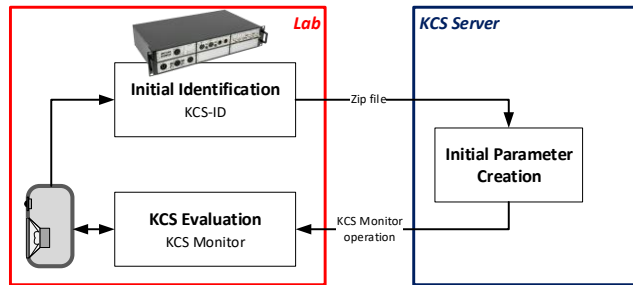


FEATURES

- Create a full parameter set required by *KLIPPEL Controlled Sound Technology (KCS)* comprising linear, non-linear and thermal speaker parameters
- Automatic determination of the speaker's working range
- Support of electrodynamic transducers operated in free air or sealed, vented or passive radiator systems of any size



DESCRIPTION

The *KCS-ID Parameter Identification* is a measurement module which is required for creating initial speaker parameters for the **KLIPPEL Controlled Sound Technology (KCS)**. *KCS-ID* uses a multi-tone stimulus to excite a loudspeaker and measures electrical voltage, current and optionally laser and microphone signals.

The signals recorded by *KCS-ID* are sent to the *KLIPPEL KCS Server* which automatically creates initial data for the particular *KCS* hardware platform. This data is provided via a *KCS Monitor* operation which is used in the dB-Lab framework. The *KCS Monitor* can connect to any supported *KCS* hardware platform and a control session can be started.

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CONTENT

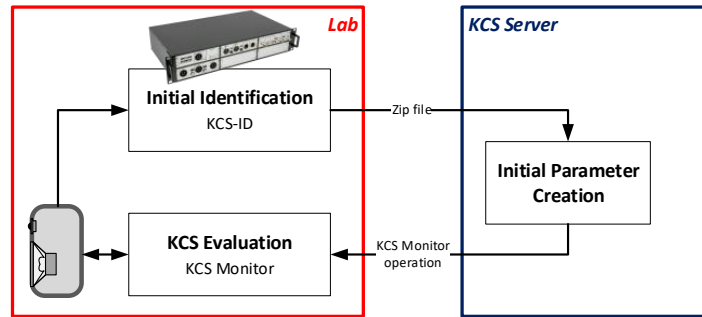
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1 Overview

1.1 Components

KCS-ID Parameter Identification Software Module	Software module running on the PC in the <i>Klippel dB-Lab</i> framework.
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1.2 Steps for creating Initial Data for KCS



1. Running <i>KCS-ID</i> Parameter Identification	Running the <i>KCS-ID</i> measurement to record sensor signals at the speaker's full working range.
2. Sending Data to KCS server	Uploading a zip file comprising measurement signals and setup parameters. The KCS Server creates initial data automatically. The calculation time is usually below 5 minutes.
3. Downloading initial data	Download a <i>KCS Monitor</i> operation from the KCS server.
4. Running KCS	The <i>KCS Monitor</i> software module running in the Klippel dB-Lab framework on a PC are used to connect to the KCS hardware device and to setup and start a KCS control session.

1.3 KCS-ID Measurement sequence

The *KCS-ID* module is performing multiple measurements consecutively to determine the maximum safe working range of the speaker and for creating the optimal stimulus for parameter identification.

1. LINEAR MODE	Small signal parameters are identified and the optimal settings for the following measurements are determined.
2. ENLARGEMENT MODE	The excitation level is incrementally increased to approach a user-defined limit such as peak excursion, impulsive distortion or voice coil temperature.
3. NONLINEAR MODE	The speaker is excited by a signal targeting a voice coil excursion which corresponds approximately to its maximum working range in the final application. The full parameter identification for running KCS is based on this measurement.
4. THERMAL MODE	If the voice coil heating was too low in the NONLINEAR MODE, a THERMAL MODE is performed to heat up the voice coil to identify thermal parameters.

1.4 Limits

The excitation voltage is incrementally increased in the ENLARGEMENT MODE until a limit parameter is reached. Following limit parameters are available:

X target	<p><i>(Laser recommended)</i> Maximum absolute peak excursion which shall be achieved in the KCS on-line processing.</p> <p>If a laser is used, the peak displacement value is measured by a laser sensor. If no laser is used, it is calculated by a linear speaker model and a BI(X=0) import. Note that in this case, the displacement value can differ significantly from the real voice coil excursion as it depends on a manual BI(X=0) import and only uses a linear speaker model.</p>
IDR max	<p><i>(Microphone required)</i> Impulsive distortion (<i>Rub&Buzz</i>) can be identified by exploiting out-of-band distortion in the sound pressure. The IDR (<i>Impulsive Distortion Ratio</i> according to IEC 60268-21 standard) limit is the ratio between peak higher order distortion and mean SPL. An excessive IDR indicates that the speaker is working above its safe working range.</p>
Coil temperature	<p>The measurement is stopped if a certain maximum voice coil temperature increase (relative to the voice coil temperature during the LINEAR MODE) is detected.</p>

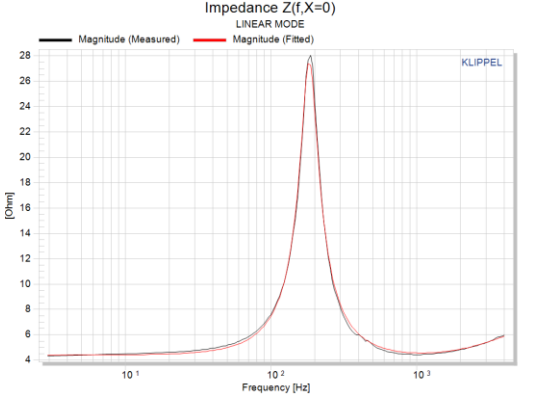
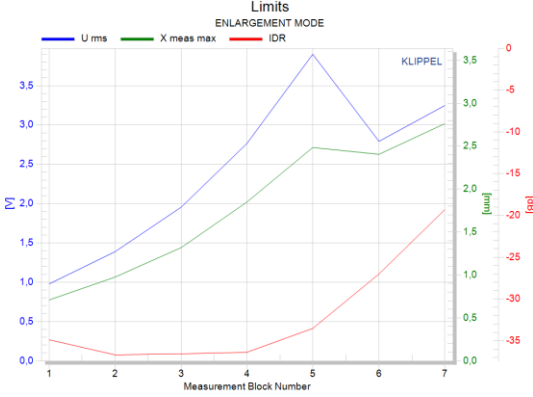
2 Customizing Setup

Target Platform	
Hardware Platform	KA3 Speaker Card with Processing Extension
Target KCS Amplifier	AMP Card
Driver	
Speaker System Type	sealed box / sidefire speaker
Target Bandwidth	fullrange
BI(0)	
Stimulus	
Properties	Automatic
Level	Automatic
• Start Voltage	1
Limits	
<input type="checkbox"/> X target	1
<input checked="" type="checkbox"/> Impulsive Distortion	Automatic Limits
• IDR max	-16
• CID max	20
Coil Temperature	90
Peripherals	
Laser Connected	<input checked="" type="checkbox"/>
Microphone Connected	<input checked="" type="checkbox"/>
KA3 Routing	
Output Channel	OUT 1
Speaker Channel	Speaker 1
Microphone Channel	IN 1
Advanced	
Skip Thermal Mode	<input type="checkbox"/>
Save Intermediate Results	<input type="checkbox"/>
Initial Data Creation	
Path	
	Save KCS Server File
	Open KCS Server


Target Platform	Target platform for which the KCS Initial Data shall be created. These options can be changed before or after the actual measurement, but must be set prior to exporting the KCS server file. KCS will not work if the incorrect platform is specified.
Driver	Setting the correct speaker type and its target bandwidth is required for parameter identification. KCS-ID supports the most common loudspeakers covering free air, sealed, sidefire, vented and passive radiator systems. Bl(0) can be imported if no laser measurement is performed. If a laser is connected, Bl(0) is identified automatically on the KCS Server. If no Bl(x) can be determined, KCS-ID sets a default value of Bl(X=0) = 1 N/A.
Stimulus	Set the properties of the stimulus, such as bandwidth and voltage. Automatic modes for stimulus settings and voltage determination are available and recommended.
Limits	The Limit parameters define the maximum working range of the driver. If any limit is exceeded, the excitation voltage is not increased any more. It is recommended to never switch off the <i>Impulsive Distortion</i> limit.
Peripherals	Define which optional sensors are connected (Laser, Microphone). These settings influence available <i>Limits</i> options.
Routing	Set hardware routing settings for the KA3.
Advanced	This section provides features which are useful for performing faster experiments and for saving additional data.
Initial Data Creation	Save measurement data to a file and open the KCS Server to create initial data.

3 Results

The *KCS-ID* module is providing time signals and spectra of all measured signals (voltage and current; optionally sound pressure and displacement). In addition, it displays a small set of linear and large signals parameters.

<p>Impedance</p>	<p>This window displays the magnitudes of the measured electrical impedance at the speaker terminals and the fitted impedance. The latter is calculated using linear speaker model parameters which are automatically identified based on the measured impedance in the LINEAR MODE.</p>																																																																																									
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<p>Limits</p>	<p>This chart shows the history of the defined limits displacement, IDR and voltage of the ENLARGEMENT MODE.</p>																																																																																									

4 Requirements

4.1 Hardware	
Analyzer	Klippel Analyzer 3 (KA3) 
Amplifier [optional]	External amplifier to drive the device under test. <u>Note:</u> The KA3 can be purchased with an internal amplifier card which can be used for smaller speakers.
Microphone [optional]	Measurement microphone (XLR or BNC) to capture the sound pressure of device under test.
Laser [optional]	Laser triangulation sensor measuring voice coil excursion
4.2 Software	
dB-Lab (>210.710)	Project management software of the KLIPPEL measurement system.
KCS Monitor	Software modules for connecting and communicating with a KCS platform.

5 References

5.1 Related Products	[S73] KCS Monitor
5.2 Specification	[S73] KCS Monitor
5.3 Manuals	KCS Monitor