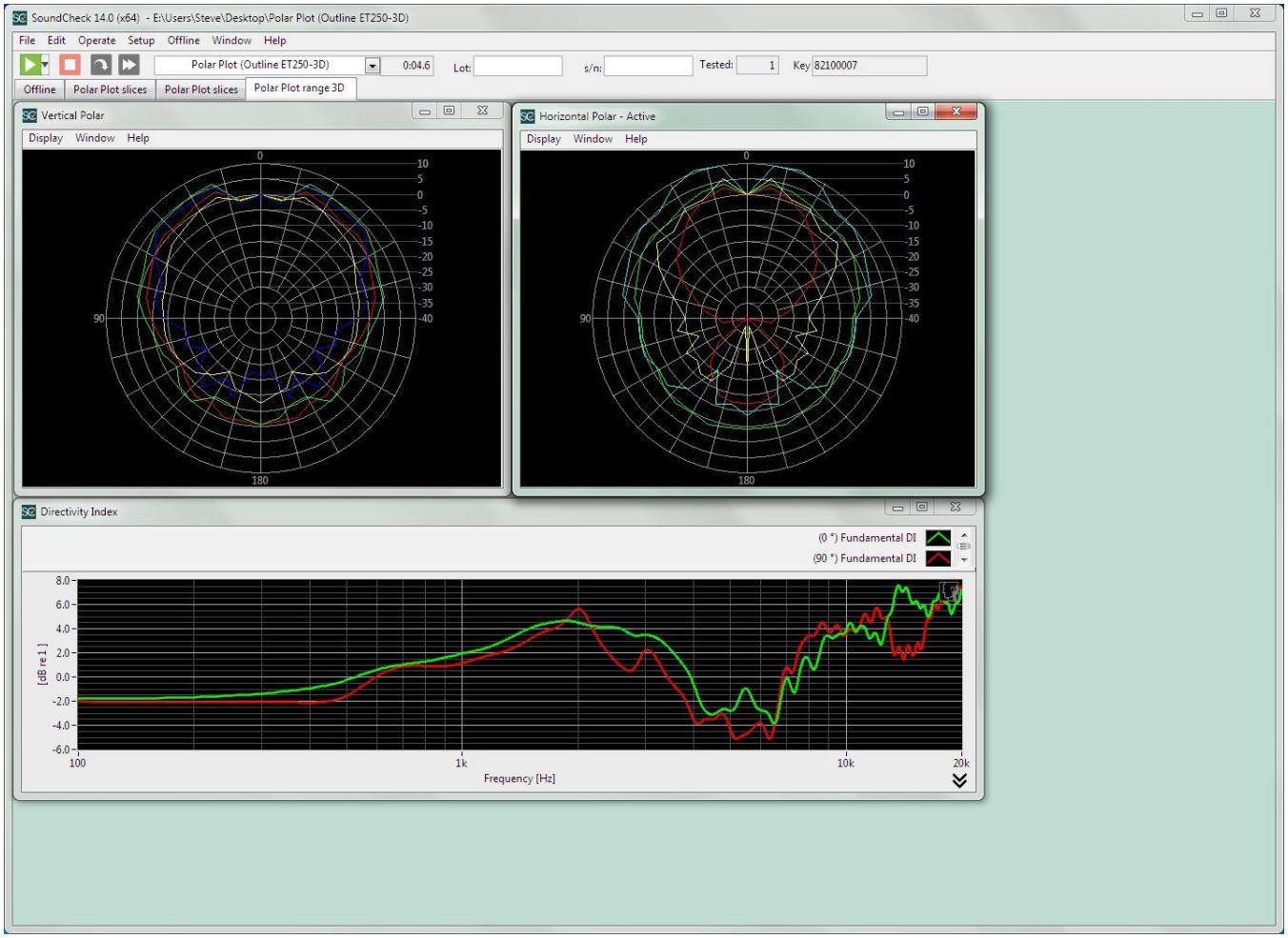
Polar Plot (Brüel & Kjær Turntable System 9640)

Introduction

This sequence measures the polar response of a loudspeaker in both the vertical and horizontal planes. It is designed to work with the Brüel & Kjær Turntable System 9640 (Model 5960 turntable and Model 5997 controller) and contains all the necessary commands to automatically rotate the turntable's platter when the SoundCheck host PC is connected to the turntable using a GPIB interface. The sequence uses a log sweep stimulus with the Time Selective Response algorithm so that the measurements can be made in a non-anechoic environment. Note that the analysis step's time window needs to be adapted to the user's measurement space.

The sequence plays the stimulus and measures at 10 degree increments from 0 to 180 degrees. This process is repeated with the speaker positioned horizontally. The two results are mirrored to display full 360 degree polar plots for each axis. A directivity index curve is also calculated for each axis and is displayed at the end of the test.



Final Display for *Polar Plot (Brüel & Kjær Turntable System 9640)* sequence

Hardware Setup & Calibration

1. Calibrate the reference microphone as instructed in the SoundCheck manual.
2. Calibrate the amplifier as instructed in the SoundCheck manual.
3. Connect the output of the microphone power supply to Input 1 of your audio interface.
4. Connect Output 1 of your audio interface to the input of the amplifier.
5. Connect the output of the amplifier to your loudspeaker.
6. Position your reference microphone at the desired test distance from the loudspeaker, and connect it to the microphone power supply.
7. Connect the turntable's control unit directly to the SoundCheck PC using a suitable GPIB adapter such as the National Instruments GPIB-USB-HS.
8. Configure the turntable interface in SoundCheck's System Hardware (see the accompanying configuration note for National Instruments GPIB-USB setup).

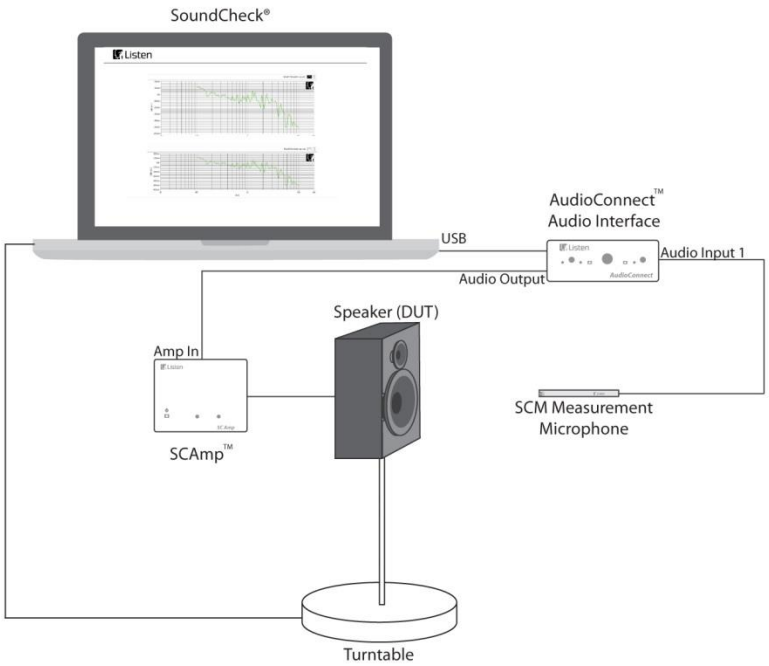
You are ready to start the sequence.

Required Optional SoundCheck Modules

2006 – Time Selective Response

2011 – Polar Plot

System Diagram



Sequence Logic

Type	Step Name	#	Out	In	
Sti	TSR log sweep	1	Amp ch 1		
Mes	Turn_abs 0	2			
Mes	Start	3			
Mes	IEEE-488 Wait for SRQ	4			
Mes	IEEE-488 Serial Poll	5			
Acq	Play & Record	6	Amp ch 1	Reference Mic	
Ana	TSR polar	7			
Pos	First Iteration curve copy	8			// Creates a copy of the first curve, on-axis response
Pos	On-Axis Normalization	9			// Compares the current measurement to the on-axis (normalizes)
Pos	First Iteration curve copy	10			
Lim	Skip Last Acquisition	11			// Checks the current angle, exits the loop after 180 degrees
Mes	Turn_rel 10	12			
Mes	Start	13			
Mes	IEEE-488 Wait for SRQ	14			
Mes	IEEE-488 Serial Poll	15			
Acq	Play & Record	16	Amp ch 1	Reference Mic	
Ana	TSR polar	17			
Lim	Skip Last Acquisition	18			
Dis	Polar Plot slices	19			// Displays vertical polar
Dis	Polar Plot slices	20			// Displays horizontal polar
Mes	Rotate Speaker	21			// Just a logic step for looping
Mes	Rotate Speaker	22			// Prompt to rotate speaker on its azimuth
Pos	Directivity Index	23			// for vertical
Pos	Directivity Index	24			// for horizontal
Dis	Polar Plot range 3D	25			

Further sequence development

This sequence has been designed for simplicity. Ways in which you could modify or further develop the sequence include:

- This sequence is currently setup to test a loudspeaker, but it could easily be modified to test other devices.
- If an anechoic chamber is present, the sequence could be edited to use a stepped sine sweep rather than a log sweep stimulus.
- Other turntables and their associated commands could be swapped out, replacing the B&K 9640