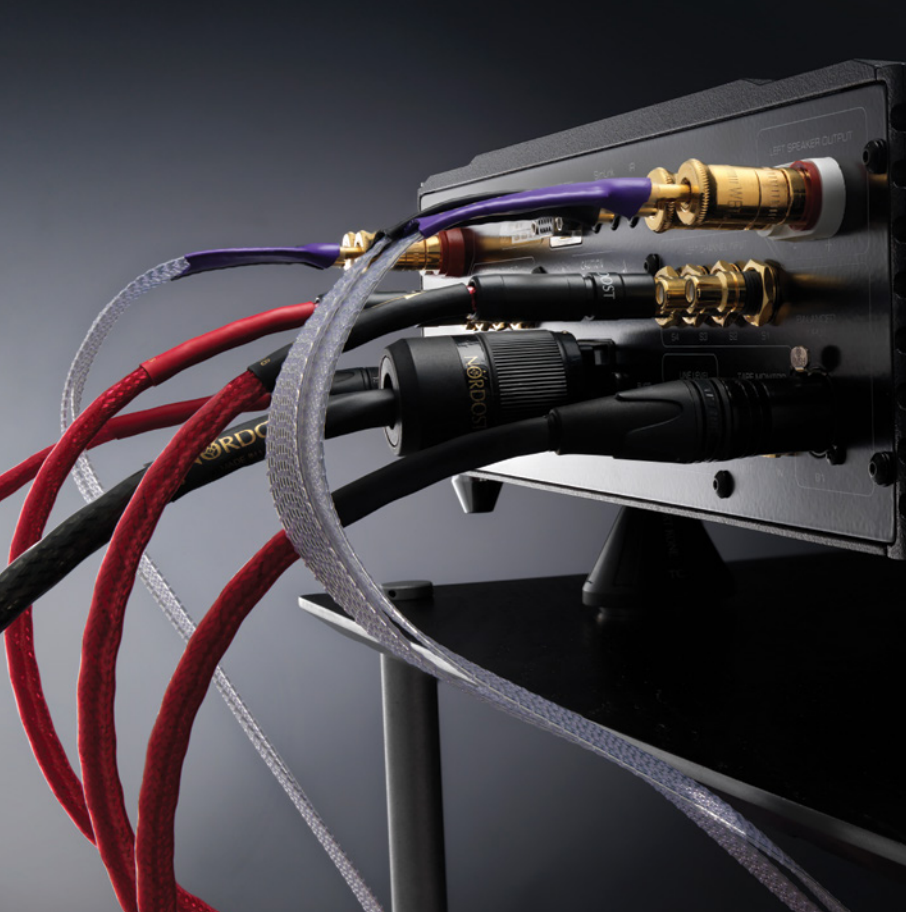




SYSTEM SOLUTION

SET-UP & TUNING DISCS



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Audio performance is a fragile commodity, easily diluted or destroyed – and nothing is more damaging to it than poor speaker placement. The problem is, that nobody tells you how to get it right, and even if your speaker positioning was right once, changes to the electronics, furniture, décor, or simply shifting the speakers and then replacing them, all mean that there's a good chance it's not right any more.

Nordost's System Solution takes the unique mix of diagnostic tracks, calibration, and system conditioning aids, all of which made our original Set-Up & Tuning Disc an indispensable tool for industry insiders and end-users alike, and brings them to the next level. As before, it gathers all of the essentials into a single place— from the simple (channel and phase checks) to the more complex and unusual (the invaluable LEDR tests, timed frequency sweeps, and repeated drum beats). Experience has allowed us to further refine the mix this time around, adding extra usability and sharper resolution to the process. New

upgrades have significantly increased the track-count, with the additional low-frequency tones alone dictating the use of a second disc, separating the pure test-tones from the diagnostic elements.

Expanding to a second disc has also allowed us to include a selection of carefully selected music tracks, each with its own detailed listening notes, chosen to illuminate a specific aspect of system performance. Invaluable as a further aid to set-up and system assessment, they are also there to simply enjoy.

Used in conjunction with the placement strategy described in the Speaker Placement guide (found in downloadable PDF form at www.nordost.com), the tools contained on these discs are capable of transforming system performance. We find the System Solution invaluable when setting up for shows or just working with our own, home systems. We think you will too.

Disc One — Track Listing

1. Introduction

2. Channel Check

Simple left, right, and center channel announcements to check correct system connection, both for left/right channels and top/bottom in bi-amped or part-active systems.

3. Phase Check

In-phase / out-of-phase announcements to check connection polarity: the in-phase announcements should be solidly centered between the speakers, the out-of-phase should be diffuse and spread out. Again, this test is equally revealing on full-range connections and bi-amped or part-active speakers, where it is possible to have reversed polarity on one (or more) connections.

White and Pink Noise

White noise and pink noise are useful for checking and comparing the frequency response and in-room balance of speakers, the way they drive the room, and the impact of acoustic interactions. Pink noise should appear even in level from top to bottom, while white noise

is brighter, with more high-frequency energy. The tracks are arranged to allow assessment of speakers together in-room, individually, or in comparison – the latter particularly useful for comparing speaker balance and placement. The fast and slow alternating tracks are ideal for making fine adjustments in position and then quickly comparing the results.

4. White Noise – Stereo

5. White Noise – Left

6. White Noise – Right

7. White Noise – Alternating Fast

8. White Noise – Alternating Slow

9. Pink Noise – Stereo

10. Pink Noise – Left

11. Pink Noise – Right

12. Pink Noise – Alternating Fast

13. Pink Noise – Alternating Slow

LEDR Tests

The Listening Environment Diagnostic Recordings are a series of computer-generated tones — remarkable tools created by EASI to assess speaker positioning and room interaction. Their predictable motion and symmetrical

paths allow you to hear how adjustments to speaker placement and listening room acoustics affect the reproduction of the stereo soundfield. Their objective, repeatable nature makes them a uniquely powerful device when it comes to optimizing speaker placement (especially toe-in) and assessing the effect of any acoustic treatment.

14. Tone 1 – Up

You should hear the computer generated “chuffing” sound start behind and at the base of the left hand speaker. The noise should slowly climb, vertically to well above and behind the top of the speaker cabinet. It will then repeat behind the right hand speaker. Any irregularity or tendency to bend or deviate from a vertical path suggests either problems with a tweeter or strong reflections. Likewise, the paths should be symmetrical and the movement evenly spaced. A lack of height suggests that there are strong reflections from the ceiling, an often-overlooked source of problems.

15. Tone 2 – Over

This is, in many ways, the most telling and useful of the three LEDR tests. The sound should start low, outside the left hand speaker, moving up and over in

an even arch to finish at the same point outside the right hand speaker. The sound then repeats in reverse. The motion should be smooth and the arc even and symmetrical. Any tendency to hang up outside the speakers, or to jump across the middle of the arc, suggests that either speaker placement is too wide, or toe-in is inadequate. Once you have adjusted the speakers a few times, you'll quickly recognize the effect of spacing as opposed to toe-in, but in essence, a stop/go halt in movement suggests a spacing problem, whereas a reluctance to move, followed by a sudden rush across the center, suggests that toe-in is at fault. Cramping of the arc at either end suggests an overly close proximity to the wall, while unevenness in the arc itself implies asymmetry in the ceiling reflections. The height of the arc should at least match the height of the “Up” tones.

16. Tone 3 – Lateral

This is the only LEDR test that involves four sets of tones as opposed to two. The first set starts in the left speaker and moves across to the right one. The second set starts from outside the right hand speaker and moves across to outside the left hand one. Then it's right to left, and finally outside the left to outside the right.

This series is particularly useful for fine-tuning speaker spacing and toe-in, once you've established a decent, symmetrical path for Tone 2. Keep in mind, it's important to keep track of the various tones: those that start and finish at the speakers, and those that start and finish outside them.

System Degauss

17. System Degauss

A complex synthetic tone that helps to remove the parasitic magnetic fields which build up within audio circuits. This track should be used both before initial set-up and at regular intervals thereafter.

Instrument Sounds

The percussion tracks consist of repeated drum-beats. The different instruments allow the system to energize the room with regular, low-frequency pulses, each with a different pitch and balance. They are extremely revealing of both speaker placement (how the speaker's low-frequency output is balanced against the room's bass nodes) and the room's ability to dissipate low-frequency energy.

The bass guitar track adds a greater sense of shape to notes. The piano track is an indicator of mid-band clarity and attack,

revealing acoustic anomalies and, for loudspeaker builders, crossover problems.

18. Kick Drum
19. Snare Drum
20. High-Hat
21. Timpani
22. Bass Guitar
23. Piano

Music Tracks

24. Yanvallous — Markus Schwartz and Lakou Brooklyn (Frantz Casseus) — Equinox (6:34)

While every track here has been chosen for its musical merits, they've also

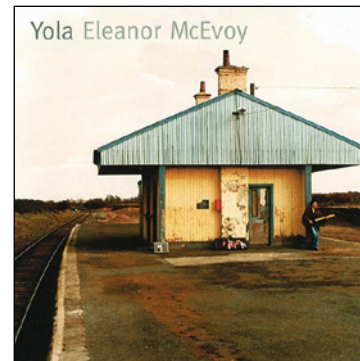


been selected because of the light they shine on specific aspects of system performance – and this is perhaps the most obvious example of that. The opening bass line is perfect as a gauge of bass weight, pace and pitch, allowing you to instantly hear the impact of changes in speaker position, to balance bass weight against texture, attack, and articulation. If you listen to the opening bars of this track as you shift the speaker forwards, backwards, or sideways, you'll quickly gain an appreciation for the significance of even the tiniest adjustments. As the track builds, the ability to hear both the shape and rhythmic complexities of the rapidly fingered bass is a sure measure of critical mid-bass clarity.

From the Soundkeeper Recordings album Equinox (SR1002) by Markus Schwartz & Lakou Brooklyn. Production, recording, and mastering by Barry Diamant. Copyright Soundkeeper Recordings 2010

25. Leaves Me Wondering — Eleanor McEvoy — Yola (4:42)

A beautifully recorded and deceptively simple pop song, with a minimalist arrangement and refreshing lack of studio fills. What makes it so revealing of your system's performance is the relationship between the deep, measured bassline



and the clear, focussed vocal that drives the song. That vocal wants to shift gears into the chorus, the musical density increasing in step with it. The key here is the balance between the expressive, emotional immediacy of the voice and the weight and attack in the bass. If the bass is too heavy, it slows the track and trips it as it reaches that upshift, too light and it robs the voice (in fact, the whole song) of presence and impact. Instead, that bassline should be present and bold, but never dominant, supporting the rhythmic shifts and phrasing of the vocal. Get that immediacy and directness in the voice right, and the bass will be just where

it should be, an object lesson in out of bandwidth influence.

From the album Yola (Mosco EMCD1) Produced by Eleanor McEvoy and Brian Connor
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26. Vivaldi – Cello Concerto RV419, 3rd Movement, Allegro – Davide Amadio (Cello), Interpreti Veneziani – Vivaldi in Venice (1:56)

This small, baroque ensemble is recorded live in the San Vidal Church in Venice. The acoustic is open and very wide, with



considerable space on either side of the band, which is placed on a riser, with a dispersive back wall close behind. The result is a clean acoustic, with plenty of air and height, with a natural depth perspective that places the harpsichord behind the orchestra, with a real sense of distance between it and the solo cello. However, the real magic in this track lies in the immediacy and energy of the playing, the contrast between the bowed cello and the plucked, pizzicato passages, the range of instrumental colors and textures. Small, but perfectly formed, this is a natural recording which captures the energy, texture and vibrant harmonics of these acoustic instruments, as well as the verve and precision of the players. The tonal separation of the instruments should be as apparent as their spacing, while the harpsichord should jangle, not grate.

From the album Vivaldi In Venice (Chasing The Dragon, VALCD008). Recorded and produced by Mike and Françoise Valentine. Copyright Chasing The Dragon 2018

27. Cole Porter – Too Darn Hot – Clare Teal with the Syd Lawrence Orchestra – A Tribute To Ella Fitzgerald (3:48)



Classic big-band action from the Syd Lawrence Orchestra, supporting Clare Teal in an arrangement of the equally classic Cole Porter number, Too Darn Hot. Double banked, they let fly with presence, power, and dynamic range to burn. The band plays it straight, beautifully balanced against a vocal that gives just enough of a nod to Ella, without trying to beat her at her own game. Big-band is always a stern test of system dynamics and headroom, and this track is a perfect example of that.

From the album A Tribute To Ella Fitzgerald (Chasing The Dragon, VALCD003). Recorded and produced by Mike and Françoise Valentine. Copyright Chasing The Dragon 2016

28. Your Colour – Calypso (4:57)

A simply beautiful track captured in a single, unrehearsed take, featuring the fragile vocals and poised playing of the young but outrageously talented Calypso – and yes, that really is her name. The slurred diction (especially on the opening lines), emotive phrasing, and widely spaced piano notes are an acid test of speaker toe-in and rake angle. The voice should be focused and clearly defined in space, even if the words aren't, while the placement of the piano notes should add to the song, not hold it back. Be prepared to work with both speakers until



you get close, at which point tiny angular adjustments of just one speaker will lock the recording in space, giving it an achingly natural sense of pace and flow.

Recorded and produced by Chris Binns/Primary Acoustics – all rights reserved.

29. Kote Moun Yo? — Markus Schwartz and Lakou Brooklyn (Trad. Arr, Markus Schwartz & Monvelyno Alexis) — Equinox (7:10)

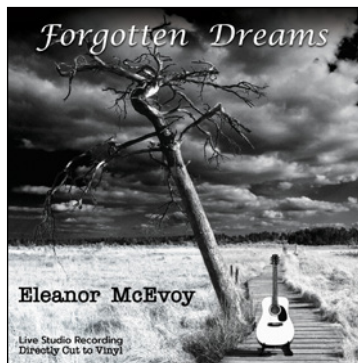
Complex, Haitian-inspired percussion patterns and instruments play against bass, trumpet, and guitar. From the opening conch call to the diverse

percussion, the live-looped drum tracks to the sparse guitar and trumpet lines, this is a test of any system's rhythmic and musical integrity, transparency, and focus. The dense, overlaid drum patterns and upright bass require low-frequency agility and clarity, testing the system's ability to keep pace with the sharply drawn melodies played on the solo instruments. This track should have an infectious, toe-tapping quality. If it doesn't then you know there's something wrong...

From the Soundkeeper Recordings album Equinox (SR1002) by Markus Schwartz & Lakou Brooklyn. Production, recording, and mastering by Barry Diamant. Copyright Soundkeeper Recordings 2010

30. If You Had A Heart — Eleanor McEvoy and Damon Butcher — Forgotten Dreams (3:02)

Eleanor McEvoy's familiar voice once again, but this time exposed in a pared back recording accompanied by guitar and piano. By now you should be past the stage of diagnostics and simply be concerned with how well the system is working. A deeply emotional song and performance, that's the quality you are looking for here. On the best systems, this recording should have an almost reach out and touch realism to it – a quality



that's even more apparent on the direct-cut LP.

Jennifer Kimball / Eleanor McEvoy / Henry Priestman pub. EMI Blackwood, From the album Forgotten Dreams (Chasing The Dragon VALCD006). Recorded and produced by Mike and Françoise Valentine. Copyright Chasing The Dragon 2018

31. Georges Bizet — Habanera (from Carmen) — Rosie Middleton (Mezzo Soprano), Debbie Wiseman (Cond.), National Symphony Orchestra — España (4:25)

Bizet's most popular opera, and arguably one of opera's most popular songs— the Habanera from Carmen will be familiar to

all. What this track brings to the disc is a full-orchestra, captured in the large hall at Air Studios, with its well-developed sense of acoustic space. Add in mezzo-soprano Rosie Middleton, standing in the heart of the orchestra, and you have a verifiable test for sound-staging and height differentiation. You can find a picture of this (and several of the other) sessions at www.nordost.com/downloads/system-solution-recordings.php which will give you a clear sense of the acoustic space and the orchestral layout. Middleton's voice should be clearly placed amidst, but above, the surrounding strings, and in front of the winds.



From the album España (Chasing The Dragon VALCD004). Recorded and produced by Mike and Francoise Valentine. Copyright Chasing The Dragon 2017

32. [Binaural Recording]

Georges Bizet — Habanera (from Carmen) — Rosie Middleton (Mezzo Soprano), Debbie Wiseman (Cond.), National Symphony Orchestra — España (4:23)

The same performance of the Bizet as track 31, but this time captured using a dummy head to create a binaural recording. We've included this track specifically for personal hi-fi enthusiasts.

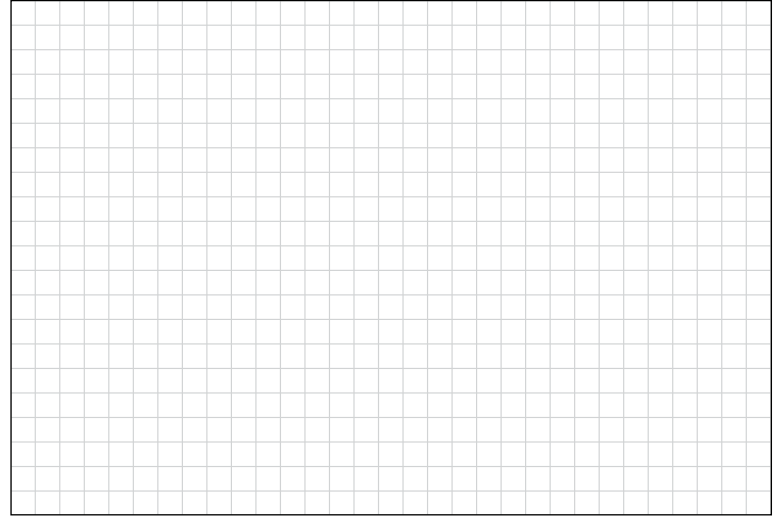


Listen with headphones and the sense of immersion within the acoustic space should be quite uncanny.

From the album España (Chasing The Dragon VALLPBR001). Recorded and produced by Mike and Francoise Valentine. Copyright Chasing The Dragon 2017

Once you have reached a final position for your speakers – a complex, exacting and time consuming exercise – it is well worth making note of their exact location.

Using the grid opposite, draw a diagram of the room, noting the position of the speakers and the distance from their bottom corners to the side and rear walls (if you measure from the bottom, it takes the speaker angle out of the equation and the floor also gives you a reference plane). If you have a digital spirit level it is also worth noting lateral and rake angles, as well as distance to the listening seat and the height of each speaker off of the floor. It may not be possible to duplicate the speakers' location exactly, but if you do have to move them, this information will get you very, very close – and save you a lot of time.



	Left Speaker	Right Speaker
Rake Angle:	_____ +/-	_____ +/-
Lateral Angle:	_____ in / out	_____ in / out
Height (Off Floor):	_____	_____
Distance (Tweeter to Listening Seat):	_____	_____

Disc Two — Track Listing

Test Tones And Sweeps

Reference Level

WARNING:

Always use this track to set system level when employing the test tones on this disc. Failure to do so could result in damage to your system. Please be aware that low frequencies may not be audible, so do not be tempted to turn up the volume until they are!

1. **Reference Level:**
400Hz at -10dB

Standard Frequency Sweeps

These will let you hear how evenly the system and the individual speakers drive the room, as well as identify potential problems, rattles and the like, within the room and the speakers.

2. **Frequency Sweep Stereo:**
20Hz – 12kHz
3. **Frequency Sweep Left:**
20Hz – 12kHz
4. **Frequency Sweep Right:**
20Hz – 12kHz

Low Frequency Sweeps

This slow, low frequency sweep is specially timed to allow you to identify the principle resonant frequencies within a room. The announcement is carefully timed in order to synchronize the signal frequency with the player's clock, the 20Hz tone starting at 20 seconds. Thereafter it advances at 1Hz per second, meaning that when you hit a resonant frequency, the time clock will tell you what that frequency is—00.45 means 45Hz, 00.57 means 57Hz and 01.11 means 71Hz (that's 60+11). The sweep runs from 20Hz to 130Hz. It is intended to be used in conjunction with the discrete tones that follow.

5. **Low Frequency Sweep Timed Stereo**
6. **Low Frequency Sweep Timed Left**
7. **Low Frequency Sweep Timed Right**

Low Frequency Tones

Once you have identified the peak frequency(s) in your room, the corresponding discrete tone can be placed on repeat, allowing you to assess the impact of changes to speaker or subwoofer placement/adjustment, or to assess/adapt bass treatments.

- | | | |
|----------|----------|-----------|
| 8. 18Hz | 35. 45Hz | 62. 94Hz |
| 9. 19Hz | 36. 46Hz | 63. 96Hz |
| 10. 20Hz | 37. 47Hz | 64. 98Hz |
| 11. 21Hz | 38. 48Hz | 65. 100Hz |
| 12. 22Hz | 39. 49Hz | 66. 102Hz |
| 13. 23Hz | 40. 50Hz | 67. 104Hz |
| 14. 24Hz | 41. 52Hz | 68. 106Hz |
| 15. 25Hz | 42. 54Hz | 69. 108Hz |
| 16. 26Hz | 43. 56Hz | 70. 110Hz |
| 17. 27Hz | 44. 58Hz | 71. 112Hz |
| 18. 28Hz | 45. 60Hz | 72. 114Hz |
| 19. 29Hz | 46. 62Hz | 73. 116Hz |
| 20. 30Hz | 47. 64Hz | 74. 118Hz |
| 21. 31Hz | 48. 66Hz | 75. 120Hz |
| 22. 32Hz | 49. 68Hz | |
| 23. 33Hz | 50. 70Hz | |
| 24. 34Hz | 51. 72Hz | |
| 25. 35Hz | 52. 74Hz | |
| 26. 36Hz | 53. 76Hz | |
| 27. 37Hz | 54. 78Hz | |
| 28. 38Hz | 55. 80Hz | |
| 29. 39Hz | 56. 82Hz | |
| 30. 40Hz | 57. 84Hz | |
| 31. 41Hz | 58. 86Hz | |
| 32. 42Hz | 59. 88Hz | |
| 33. 43Hz | 60. 90Hz | |
| 34. 44Hz | 61. 92Hz | |

System Burn-In

Another complex, synthetic track, this time designed to burn-in new speakers and equipment more quickly than music does. Simply set this track on repeat and leave the room. If you want to minimize the leakage of noise (and it is practical to do so) set the speakers face to face and connect them out of phase.

76. **System Burn-In**



See www.nordost.com/downloads.php
for more language options



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