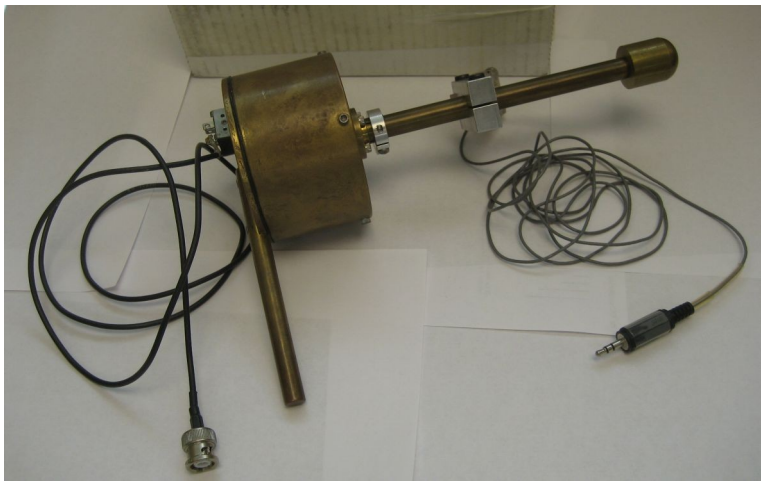
Sockolich Transducer Thevenin Parameters

The Sockolich transducer (ST) frequency response was measured in 5 Brass cavities by Jennifer and Rob with the stimresp program. The data was imported manually into a modified version of the MEPA Matlab software v 4.5.3 which supports multiple probes.

The first section illustrates the ST transducer and the 5 brass cavities. The second section shows the measurement setup by Jennifer. In the third section the sound level meter readings are given for an artificial ear measurement. In the forth section the thevenin parameters are shown accompanied by the cavity frequency responses as well as plots to 'debug' the least-squares solution for modellung the cavity frequency responses. The section 6 compares the thevenin paraemters as calculated from different cavity sets and different microphones or measurement setups (Jennifer/Rob).

1. The ST transducer and Brass cavities

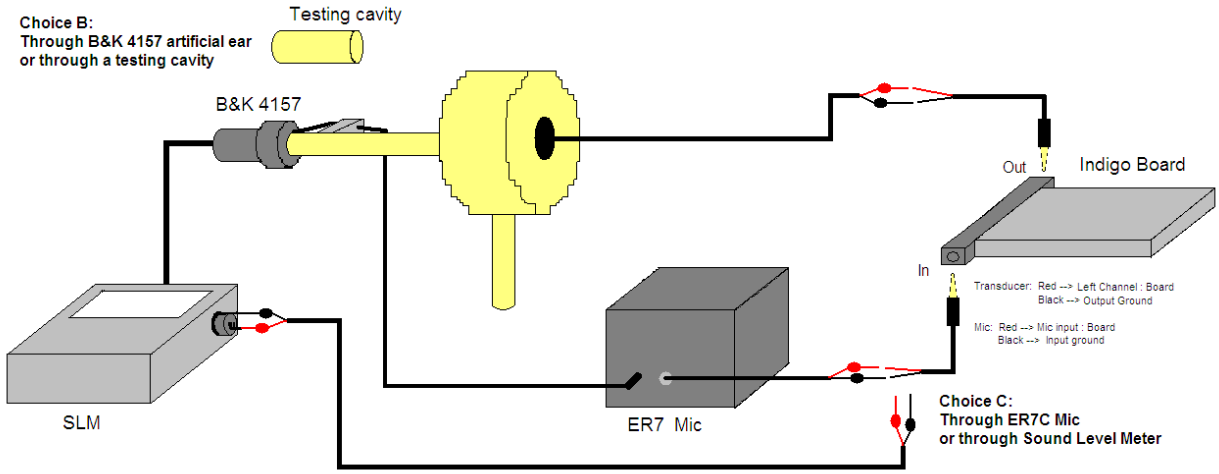
The probe includes a transducer that receives its input through a BNC cable and a place to insert a mic near the tip, as shown below. The mic is then connected to the ER7 mic box. The probe receiver and mic box are then connected to the Indigo board.



The Brass cavities have lengths
c1 = 3.065 mm
c2 = 6.13 mm
c3 = 12 mm
c4 = 42 mm
c5 = 84 mm

2. Measurement Setup

The figure (done by Jennifer) below shows the measurement setup.



3. Sound level meter readings

For each test, the voltage output was set at 1.0 V and the Sound Level Meter's FSD was set to 100(120). Sine responses were taken at 1000 Hz. All results were saved as "res_cavity_mic_board_stimulus_1.0V.mat". For the tests ran through the B&K coupler, the SLM readings were recorded as shown. This allows to calculate the speaker sensitivity.

Cavity	*Board*	*Mic*	*Stimulus*	*SLM output*	*SLM +14dB*
B&K 4157	Indigo	7_70	Sine	84.7	98.7
	Indigo	7_70	Chirp	75.0	89.0
	Indigo	7C	Sine	82.4	96.4
	Indigo	7C	Chirp	78.9	92.9
	Indigo	SLM	Sine	82.8	96.8
	Indigo	SLM	Chirp	79.2	93.2

4. Thevenin Parameters

The data was imported manually into a modified version of the MEPA Matlab software v 4.5.3 which supports multiple probes.

a) Measurement by Rob with cavities 2 – 5

(It is not known in how far Rob uses the same measurement setup as Jennifer given above)

b) Jennifer: Indigo with Probe 7c and cavities 1 – 4

c) Jennifer: Indigo with Probe 7c and cavities 2 – 5

d) Jennifer: Indigo with Probe 770 and cavities 1 – 4

e) Jennifer: Indigo with Probe 770 and cavities 2 – 5

f) Example for ER10C thevenin parameters:

5. Thevenin Parameter Comparison

In the following plot the thevenin parameters shown in section 4 are compared.