Snart Note

System Calibration for ER3 and 10D

using the System Calibration Utility

Introduction

This document shows the procedure that can be used by field technicians to calibrate transducers (ER-3A, ER-3C, or 10D) to be used with IHS equipment. These calibration values are then applied by the software automatically when performing tests using these transducers for stimulation.

Required Equipment

This guide was created to be used with the following equipment:

- 824S Larson Davis SLM or equivalent Sound Pressure Level Meter (SLM).
- PRM 902 or equivalent pre-amplifier.
- AEC304 Occluded Ear Simulator (711 coupler or any ear simulator that conforms with IEC 60318-4 with 1/2 inch microphone).

Note that this guide uses images from the specific equipment mentioned above; when using equivalent devices, refer to the documentation of your device to locate the corresponding settings and instructions.

SPL Meter Settings

This general procedure requires the following settings:

- **Primary Measurement Mode:** SPL.
- **Primary Weight:** Flt (Flat).
- **Secondary Measurement Mode:** Peak.
- **Secondary Weight:** F (Flat)
- **Response:** Fast.
- **dB Range:** 40 - 120.

Fig.1 - Settings of SPL meter.

Connections

1. Attach the Occluded Ear Simulator to the SPL meter. Verify that all the parts make an air-tight fit when assembled.
2. Connect the stimulator to the Occluded Ear Simulator.
   - If connecting the ER3 insert, use a 14A yellow foam ear tip, or use a Tube Adapter. Red insert first.
   - If connecting the 10D probe, use a blue 9 mm ear tip.

Fig.2 - Connection of ER3 to SPL Meter.

Fig.3 - Connection of 10D Probe to SPL Meter.

Setting the Calibration Software

1. Start the IHS Launch pad program and run the calibration module, by clicking on **[System > Calibration]** from the main menu.
2. Enter your name, and when prompted for a password, enter the system password. The default system password is 'ihs'.
3. After starting the Calibration Module, make sure to select the stimulator to be calibrated from the list of transducers in the **[Settings]** menu.

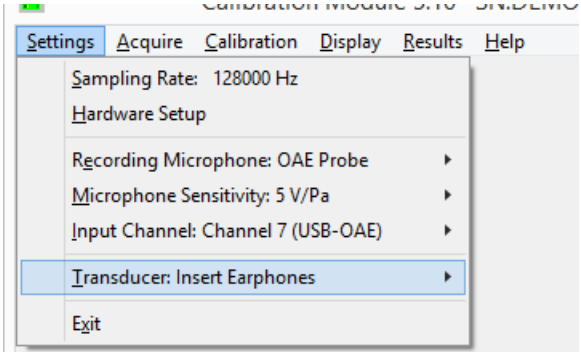

Fig.4 - Settings menu options.

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For additional help:
e-mail: support@ihsys.com
phone: (800) IHSYSTEMS (USA)

4. Make sure the mode is set to SPL, as shown below.

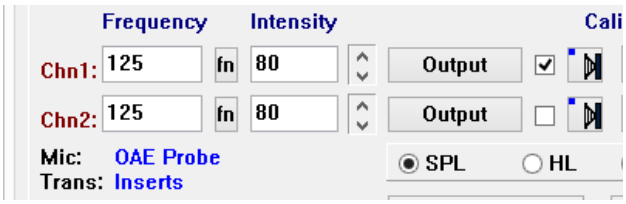

Fig.5 - Control panel options, for insert earphones.

Performing Calibration

1. From the main menu, click on **[Acquire > Max Freq]** and, if calibrating:
   - **ER3 Inserts:** set the maximum to 10 kHz.
   - **10D Probe:** set the maximum to 16 kHz.
2. Set the intensity fields for both channels, if calibrating:
   - **ER3 Inserts:** set the values to 80.
   - **10D Probe:** set the values to 70.
3. Click the **[fn]** button until the frequency field for the channel reads "125".
4. Enable the check box to the right of the **[Output]** button for channel 1 (see Fig.6).

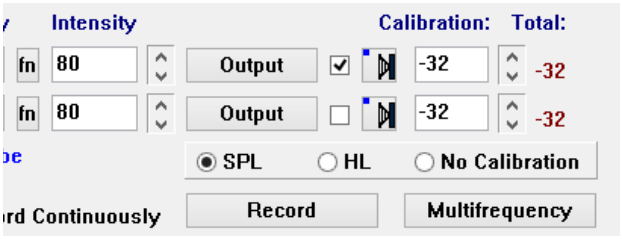

Fig.6 - Control panel options, for insert earphones.

5. Press the VIEW button on the Sound Level Meter to change the view to SPL meter mode.
6. Press RUN on the Sound Level Meter.
7. Read the **SPL** value from the LCD screen
8. If the value read is outside the +/- 0.5 range, from the value set in step 2, adjust the calibration using the up/down arrow buttons to the right of the calibration field until the read value is within range.
   - **For inserts:** the measured level should be 80 +/- 0.5 dB SPL.
   - **For 10D Probe:** the measured level should be 70 +/- 0.5 dB SPL.
9. Click on the **[fn]** button to change to the next frequency, then repeat the previous step.
10. Continue repeating the calibration check and adjustment for all frequencies up to the maximums as indicated in step 1.
11. Click on **[fn]** until the frequency field changes to "click"; alternatively, you may type the letter "c" in the field.
12. Set the Intensity field to 90.
13. Press the RESET button and read the **Peak SPL** from the Sound Level Meter.
14. If the value read is outside the 90 +/- 0.5 range, adjust the calibration as needed using the up/down arrow buttons to the right of the calibration field.
15. If calibrating ER3 insert earphones, switch the connection to the left insert. If calibrating the 10D, leave the connection untouched.
16. Clear the channel 1 output check box, and activate the channel 2 output check box.
17. Repeat the procedure starting from step 2, for the second channel.
18. If continuing calibration with an additional transducer, start at step 1 of this section.

Last Steps

1. On the calibration module window, click on **[Calibration > Edit SPL Table]**.
2. Choose the transducer type that was just calibrated from the stimulator list.

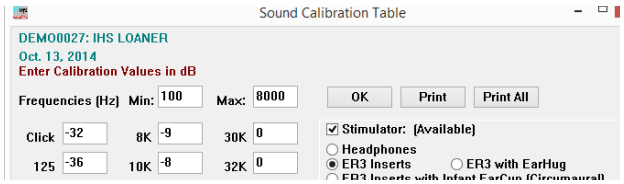

Fig.7 - Sound Calibration Table.

3. Click on the **[Today]** button to the right of the 'Calibration Date' field.
4. Press the **[Print]** button to send the table to the default windows printer. Keep this copy for your records.
5. Repeat for any other transducer types that were calibrated.
6. Click **[OK]** to close.

The Maximum Output Values

Transducers have a pre-defined output range, typically this range is 150 dB from the minimum to the maximum. The maximum is set at the factory to the highest level at which undistorted output is possible for the given transducer. When adjusting the calibration of a transducer using this procedure, the minimums and maximums will automatically adjust accordingly to prevent sound distortion.