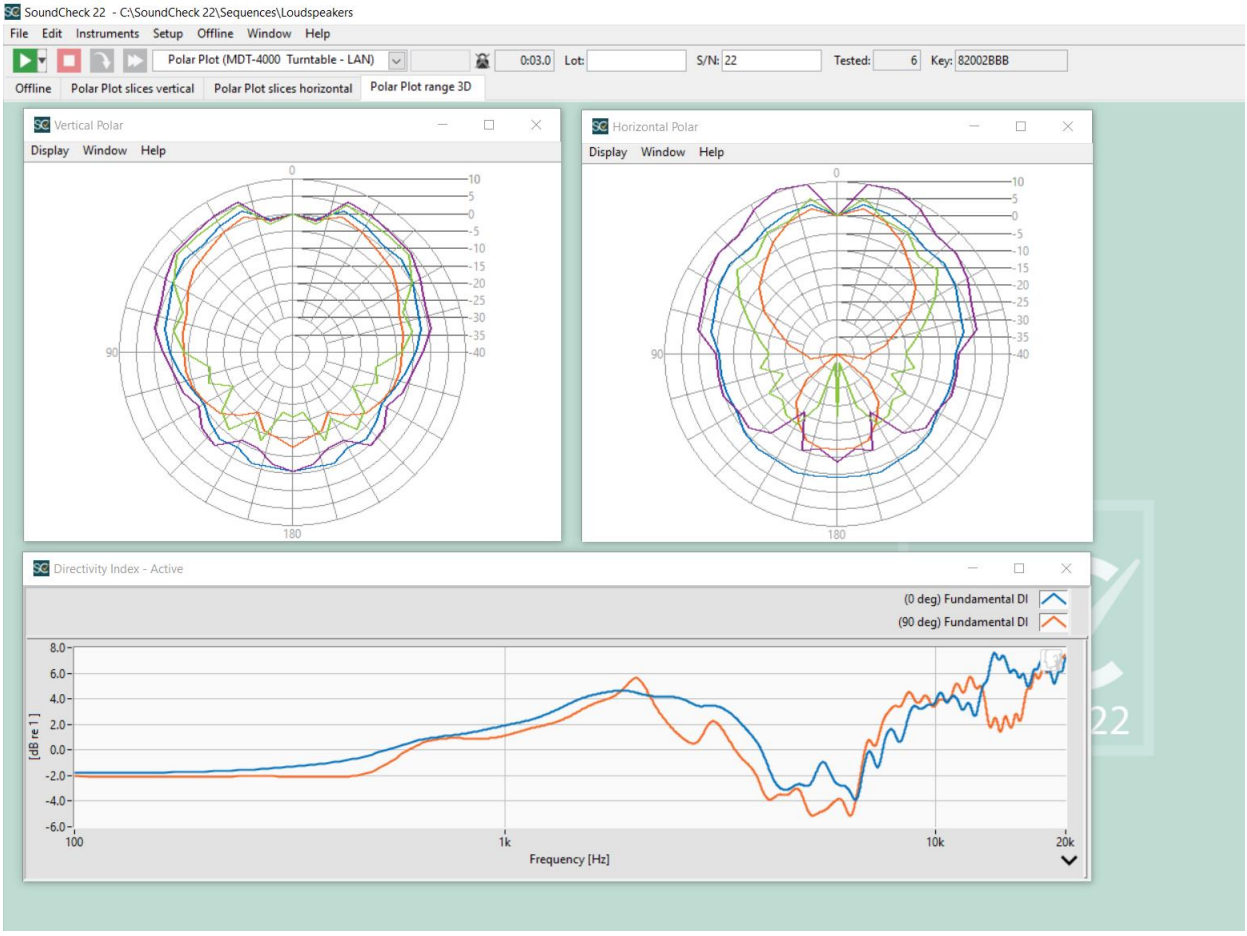
Polar Plot (MDT-4000 Turntable - LAN)

Introduction

This sequence measures the polar response of a loudspeaker in both the vertical and horizontal dimensions. It is designed to work with the Portland Tool & Die MDT-4000 turntable and has all the necessary commands to automatically rotate it via a Local Area Network (LAN) connection. The sequence uses a log sweep stimulus with the Time Selective Response algorithm so that the measurements can be run in a non-anechoic environment. Note that the 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 the *Polar Plot (MDT-4000 Turntable - LAN)* sequence

Hardware Requirements

Audio Interface – Listen AudioConnect 2 or similar
Power Amp – Listen SCAmp or similar
Reference Microphone – Listen SCM-4 or similar
Portland Tool & Die MDT-4000 Turntable

Hardware Setup & Calibration

1. Copy “MDT-4000 Ethernet.vi”, “MDT-4000 Ethernet Editor.vi”, and “MDT-4000 Dependencies.lvlibp” to “SoundCheck\System\Custom VIs”
2. Calibrate the amplifier as instructed in the SoundCheck manual.
3. Calibrate the reference microphone as instructed in the SoundCheck manual.
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 output of the mic supply to input 1 of your audio interface.
8. Connect your PC and the MDT-4000 to the same network.

Connecting the MDT-4000 to SoundCheck

By default, the LAN interface is configured to use DHCP, which will automatically configure the IP settings if the host network also supports DHCP. When the system has been configured by the DHCP server, the local IP address will be displayed on the touchscreen under the MENU->LAN screen. If the IP settings have not yet been configured by the DHCP server, the IP settings will be displayed as all dashes. The LAN can also be configured to use a static IP address by using the LAN setup under the system setup menu on the MDT-4000 touchscreen. For more information on the MDT-4000, please see the user guide available for download from this link.

Once the computer running SoundCheck and the MDT-4000 are on the same network, the SoundCheck sequence will need to be configured to connect to the device.

1. Open the “Polar Plot (MDT-4000 Turntable – LAN)” sequence.
2. There are 3 steps that will need to be linked to the connected turntable, all named “Cus – MDT-4000 Ethernet”. NOTE – These names cannot be changed.
    a. Step 5 – Sets the turntable to 0°
    b. Step 11 – Rotates the turntable in 10° increments in a loop from 0°- 180°
    c. Step 19 – Rotates the turntable back to 0° after the loop
3. Each step will need to be opened and connected to the turntable. There are two options for this:
    a. If the IP address is known from the instructions above, it can be manually entered in the “IP Address” field when “User Entry” is selected.
    b. Setting the Address Selection to “Scan Network”, clicking the Scan Network button will search for any devices and allow them to be selected in the detected units field.

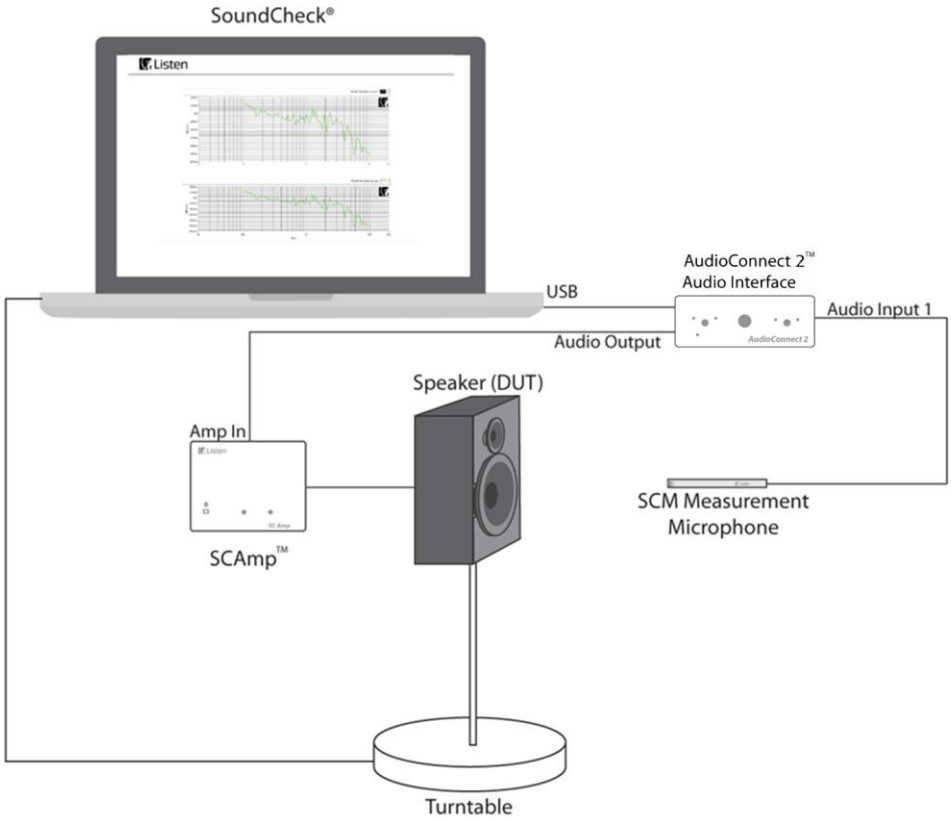
Once all three steps have been properly connected to the MDT-4000, the sequence is ready for use.

Required Optional SoundCheck Modules

2006 – Time Selective Response

2011 – Polar Plot

System Diagram



Further sequence development

Ways in which you could modify or further develop the sequence include:

- This sequence is currently set to test a loudspeaker, but it could easily be modified to test other devices.
- The sequence mirrors 180° and runs at 10° increments. It could be changed to measure a full rotation, or different rotation step sizes.
- If an anechoic chamber is present, the test could be reconfigured to use a stepped sine sweep rather than a log sweep stimulus.
- Other turntables and their associated commands could be swapped for the MDT-4000 commands.
- Example sequences for the MDT-4000 connection via RS-232, Outline ET250-3D, LinearX, and B&K 9640 turntables are available on the Listen Website.