative
<b>Resolution</b>	1/3, 1/6, 1/12, 1/24 octave
<b>Spectra</b>	acceleration/velocity/displacement
<b>More features</b>	user definable frequency range, damping ratio, velocity DC filter, analyse duration
SOUND LEVEL	
<b>Frequency weighting</b>	A, B, C, D, Lin (Z)
<b>Time weighting</b>	Fast, Slow, Impulse
<b>Lpk weighting</b>	A, C, Lin (Z)
<b>Octave plot CPB</b>	1/1, 1/3, 1/6, 1/12, 1/24 type; ANSI-IEC-true-octave/synthesized, Lin/A/B/C/D weighting, Lin/Exp/Pk avg with overlap
<b>Supported standards</b>	IEC 60651, IEC 60804, IEC 61672
<b>Outputs</b>	Sound pressure level, any combination of Frequency and Time weighting, Leg, Lpk, Lim, LE overall or on custom statistical rate, percentile levels (1, 5, 10, 50, 90, 95, 99 %)
<b>More features</b>	realtime narrow band FFT, frequency weighted raw channel
<b>Calibration</b>	auto-calibration of scaling factor with reference calibrator (1kHz, 94dB, acc to IEC 60942:2003)
BALANCING	
<b>Application</b>	for rigid rotor running below its resonance frequency, based on ordertracking (amplitude & phase), single- and dual-plane
<b>Supported tach inputs</b>	Counter: optical tacho, proximity, pick-up probe (1 pulse/rev), optical strip tape probe (with bl/wh tape, algorithm for determining number of pulses), 1-, 2-, 3- tracks encoder, geartooth with missing teeth (e.g. 60-2), CDM, CDM with zero RPM channel: any analog speed channel, virtual (synthesized RPM channel, also in post-processing) Analog pulses: analog signal (e.g. 60-2) / analog tacho + angle sensor math alarm output if velocity exceeds predefined value weight splitting
<b>Visualisation</b>	Vector polar plots of 1st order of all runs
<b>Sequence</b>	step-by-step guidance through procedure: initial run, trial mass run, correction mass run, repeat steps if needed
<b>Features</b>	x and y direction balancing at the same time, when using triaxial sensor
OPTIONAL PLUGINS	
SOUND POWER (PLUGIN-SOUNDPOWER)	
<b>Standards</b>	ISO 3744 (anechoic/semi-anechoic chamber), ISO 3745 (free-field)
<b>Geometries</b>	Parallelepiped, Cylindric, Hemisphere, Sphere
<b>Microphones</b>	32+ number of microphones; positions will be calculated according to entered geometry and size, floor / 1 wall / 2 wall setup
<b>Measurement</b>	Guided sequence, previous/next group (action buttons), background noise/sound measurement, with repeatability check, minimum measurement duration & level plausibility check and warnings, grouping of microphones
<b>Octave CPB</b>	1/1 or 1/3 octave
<b>Correction methods</b>	C1 and C2 meteorological, K1 background noise and, K2 room noise (mean absorption grade, reverberation time, K2 editor)
<b>Post-Processing</b>	do calculations offline on the stored raw data, cursor placement for background noise correction
<b>Report</b>	customizable Excel/Flexpro Template
FUNCTION GENERATOR (OPT-FG / OPT-FG-MUL)	
<b>Specifications</b>	1 to 64+ generators
<b>Output bandwidth</b>	DC to 40 kHz
<b>Frequency resolution</b>	0,1 mHz
<b>Waveshapes</b>	Sine, Square, Triangle, Saw, White/pink noise, arbitrary table
<b>Operation modes</b>	Fixed (pure tone), Sweep, Step sweep, Burst, Chirp amplitude/phase/offset can be changed live during measurement (smooth operation, no glitches when operating shaker)
DISTRIBUTED DATA ACQUISITION (OPT-NET)	
<b>General</b>	Software Plugin for linking multiple DEWESoft instruments and/or computers together by Ethernet/WLAN, to act as one big system, e.g. for high-channel count
<b>Operation modes</b>	1:1, 1:x and x:1
<b>Functionality</b>	full remote control, view live-data only, redundant data storage
<b>Roles</b>	Master/Slave, Measurement-Unit/Client/View-Client
<b>Synchronisation</b>	IRIG, Clk/Trg, GPS PPS
<b>Time accuracy between devices</b>	50 nsec, independent of used sampling rate
<b>Max. Sync-cable length</b>	100 m (Clk/Trg), 200 m (IRIG)

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