Digital Microphone

Introduction

This sequence demonstrates the two most common microphone measurements on digital MEMS microphone: frequency response and sensitivity. A stepped sine sweep is played from 10 kHz to 100 Hz through a source that has previously been calibrated to produce 1 Pascal across the frequency band. The recorded signal is analyzed with a HarmonicTrak analysis step, which calculates the response curve. A post processing step is then used to extract the level at 1 kHz, the sensitivity value. Limits are set around both the frequency response and the sensitivity, the default values are for a typical MEMS microphone and should be adapted to your particular device.

The final display shows two graphs. The top X-Y graph displays the data at its absolute level in dBFS. The lower graph shows the same response curve but normalized to 0 dB at 1 kHz. This is a common way of displaying microphone frequency response and applying limits.

![Final Display for Digital Microphone sequence](image)
Software Requirements – SoundCheck Basic or Above

- SoundCheck 12.0
- 2004 - Post Processing

Hardware Requirements

- Portland Tool & Die DCC-1448 (Listen p/n 2018) or PQC-3048 (Listen p/n 2018)
- AmpConnect (Listen p/n 4042), SC Amp (Listen p/n 4060) or other power amplifier
- Source speaker
- Measurement microphone e.g. Listen SCM3 (p/n 4002) and any required power supply e.g. Listen SoundConnect p/n 4022)

Hardware Setup & Calibration

1. Calibrate the source speaker as per the instructions in the SoundCheck manual.
2. Connect the MEMS microphone and digital MEMS interface per Digital Microphone Test Configuration Notes.

You are ready to start the sequence.

System diagram

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<table>
<thead>
<tr>
<th>Type</th>
<th>Step Name</th>
<th>#</th>
<th>Out</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sti</td>
<td>Stweep - 10k-100Hz (R40)</td>
<td>1</td>
<td>Source Speaker</td>
<td>Source Speaker Digital DUT Mic</td>
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<tr>
<td>Acq</td>
<td>Play &amp; Record</td>
<td>2</td>
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<tr>
<td>Ana</td>
<td>HarmonicTrak</td>
<td>3</td>
<td></td>
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<tr>
<td>Pos</td>
<td>Sensitivity</td>
<td>4</td>
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<td>Lim</td>
<td>Response</td>
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<td>Dis</td>
<td>2ea XY Graph and Results</td>
<td>7</td>
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```

// Finds the sensitivity value at 1 kHz
// Typical sensitivity limit
// Typical frequency response limit