Accurate Sound Reproduction Using DSP Addendum
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Accurate Sound Reproduction Using DSP Addendum

Copyright

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Note to Readers

This addendum is for readers who have purchased the paperback edition and wish to have an electronic copy of the hyperlinks. With over 200 hyperlinks, there is no easy way to include the link addresses in the paperback edition. Some hyperlink addresses are long, and with the number of links, typing them out manually is not practical.

I can be reached through a variety of user groups and forums. The two I most frequent are:

Computer Audiophile
diyAudio

I hope you enjoy the link content.

Kind regards,

Mitch

Acknowledgements

Acourate software
Acourate user group
Acoustic and Psychoacoustic Issues in Room Correction
Archimago

Hardware and Software Requirements

Finite Impulse Response (FIR)
convolution
Acourate
ASIO
1. Introduction to Accurate Sound Reproduction

Finite Impulse Response (FIR)

convolution

Finite Impulse Response

loudspeaker design

room acoustics

psychoacoustics

audio DSP

The Scientist and Engineer's Guide to Digital Signal Processing

a. Accurate Sound Reproduction

linear response

transfer function

Step Response
Step Response

LEDE recording studios

The LEDE- Concept for the Control of Acoustic and Psychoacoustic Parameters in Recording Control Rooms

Haas effect or Precedence effect or law of the first wavefront
time aligned

Mixing down

stereo microphone techniques

mastering

stereo enhancement

Sabine

TEF computer

The Best Room Kits

Listening conditions for the assessment of sound programme material: monophonic and two–channel stereophonic
ears frequency response changes with sound pressure level
ears' overall frequency response is the flattest (i.e. 80 to 90 dB SPL

b. Recommended Target Responses

Listening conditions for the assessment of sound programme material: monophonic and two–channel stereophonic

Relevant loudspeaker tests in studios in Hi-Fi dealers' demo rooms in the home etc. using 1/3 octave, pink-weighted, random noise

Recommendation ITU-R BS.1116-3 (02/2015) Methods for the subjective assessment of small impairments in audio systems

Listening conditions for the assessment of sound programme material: monophonic and two–channel stereophonic

The Subjective and Objective Evaluation of Room Correction Products

Presentation download

The Measurement and Calibration of Sound Reproducing Systems

Bob Katz

Few consumer loudspeakers are time aligned

Blauert & Laws
2. Quick Start Guide - Basic Loudspeaker and Room Correction

Figure 4. Typical layout of stereo listening arrangement

Dolby's 5.1 Channel Production Guidelines

Recommendation ITU-R BS.775-1 Multichannel stereophonic sound system with and without accompanying picture

a. Importing Microphone Calibration File

b. Setting up Microphone at Listening Position

c. LogSweep Measurement

d. Amplitude Preparation

e. Target Curve Design

f. Inversion

g. Filter Generation

h. Test Convolution

i. FilterGen TestConvo Iteration

see this article

j. Filter Installation

Convolution Engine
k. Listening Impressions

AudioCheck.net

Bob Katz’s

Mastering Audio: The Art and the Science

Volume Leveling

Loudness Range: A Measure To Supplement EBU R 128 Loudness Normalization

few loudspeakers on the market that are actually time coherent

Listening Environment Diagnostic Recording (LEDR)

JRiver's WDM driver

Stereo Perception and Sound Localization

commercial test recordings

Audacity

timbre

fairly acute

3. Understanding Acoustic Measurements and Target Responses

a. Acoustics and Psychoacoustics of Room Correction

Acoustic and Psychoacoustic Issues in Room Correction

Power Point presentation

directivity

Directivity in Loudspeaker Systems

the law of the first wavefront or first arrival or the Haas effect

The HAAS Effect! Demonstration (use headphones)
Lexicon unit

David Griesinger

a DSP processor

A 20 Hz frequency has a time period or cycle time of 50 ms

b. Frequency Response

Relevant loudspeaker tests in studios in Hi-Fi dealers' demo rooms in the home etc. using 1/3 octave, pink-weighted, random noise

Recommendation ITU-R BS.1116-3 (02/2015) Methods for the subjective assessment of small impairments in audio systems

Listening conditions for the assessment of sound programme material: monophonic and two–channel stereophonic

The Subjective and Objective Evaluation of Room Correction Products

Presentation download

The Measurement and Calibration of Sound Reproducing Systems

Listening conditions for the assessment of sound programme material: monophonic and two–channel stereophonic

Fun with Digital Audio - Bit Perfect Audibility Testing

c. Step Response

timbre

stereo imaging

heavily weighted towards high frequencies

Figure 12

this PDF document

demonstrated in the video

d. Group Delay

Minimum Phase and Time Delay


Some observations on Group Delay and how to minimize it's effects in a vented design
e. Energy Time Curve (ETC)

precedence effect

Haas effect demo

Acoustics and Psychoacoustics Applied - Part 1: Listening room design

close-up view of the chart

Listening conditions for the assessment of sound programme material: monophonic and two-channel stereophonic

the law of the first wavefront

f. Reverberation Time

Reverberation

Listening conditions for the assessment of sound programme material: monophonic and two-channel stereophonic

JohnM's post here

STC and sound absorption results

Sabine equations

g. Polar Response (Loudspeaker Directivity)

loudspeaker's directivity

Speaker directivity / off-axis response: theory and measurement techniques

Linkwitz Riley Crossovers: A Primer

Loudspeaker Measurements Polar Response/Dispersion

Danley Sound Labs

ciyAudio aficionados

home theater monsters

studio monitors

Bruno Putzeys' kii III

B&O's BeoLab 90

Dr. Earl Geddes

Directivity in Loudspeaker Systems
Summa loudspeaker

Listening conditions for the assessment of sound programme material: monophonic and two-channel stereophonic

How to do PolarMap measurements

h. Interaural Coherence Coefficient (IACC)
Blauert
Braasch
Griesinger

i. Revisiting Quick Start Guide

4. Advanced Digital Loudspeaker and Room Correction

bi-amping
tri-amping

a. Digital Crossover (XO)
Thoughts on Crossovers
Minimum phase
Horbach-Keele
Parts Express
speaker crimp connectors
diyAudio
Dirac
PDF document
Stereophile
diyAudio

b. Loudspeaker Driver Linearization
BMS 4540ND
QSC waveguide
Advanced Acoustic Digital XO Time Alignment Driver Linearization Walkthrough

requires

c. Time Alignment

Acoustic Forum

d. Fine-Tuning Techniques

5. Acoustic Measurement Techniques

a. Measuring Room Noise Floor

Download

Checking Levels

Calibrating the Soundcard

Calibrating the SPL Reading

NC level is a standard

b. Performing Loopback Measurements

JRiver is transparent

Virtual Audio Cable

VB Audio Cable

REW's Signal Generator

JRiver's 64-bit internal volume control

my own measurements and listening tests

convolver text configuration file

example configurations

REW's pink noise generator

RTL Utility

JRiver
c. Beamforming Measurement Technique  
Quasi-Anechoic Measurement of Loudspeakers Using Beamforming Method

d. Filter Design Verification  
Acoustics and Psychoacoustics Issues with Room Correction

REW's On-line Help

6. Conclusion

About the Author

DIY today
sometimes produced
Computer Audiophile
Acourate user group
JRiver Interact
REW forum
diyAudio
hydrogenaudio