Passive Speaker Designer (PSD) - Lite

Driver Input Module

- FRD/ZMA file import
 - Includes format checking to reject header and trailer data and allows any non-numeric delimiter
 - Allows browsing web-based directories and directly imports web files
 - o Interpolates data using an oversampling/filter/decimation algorithm
- Response Editor tool to browse the FRD/ZMA data, edit individual values, and scale the entire data set.
- FFT-based phase extraction algorithm to ensure measurement data is minimum phase
- Additional Delay tool to add/subtract a fixed delay to the measurement data
- Minimum group delay calculation
- Thiele-Small parameter database with over 600 current-model entries

Crossover Module

- Schematic-based user entry for intuitive crossover design
- Mouse wheel cycles through common inductor, resistor and capacitor values
- Use of background processing (threads) ensures a responsive user interface
- Wide choice of schematic modules to implement nearly any crossover topology
- Tabbed-based driver and chart selections to simplify the interface and ensure usability on laptops

Box/Baffle Module

- Allows drawing cabinet front and side views with up to 20 corners for each view
- Calculates internal volume using external dimensions and wall thickness.
- Calculates driver volume and adjusts the internal volume calculation to account for bracing and port volume
- Provides drawing tools to move and resize drivers with the mouse
- Calculates driver offsets according to location on the baffle and front baffle angle, and automatically updates the Crossover Module with the offsets
- Uses a ray-tracing algorithm to model Baffle Step and edge diffraction
- Allows modeling open-back cabinets by using additional ray-tracing from the back of the driver
- Multi-threaded design takes advantage of multi-core CPU's for accelerating the ray-tracing

Woofer Box Module

- Models woofer low-frequency response using the accurate Benson model
- Models sealed, vented and passive radiator designs
 - o Plots SPL, Excursion, Impedance and Consumed Amplifier Power
- Provides a splicing tool to replace the measured response with the more accurate modeled response below a specified frequency
- Provides a "what-if" tab for quickly evaluating various woofer alternatives
- Allows calculating the response of both the woofer and midrange

Amp and EQ Module

- Calculates the effective power from rated power and driver resistance
- Models the system response for a wide range of active filters commonly used for woofers:
 - Low pass and high pass, up to 8th order
 - 5-band Parametric equalization
 - Linkwitz Transform
 - Rumble/boost filters used in subwoofer plate amplifiers
- Provides schematic-based interactive tool for calculating component values for the Linkwitz transform and Rumble/boost filters

Configuration/Customization/Help

- Allows selecting between Single Driver, 2-Way and 3-Way designs
- Configuration used to dynamically configure other menus in the program
- Color customization that is saved with the project data
- Chart customization, including colors, line widths, backgrounds, grid and 3D
- On-line Help files that provide both "how-to" and "how it works" assistance
- Graphics scaling algorithms to resize the windows and chart zoom.
- Printing support for all charts
- Data save routines for most modules to export the data.

Integration Environment

- .NET development tools for best compatibility with Windows
- All attributes and key states defined by a Loudspeaker Object Model
 - o Documented in a Help file accessible from the opening menu
 - Defines the schema for the XML Save/Load file
 - o Supports interoperability with other design tools that use the same object model
- Extensible framework that supports both passive and active loudspeaker design
 - PSD: Superset of PSD-Lite that includes component and amplifier databases
 - ASD: Active Speaker Designer for controlling DSP

- Driver support for USB interface to control real-time hardware
 - \circ $\;$ Allows expansion to address driver and system response measurements
 - Allows real-time control of DSP for interactive response adjustments