access all of it easily. However, this page offers introductory answers to frequently asked questions about our line of loudspeakers and the design philosophies we embrace. Click on a subject heading below to view questions and answers relating to your selection. Links throughout the answers will guide you to further information on our website or from other sources. Should you have any further questions, please ask in a related thread or write a new topic.

Videos
Vertical Nulls - Acoustic Measurement, July 9, 2009
Emiko Carlin interviews Wayne Parham about the Lone Star Audiofest, January 30, 2025
Ken Schwarz interviews Wayne Parham at the Boston Audio Society, March 15, 2025
Jason of the Intellectual People Podcast interviews Wayne Parham, March 30, 2025

General Information
High-Fidelity Uniform-Directivity Loudspeakers
Uniform Directivity - How important is it?
Notes for the DIYer
Pi horn design philosophies
My personal opinions of various design philosophies

Corner pi speakers

Surround voicing and matching the mains

Models, Upgrades and Driver Characteristics
Info to compare Pi models
Options in a nutshell
Upgrades
Electro-mechanical properties and diaphragm motion
Magnet structures
Push-pull verses shorting rings
12pi push/pull benefits
Heat exchanger effectiveness
Speaker Voice Coil Cooling System Valve
Radiant Cooling System (Cooling Plug) Patent

Cabinet Design
Hoffman's Iron Law
Vented Speaker Systems
Response curves of closed vs. vented systems
Speaker damping - Overdamped, Underdamped or Critically Damped
Acoustic filter Q and PiAlign's "Qe"

Pi Alignments compared with B4, C4 and QB3
Helmholtz formula
Helmholtz frequency of each model
Displacement calculations (or measurements)
Cabinet design, port placement and internal standing waves
Golden ratio for loudspeaker cabinets
Trapezoid enclosures
Damping material placement
Altering dimensions

Horn / Waveguide information

Basshorn or Transmission Line
Midrange Horn
Midrange horn shape in Pi cornerhorn
H290C Horn/Waveguide
Horn phase
Pattern control and mouth size
Horn/Waveguide dimensions and beamwidth
Matching directivity in the vertical and the horizontal planes

Crossovers
Speaker motors and passive crossover filters
Crossover Electronics 101 Seminar Handout
Phase angles, crossovers and baffle spacing
Baffle spacing, phase angles and time alignment, revisited
Tweeter circuits for constant directivity horns and waveguides
Woofer size for uniform directivity loudspeakers
Crossover configuration
4Pi crossover study
Baffle Step

Room Effects and Loudspeaker Interactions
Constant directivity verses on-axis EQ for non-uniform directivity (aka baffle step filters)
Loudspeaker sensitivity and boundary loading
Boundary conditions and room interactions
Boundary conditions and floor bounce
Floor Bounce
In-wall Baffle
Imaging, placement and orientation
Speaker placement and wavefront launch
Corners and frequencies
Room modes, multisubs and flanking subs
Helper Woofer Location
Flanking Subs vs Helper Woofers
Benefits of Flanking Subs
Simulations and Measurements

Spice crossover models
Determining mechanical reactance values for Spice models
Clarification of attenuation values
DI-matched two-way loudspeakers
Crossover optimization for DI-matched two-way speakers
Crossover optimization for DI-matched two-way speakers, revisited
The Acoustic Center: How it applies to Loudspeaker Measurements

Miscellaneous
Mounting Screws and T-Nuts
Gaskets
Midhorn Bracing

R11/R13 Fiberglass Insulation and Environmental Health
