



# BassBox™ Pro

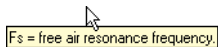
**BassBox Pro** is a powerful speaker enclosure design program. It is used around the world by professional and amateur speaker system designers to design worldclass speaker boxes. BassBox Pro is very versatile and can be used to design speakers for a wide variety of applications including home hi-fi, home theater, car, truck, van, pro sound reinforcement, recording studio monitors, stage monitors, PA, musical instruments, etc.

## Easy to Learn and Use

BassBox Pro has many features that make it very easy to learn and use. For example, when the program is first run, a Welcome window will appear to help you configure the program and introduce you to its online manual.

The online manual is extensive and contains most of the same information as the beautiful 364 page printed manual. Both the online and printed manuals are the best in the industry and include a "Box Designer's Guide", "Sample Designs" and "BassBox Pro Reference".

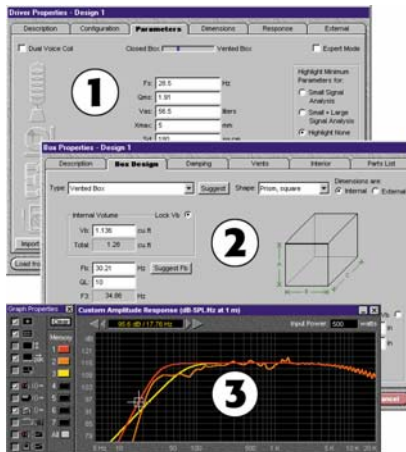
BassBox Pro also includes a "balloon" help feature (shown below). When the mouse hovers over a control or label, a small text box will appear to provide a definition or explanation of the object below.



## Three Step Box Design

There are many ways to begin a design with BassBox Pro, including the use of its innovative Design Wizard. In general, speaker design involves these steps:

- 1 Enter the driver parameters such as  $F_s$ ,  $V_{as}$  and  $Q_{ts}$ . BassBox Pro's driver database contains parameters for thousands of drivers.
- 2 Calculate the box volume and tuning. This is very easy with the program's helpful "Suggest" button.
- 3 Evaluate the performance with the graphs. This can include the effects of the acoustical environment. For example, BassBox Pro can estimate how the speaker will sound to passengers in a car.



Each box design can be saved and re-opened or re-used later. As many as ten different designs can be open at the same time. Box designs can also be duplicated so that driver or box information does not need to be re-entered.

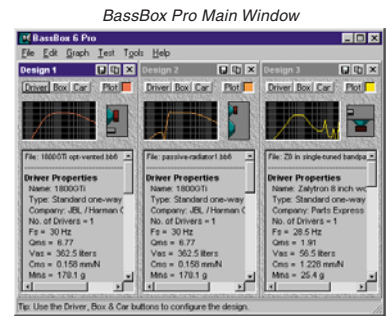
## Design Wizard

BassBox Pro includes a powerful Design Wizard to help new users quickly design a speaker. It can start with either the driver or box and it will walk you through BassBox Pro as it prompts you for information in an orderly progression. In this way it serves as a "smart" assistant to help you use the program.



## Main Window

The centerpiece of BassBox Pro is its resizable main window that includes a summary of all open designs. Up to 10 designs can be open simultaneously. A mini preview graph is provided for each design to show its amplitude response. These preview graphs are automatically updated whenever a design is altered, providing "real time" feedback. A small picture beside each mini graph displays the box type that has been selected (closed, vented, bandpass or passive radiator). A summary of the driver and box parameters is listed in a text box.



## Largest Driver Database

BassBox Pro includes the world's largest database of driver parameters! Users can add, edit or delete drivers and it can be searched by manufacturer, model name, parameters and suitability for a closed or vented box.

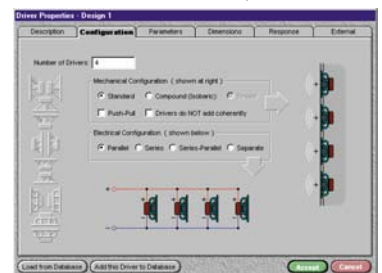


## Driver Properties

Information about a driver is contained in the Driver Properties window. Like many windows in BassBox Pro, it uses tabs to organize the information. Three of its six tabs are displayed at right.

The first example shows the "Configuration" tab where the number of drivers and their mechanical and electrical configurations are set.

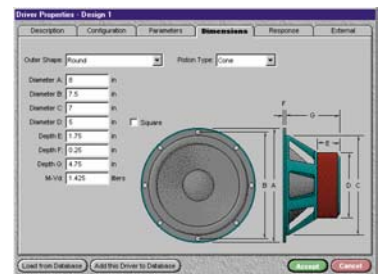
Three Views of the Driver Properties Window



The second example shows the "Parameters" tab containing the driver's Thiele-Small and electromechanical parameters. "Net" parameters are displayed when more than one driver is specified. If the driver has a dual voice coil, separate parameters can be entered for each of the three voice coil wiring methods (separate, parallel and series). An "expert mode" is available to automatically analyze driver parameters for errors.



The third example shows the "Dimensions" tab containing the driver's outer shape, piston type, dimensions and volume settings. A driver illustration with dynamic dimension labels is provided to simplify dimension entry.



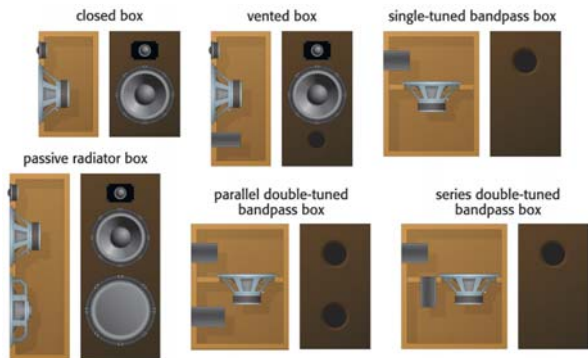
Not shown are the "Description", "Response" and "External" tabs.

# BassBox Pro more features...

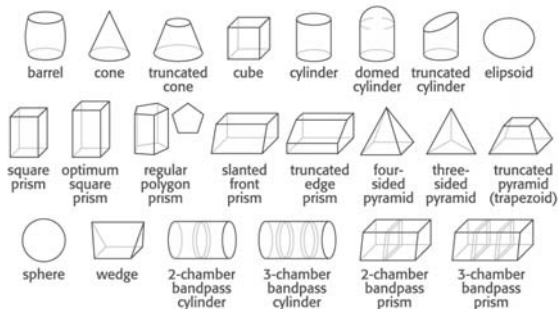
Licensed users of current BassBox Pro & X-over Pro versions can download free<sup>1</sup> updates of the driver database from the **HARRISTECH** internet website at [www.ht-audio.com](http://www.ht-audio.com).  
<sup>1</sup>Users are responsible for all costs of connecting to the internet.

## Design Many Different Box Types & Shapes

BassBox Pro models a wide variety of box types including closed, vented, vented with active HP EQ filter (B6), single-tuned and double-tuned bandpass and passive radiator boxes as shown below:



Twenty-two different box shapes are available as shown below:



## Box Properties

The information about the box is contained in the Box Properties window. Three tabs are displayed at right. They depict a single-tuned bandpass box with three chambers (using 2 drivers).

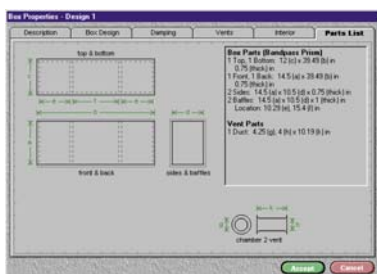
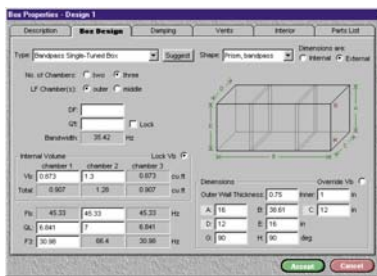
The first example shows the "Box Design" tab where the box type, shape, volume, tuning and dimensions are set. Notice that it includes a scaled drawing of the box. This drawing automatically updates in "real time" whenever the box is changed.

The second example shows the "Vents" tab which contains the vent parameters and dimensions. The vent parameters include the number of vents, their shape and end type. If a passive radiator box is selected, this tab will appear as the "Passive Rad." tab. Multiple, identical passive radiators can be specified and the program will automatically display their "net" parameters.

The third example shows the "Parts List" tab with a scaled drawing of each box part, a list of dimensions and, if appropriate, cut angles.

Not shown are the "Description", "Damping" and "Interior" tabs.

Three Views of the Box Properties Window



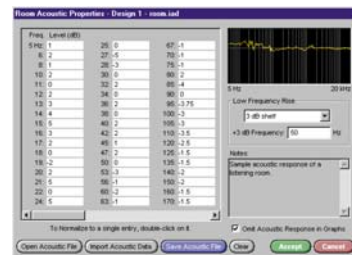
## Acoustic Properties

BassBox Pro accepts two types of acoustic data. It can be entered manually or imported from several measurement systems (B&K, CLIO, IMP, LMS, JBL/SIA Smart, MLSSA, Sample Champion, TEF-20 and TrueRTA). The data is added to some graphs to improve accuracy.

The acoustic response of the listening environment is entered into the Car/Room Acoustic Properties window (shown above). For example, the acoustic response of a vehicle interior can be entered to show how a speaker will sound to passengers in a car.

The normalized acoustic response of the driver is entered into the "Response" tab of the Driver Properties window (not shown). The driver's acoustic response is normalized to its predicted Thiele-Small response.

Car/Room Acoustic Properties Window



## Performance

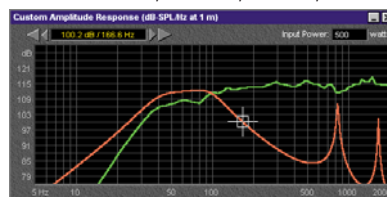
BassBox Pro provides 9 graphs to evaluate the performance of a speaker design. The Normalized Amplitude Response, System Impedance, Phase Response and Group Delay graphs are provided for small-signal analysis. The Custom Amplitude Response, Maximum Acoustic Power, Maximum Electric Input Power, Cone Displacement and Vent Air Velocity graphs are provided for large-signal analysis.

The graphs include numerous options. There are two graph modes: a combination graph window which displays graphs one at a time for computers with low VGA resolutions and separate graph windows for simultaneously displaying multiple graphs for computers with higher XGA resolutions.

The graphs can also display the estimated piston band on-axis amplitude rise of a driver and the estimated diffraction response shelf (for select box shapes) that can arise from the front-panel circumference of the box.

Other options include two vertical and two horizontal scales, 7 graph memories, a cursor and an export (copy) function via the Windows clipboard.

Custom Amplitude Response Graph



## Custom Printouts

Custom printouts can be created which include the box and driver parameters, a three-dimensional box drawing with internal and external dimensions, a parts list with box parts drawings, dimensions and cut angles, an English fraction-to-decimal table, a wiring diagram with an external network parts list and nine graphs. A custom logo or graphic can be included in the title block.



## Test Procedures

Driver and passive radiator test procedures are included in the program to help you measure most Thiele-Small parameter. (Requires test equipment.)

## Passive Network

A passive network (HP, BP or LP filter, impedance EQ network and/or L-pad) can be entered or imported from X-over Pro to display the system response.

## Compatibility

BassBox 6 Pro can open speaker design files from BassBox 6 Lite and older versions of BassBox (versions 5.1, 5.0, 4.0 and 3.0).

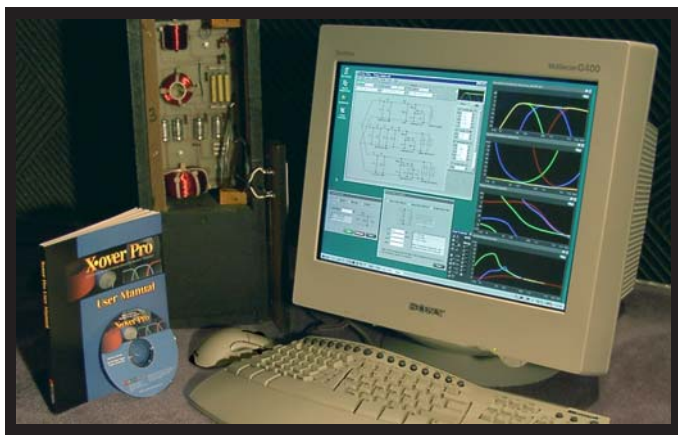
## BassBox Pro includes:

A CD-R with the BassBox Pro program, driver database and online manual. A 364 page printed manual.



## System Requirements

Requires Microsoft® Windows® and has broad compatibility with 32-bit versions of Windows 7, Vista, XP, 2000, NT4, Me and 98. It also runs under many 64-bit versions of Windows. The program requires at least 36 Mbytes of free hard drive space and a CD-R compatible CD, DVD or Blur-ray drive. Also, the Arial and Symbol TrueType fonts must be installed (both fonts are a standard feature of Windows).



# X•over Pro

**X•over Pro** is an innovative passive network design program. It can help you design a 2-way or 3-way passive crossover network, a high-pass, band-pass or low-pass filter, an impedance equalization network, an L-pad and a series or parallel notch filter. With its internal Thiele-Small modeling engine and impedance equalization, X•over Pro provides professional results without requiring you to make complex measurements of each driver.

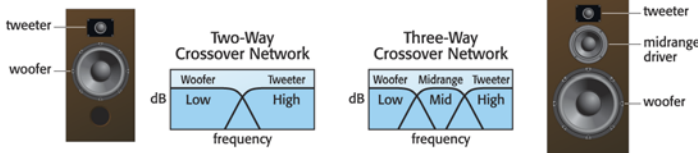
## Easy to Learn and Use

X•over Pro has many features that make it very easy to learn and use. For example, when the program is first run, a Welcome window will appear to help you configure the program and introduce you to its online manual.

The online manual is extensive and contains most of the same information as the beautiful 243 page printed manual. Both the online and printed manuals are the best in the industry and include a "Crossover Network Designer's Guide" and "X•over Pro Reference".

X•over Pro also includes a "balloon" help feature (shown below). When the mouse hovers over a control or label, a small text box will appear to provide a definition or explanation of the object below.

$F_s$  = free air resonance frequency.



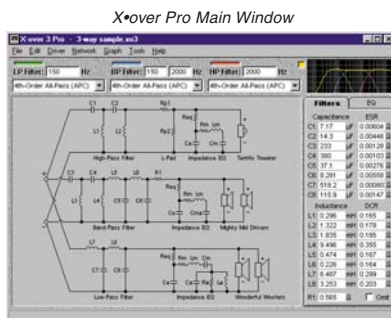
## Many Popular Crossover Networks & Filters

X•over Pro designs passive 2-way and 3-way crossover networks and separate low-pass, band-pass and high-pass filters. Users can choose 1st, 2nd, 3rd and 4th-order "ladder" filter topologies. The crossover networks use the popular "parallel" topology. 2-way crossover networks and separate low-pass and high-pass filters offer Bessel, Butterworth, Chebychev, Gaussian, Legendre, Linkwitz-Riley filter types. 3-way crossover networks and separate band-pass filters offer All-Pass Crossover (APC) and Constant-Power Crossover (CPC) filter types.

## Main Window

The centerpiece of X•over Pro is its resizable main window containing many of the filter settings for the crossover network and a schematic depicting the crossover network/filters, impedance equalization network, L-pads and driver wiring. Four display options are provided for the schematic.

*continued above...*



## Main Window continued...

A mini preview graph is located in the upper right corner of X•over Pro's main window. It displays the amplitude response if the Thiele-Small parameters are available for the drivers and provides "real time" feedback of design changes.

A "Filters" and an "EQ" tab are located below the mini preview graph. They list the values of all capacitors, inductors and resistors in the schematic and enable users to manually change them. Standard values can also be substituted for the calculated values of all components in the design.

## Largest Driver Database

X•over Pro includes the world's largest database of driver parameters! It includes both open back drivers (like woofers) and sealed back drivers (like tweeters). Users can add, edit or delete drivers and it can be searched by manufacturer, model name and driver/box parameters.



## Driver Properties

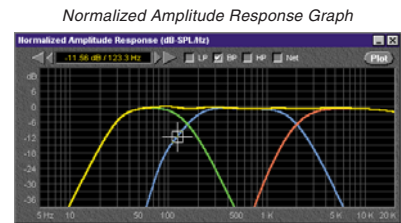
Driver information is entered, imported or loaded into the Driver Properties window shown at right. It uses six tabs to organize the information.



X•over Pro scales its capabilities to fit the quantity of driver information entered. A crossover network, filter or L-pad can be designed with just the nominal impedance value of each driver. With sufficient Thiele-Small parameters, the program can also design impedance equalization networks and it can display the response in its four performance graphs.

## Performance

X•over Pro provides 4 graphs to evaluate the performance of a crossover network design. This includes the Normalized Amplitude Response, System Impedance, Phase Response and Group Delay graphs.



The graphs include numerous options. There are two graph modes: a combination graph window displays graphs one at a time for low VGA resolutions and separate graph windows simultaneously display multiple graphs for higher XGA resolutions.

Other options include two vertical scales, 7 graph memories, a "net" plot line, a cursor and an export (copy) function via the Windows clipboard.

## Helpful Tools

X•over Pro includes several tool windows such as: a Filter Component Resistance Estimator to estimate ESR and DCR, a Parallel-Series Value Calculator, a Color Value Decoder and a Notch Filter Designer.

## Custom Printouts

Custom printouts can be created which include a list of all capacitors, inductors, resistors and their values, a schematic depicting the details of both the component wiring and driver wiring, the driver and box parameters and four graphs. A custom logo or graphic can be imported and printed in the title block.



## Compatibility

X•over 3 Pro can open older X•over files (versions 2.1, 2.0 and 1.0). It can also import driver/box data from BassBox Pro/Lite.

## X•over Pro includes:

A CD-R with the X•over Pro program, driver database and online manual. A 243 page printed manual.



## System Requirements

Requires Microsoft® Windows® and has broad compatibility with 32-bit versions of Windows 7, Vista, XP, 2000, NT4, Me and 98. It also runs under many 64-bit versions of Windows. The program requires at least 31 Mbytes of free hard drive space and a CD-R compatible CD, DVD or Blur-ray drive. Also, the Arial and Symbol TrueType fonts must be installed (both fonts are a standard feature of Windows).

# BassBox™ Lite



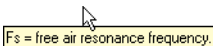
**BassBox Lite** is a streamlined or "Lite" version of BassBox Pro without a driver database. It offers 85% of the most powerful speaker box design features of the Pro version while using a condensed user interface that combines the graphs with the main window. BassBox Lite offers additional cost savings by providing an extensive online manual instead of a printed manual.

## Easy to Learn and Use

BassBox Lite has many features that make it very easy to learn and use. For example, when the program is first run, a Welcome window will appear to help you configure the program and introduce you to its online manual.

The online manual is extensive and well illustrated. It is installed with the program and it can be used by itself or it can be opened from within the program. It includes a "Box Designer's Guide" with sample designs and a comprehensive "BassBox Lite Reference".

BassBox Lite also includes a "balloon" help feature (shown below). When the mouse hovers over a control or label, a small text box will appear to provide a definition or explanation of the object below.



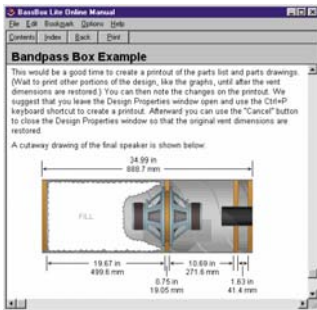
## System Requirements

Requires Microsoft® Windows® and has broad compatibility with 32-bit versions of Windows 7, Vista, XP, 2000, NT4, Me and 98. It also runs under many 64-bit versions of Windows. The program requires at least 23 Mbytes of free hard drive space and a CD-R compatible CD, DVD or Blu-ray drive. Also, the Arial and Symbol TrueType fonts must be installed (both fonts are a standard feature of Windows).

Welcome Window



Online Manual



## Design Properties

Driver and box information are entered in the Design Properties window. The data is organized with eight tabs. The "Box" tab with a scaled box drawing is shown at right.

Data only needs to be entered once. Then it can be saved and re-used later in new designs. Driver data can also be imported into an open design from another BassBox Lite speaker design file without affecting the box data of the open design.

Twelve popular box shapes are available (shown below):

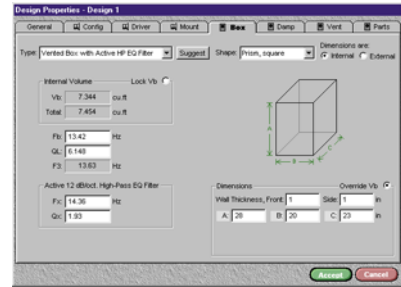


## Main Window

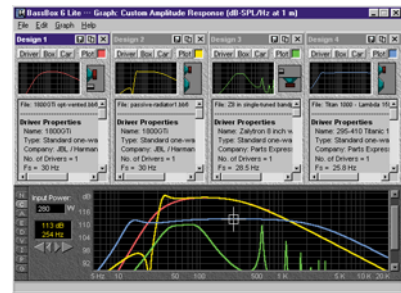
The focus of BassBox Lite is its compact main window with a summary of all open designs and the performance graphs. Up to four designs can be open simultaneously.

A mini preview graph is provided for each design to show its amplitude response. They provide "real time" feedback of design changes. A small picture beside them displays the selected box type (closed, vented, bandpass or passive radiator). A summary of the design parameters is listed below. Nine large graphs are viewed one at a time at the bottom of the main window. These are the same graphs available in BassBox Pro.

Design Properties Window



BassBox Lite Main Window



## Acoustic Properties

The bass boost of several acoustical environments can be estimated.

## Compatibility

BassBox 6 Lite can open most speaker design files from BassBox 6 Pro and older versions of BassBox (versions 5.1, 5.0, 4.0 and 3.0).

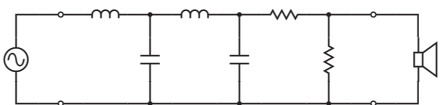
## BassBox Lite includes:

A CD-R with the BassBox Lite program and thorough online manual.



# HT Typeface Collection

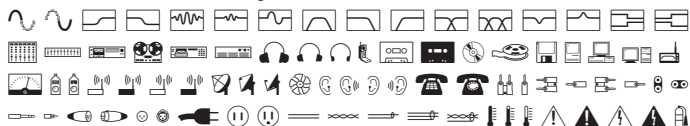
The **HT Typeface Collection** is a collection of four audio font sets. They can help to draw attention to your printed materials by adding high-quality graphics to your reports, proposals and letters. The sample schematic shown below depicts a signal source, a 4th-order low-pass filter (two series inductors and two parallel capacitors), an L-pad (one series and one parallel resistor) and a driver. It was created with the "HT Schematic" font.



Samples of each of the collection's four audio font sets are displayed at right. All four font sets are provided in both the TrueType® and Adobe® Postscript® Type 1 formats for Windows 7, Vista, XP, 2000, NT4, NT3, Me, 98, 95 and 3.1. They are provided on CD-R and include a printed "Key Map" showing how the keyboard is used with each font set.

The HT Typeface Collection License Agreement allows the font sets to be installed on up to five computers if they are owned or leased by the licensee.

## "HT Audio Stuff" font samples:



## "HT Speakers" font samples:



## "HT Microphones" font samples:



## "HT Schematic" font samples:

