

Bass 5-Pc

(Version 5.0.0)

Quick Start Manual

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1 - Hardware/Software Requirements

Minimum Hardware

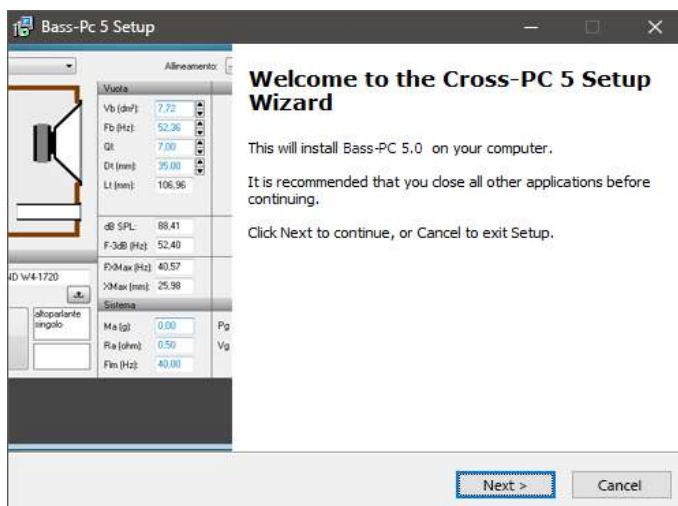
- A PC with a 1GHz Intel or AMD processor
- 1024X768 or higher resolution screen.
Recommended 1280x1024 or higher
- Internet Broadband connection (required)

Software

- Windows Vista 32-bit
- Windows 7 32- and 64-bit
- Windows 8 (not RT)
- Windows 10 32- or 64-bit edition

2 - Installation

Once downloaded and launched the program *Bass-pc_5.0.0_install.exe*, Simply click on the button *Next>* on each screen.



The installation path must not be changed for any reason.

The installation software creates in the Windows program group a folder named **GR\Bass-PC 5** containing different programs, and creates, on request, a desktop shortcut and Quick Launch bar shortcut.

Also it creates an archive of the projects, which will be located in the folder **\Documents\GR\Boxes**, and a speakers archive folder **\Documents\GR\Speakers**.

During this phase, two software are installed in sequence: **Bass-Pc** and **Speakerss-Pc**. Is necessary to click the button switch *Next>* on each windows to have a correct installation screen.

An incomplete installation affects the operation of the software.

At the end of the installation, if you keep the option selected *Start Bass-PC*, The program will start automatically.

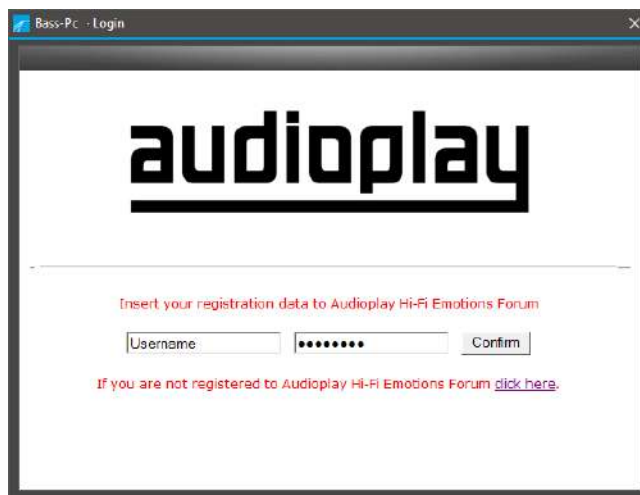


3 - First Start

When you start the program, it immediately shows the welcome screen.



Then it is required to log in the AudioPlay forum.

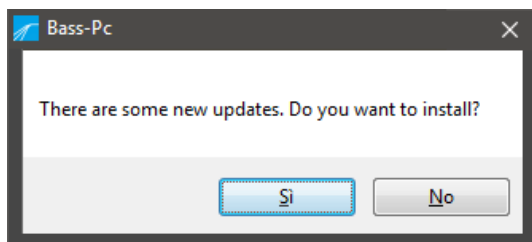


Enter the *username* and the *password* you used to access the forum. If you have not yet registered, you can do so by clicking on the appropriate link in the window.

Access to the forum is required only the first time that you download the software, or when you install it on another computer.

Updates

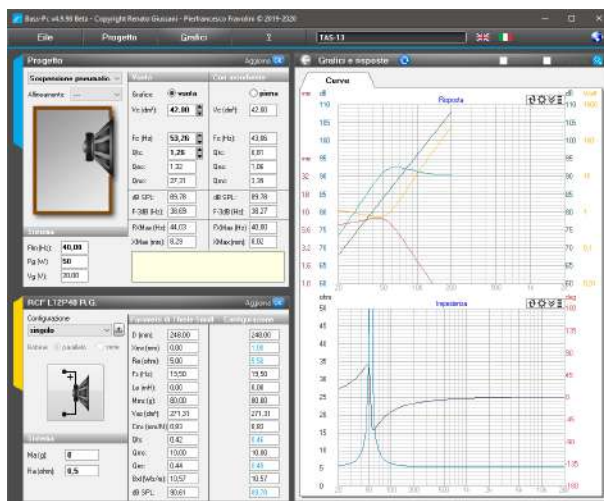
If there are any updates, a window will be displayed asking if you want to update the software.



If you answer Yes, updates will be downloaded and installed automatically.

After downloading and installing updates, the program's main window will be displayed, and the **TAS-13.PGT** project will be loaded.

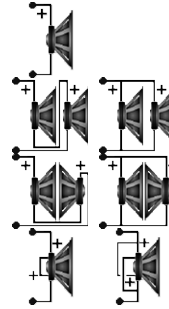
The program window is divided in two main areas: the *graphics* window on the right displays the frequency response, impedance and other characteristic curves of the project; on the left the *Project* window allows you to input the data. The bottom left window contains the Loudspeaker and configuration data.



4 – Speaker/Window - Configuration

This window is focused on the loudspeaker data. To change a speaker you must open the *Speakerss* software (See Chapter 5 - Loudspeaker). However, this window allows you to choose the speaker configuration. The possible configurations are:

- *Single Speaker*
- *Two coupled speakers*
- *Two Push-Pull speakers*
- *Dual Coil Speaker*



For the last three configurations it is possible to choose the *series* or *parallel* connection for the coils.

The first column of the window shows the parameters of the unmodified speaker, in the second there are the parameters modified according to the configuration adopted, also including the effect on the parameters of the resistance and the mass added.

RCF L12P48 R.G. Update OK

Configuration: **single**

Coils: ☒ parallel ☐ series

System

Ma (g): **0.00**

Ra (ohm): **0.50**

Thiele-Small Parameters	Configuration
D (mm):	248,00
Xmx (mm):	0,00
Re (ohm):	5,00
Fs (Hz):	19,50
Le (mH):	0,00
Mms (g):	80,00
Vas (dm³):	271,31
Cms (mm/N):	0,83
Qts:	0,42
Qms:	10,00
Qes:	0,44
Bxl (Wb/m):	10,57
dB SPL:	90,61

In this window you can also enter the values of added resistance R_A and added mass M_A . The first allows to take

into account the resistance of the connection cables to the amplifier and the internal resistance of the coils, placed in series with the signal, located in the crossover filter.


This resistance actually leads to an increase in the Q_{ES} of the loudspeaker and thus of the Q_{TS} , as well as causing a reduction in the emitted sound level.

The M_A field, added mass, allows you to enter the value of a possible mass fixed on the speaker cone to weigh down its mass. This allows the frequency resonance F_S of the loudspeaker to be lowered, accepting a decrease in efficiency and therefore of the level emitted with the same electrical power applied to the loudspeaker.



The software allows negative values to be entered for M_A and R_A . This, if on the one hand it does not have a practical use in the traditional design, on the other it allows to evaluate the influence of these two parameters have on T&S parameters of the transducer, and it is very useful for educational purposes. Moreover it allows to see the effect of a negative added resistance when it is possible to use an ACE Bass type of feedback circuit.

Ma (g):	<input type="text" value="0.00"/>
Ra (ohm):	<input type="text" value="-1.50"/>

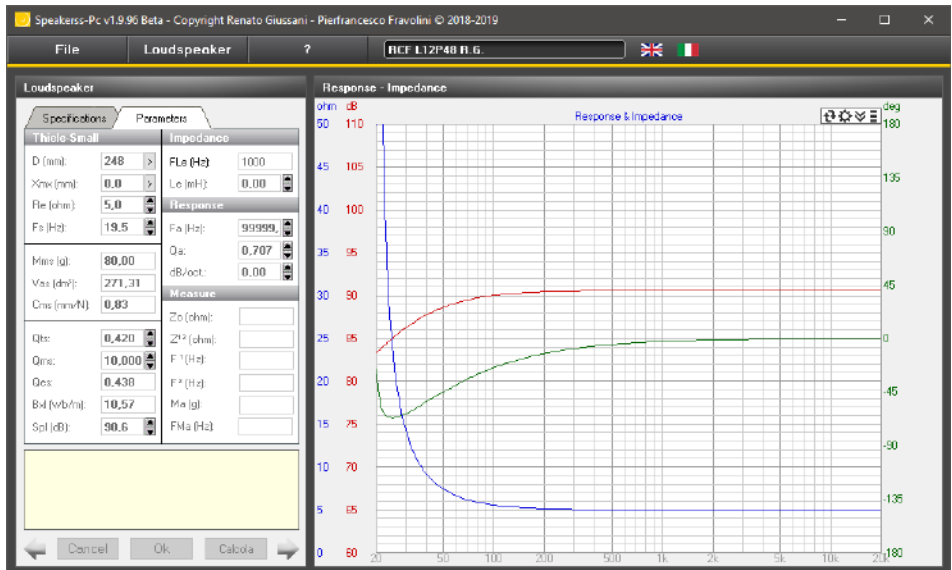
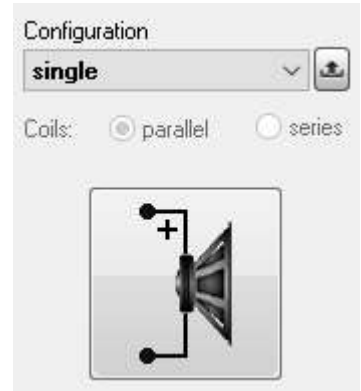
If you want use a configuration with two speakers, or coupled in push-pull, values of added mass M_A and added resistance R_A must be considered for speaker. So if you add to each of the speakers a mass addition of a certain value, the total mass M_{MS} of the equivalent speaker will be equal to twice the sum M_{MS} of the single speaker and twice the R_A .

By clicking the  button, the software *Speakerss* is loaded. It lets you view, insert and modify all the speaker parameters (see chapter 5 - speaker).


5 - Speaker

The input of speaker parameters is managed by a separate program: **Speakerss**, which can be called by clicking on the icon  that is installed on your computer desktop or clicking on the button  present in the project window.

In the speaker window it is possible to input all the parameters necessary for the correct use of the transducer, and for the simulation of the response curve and impedance of the driver itself.



In particular, the parameters ***Re***, ***Qms***, ***Qts*** and ***Le*** need to model the impedance curve, while ***Fs***, ***Qts***, ***Spl***, ***Fa***, ***Qa*** and ***dB/oct*** allow to draw the response curve.

The sign  located near the text box indicates that it is possible to change quickly and in an interactive manner

the value entered through the keys *Up* and *Down* on the keyboard, or clicking the mouse buttons ▲ is ▼. It is also possible increase or decrease the values of the selected box using the mouse wheel.

Assisted Parameters Entry

The input of the speaker parameters is guided. This allows you to provide the program parameters always matching with each other, and to calculate those parameters which may not be provided in the manufacturer's datasheet. You must first enter the speaker model (Required), then type (you can choose from *woofer*, *midrange* and *tweeter*), the configuration (if *single speaker* or *double coil*), the serial number, the nominal impedance ***Zn*** and the nominal diameter ***Dn***. Then the nominal power applicable to the speaker, in Watt. The dimensional parameters of the transducer are requested below: the diameter of the mounting hole ***Df***, the total depth ***Pt***, the offset, the height ***Am*** and the diameter of the magnet ***Dm***, the diameter and the thickness of the flange ***Dfl*** is ***Sfl***.

Clicking the down arrow to the left ➡ It leads to the entry page of the parameters of *Thiele-Small*.

It is required for the first equivalent diameter in millimeters ***D*** is the

maximum peak excursion ***Xmx***; in the


absence of the value reported by the manufacturer, the excursion can be calculated with the formula:

D (mm):	248	>
Xmx (mm):	5,0	>
Re (ohm):	5,0	▲▼
Fs (Hz):	19,5	▲▼

$$X_{MX} = \frac{h_b}{h_t}$$

in which ***h_b*** is the height of the coil and ***h_t*** is the height of the air gap. The use of this data as a limit to the linear excursion of the loudspeaker allows the calculation of

curves of *MIL* and *MOL limit* theoretical in good agreement with experience. This value is used by the software to calculate, accurately, the excursion limits as a function of frequency such as to correspond to a constant level and sufficiently low level of total intermodulation.

The resistance of the moving coil and the resonance frequency of the loudspeaker in the air are then required. The four parameters described above **are needed** for proper speaker simulation. If you do not have parameters ***D*** or ***X_{MX}***, these can be calculated by clicking on the button  placed on their right. In the small window that appears it will be possible to insert the piston surface ***Sd*** (In cm²) or the value ***h_b*** and ***h_t***.

Of the three following parameters, namely ***M_{MS}*** (moving mass) ***V_{AS}*** (acoustic volume equivalent to the compliance of the suspension) and ***C_{MS}*** (mechanical compliance of the suspension) only one is necessary, possibly the most reliable. In this case you need to input **one and only one** of three values.

Only for tweeters and midranges, when all the required parameters were not available, you can enter only a small number of values, necessary to the correct simulation of response and impedance curves, as it happens in Cross-Pc. In this case it will not be possible to load the speaker in Bass-Pc software.

Of the five following parameters, only two must be inserted. The first is the ***Q_{TS}***, *total quality factor*. If it is not known you can move on to the next two (***Q_{MS}*** and ***Q_{ES}***).

The last two parameters are the strength factor ***Bxl*** and the level of speaker output, ***dB_{SPL}***, detected at 1m, driving the transducer with 2.83 volts of pink noise.

Attention must be paid to the fact that some manufacturers claim that the emission level was measured by supplying the transducer with an output of 1W. In case of speakers with a nominal impedance of 4 ohms, this means that the amplifier delivers 2 V RMS , not 2.83 V. In this situation, the reported value will be wrong and should be corrected by increasing the reported value of 3 dB.

The data required now by the program is the inductance of the moving coil L_E . For woofers, the calculated value at 1 kHz must be entered, while for midrange and tweeters, the value at 10 kHz.

The value can be changed by pressing the buttons ▲ and ▼ or by using the + and - keys or with the mouse wheel, and immediately see the effect of the variation on the graph on the right.

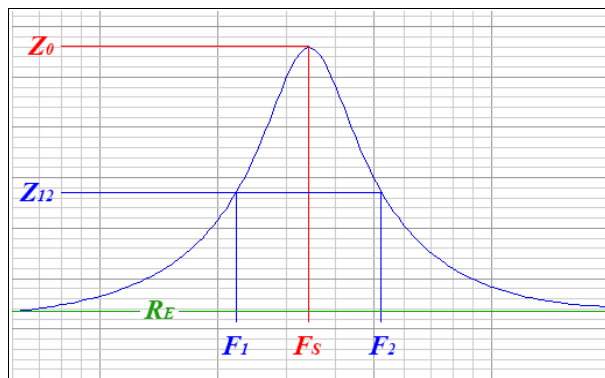
By entering the parameters F_a , Q_a , and dB/oct it is possible to model the response curve of the loudspeaker in high frequency. Also in this case it is possible to change the value by clicking on the buttons ▲ is ▼ or by using the + and - keys or the mouse wheel. The overall response curve, calculated both from the low frequency and high frequency parameters, is immediately and displayed on the graph, making its modeling extremely simple using the cursor keys or the mouse wheel..

Measurement of parameters

The software facilitates the manual detection of Speaker parameters. You can access the measurement procedure using the menu *Speaker > Measurement*.

After entering the model and the speaker type, the dimensional parameters, and four required parameters D , X_{MAX} , R_E and F_S , You must enter the impedance at

resonance Z_0 . At this point the value is calculated Z^{12} impedance at frequencies F_1 and F_2 . Now you must enter these two frequencies.



Therefore, a nonmagnetic weight should be placed on the cone of the loudspeaker so as to move the membrane by at least 1mm and measure the new resonance frequency F_{MA} .

Once entered the measured values, the software calculates the remaining parameters and draws the response and impedance curves.

You can now input L_E value. You It can also calculate this value by measuring the impedance value measured at 1kHz for the woofers and 10 kHz for the midrange and tweeter. The value of L_E will be given by the formula

$$L_E = \frac{(Z^2 - R_E^2)^{\frac{1}{2}}}{2 \cdot 3.14 \cdot f}$$

Where Z is the measured impedance and f is the frequency at which the detection is made.

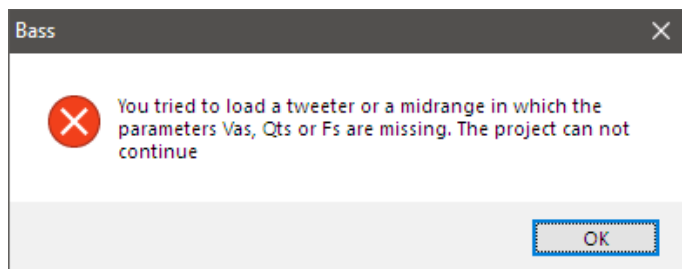
Alternatively, the value of the inductance can be changed with the cursor keys or the mouse wheel so that at the frequency of 1 kHz (or 10 kHz for midrange and tweeter) the impedance curve passes through the

measured Z value.

Differently from the previous DOS version, Bass-PC 5 allows the use of tweeters and midrange, even if all the parameters are not present.


In fact, dome tweeters and midrange speakers that already have a built-in load volume do not have all the parameters but only the response and impedance curves and a few others. In this case the software gives the possibility to insert the parameters that one has, and allows a correct simulation both of the response curve and of impedance, in a similar way to the Cross-Pc 5 software.

A speaker with incomplete parameters can be saved and displayed with Speakersss but, if the parameters are not sufficient to design a correct alignment in a closed box, reflex or symmetrical load, it will not be possible to load it in Bass-Pc.



6 - Project

In this window you can choose the load type between *Acoustic Suspension*, *Bass Reflex* and *BandPass 4th Order*, check the alignment and manually edit all project parameters.

Project		Update OK
Acoustic Suspension ▼ Alignment: B2 ▼ 		
System		
Flm (Hz): 40,00 Pg (W): 100 Vg (V): 28,28		
Empty	Filled	
Graph: <input checked="" type="radio"/> empty	<input type="radio"/> full	
Vc (dm³): 199,27	Vc (dm³): 199,27	
Fc (Hz): 29,97	Fc (Hz): 26,28	
Qtc: 0,71	Qtc: 0,54	
Qec: 0,74	Qec: 0,65	
Qmc: 15,37	Qmc: 3,08	
dB SPL: 89,78	dB SPL: 89,78	
F-3dB (Hz): 29,97	F-3dB (Hz): 36,94	
FXMax (Hz): 40,00	FXMax (Hz): 40,00	
XMax (mm): 13,23	XMax (mm): 11,24	

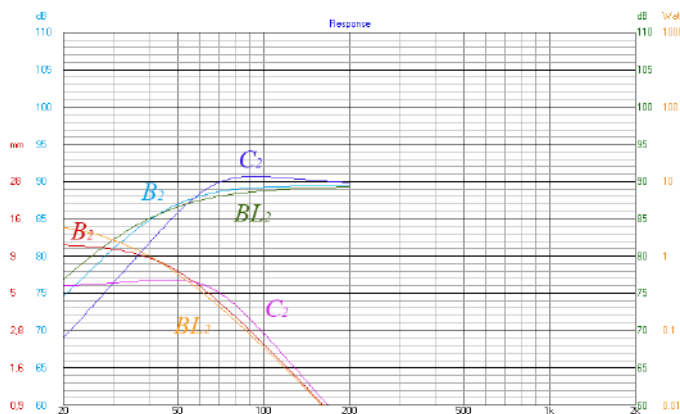
Acoustic Suspension

The design of acoustic suspension loudspeakers systems remained virtually unchanged compared to the previous version of the program (Bass-Pc 3.0 for DOS). You can perform the calculation from a desired total Q factor Q_{TC} , or from a volume V_C or by the resonance frequency F_C , or choose from three default second order alignments **B_{L2}**, **B₂** is **C₂** respectively *Bessel*, *Butterworth* or *Chebischev*, characterized by the total Q factor Q_{TC} equal to 0.577, 0.707 and 1.

The response to the transients of the system and the presence or absence of excessive swelling or attenuation in the response depend on the obtained Q_{TC} value. Factors under about 0.707 have a very damped trend, with excellent transient response but with high attenuation of the lower frequencies, while for larger Q_{TC} the response is enhanced and there is a worse damping of the cone oscillations. The value 0.707 is a good compromise between the two conditions, and therefore it is advisable from it to design the system. This choice leads to having a **B_2** alignment (second order Butterworth), or "maximally flat".

The graph displays a comparison between the various alignments of the acoustic suspension.

The software also displays the curve excursion of the voice coil at different frequencies.



The input boxes of the parameters are differentiated depending on the function: in those where the text is in **bold** it is possible to input the values, the others allow instead only the copy of the value to the clipboard, as their value is calculated by the software.

Moreover the box bordered in **light blue** indicates that that value will be kept fixed during the recalculation of the project in the case of varying for example the configuration of the loudspeaker or the added resistance

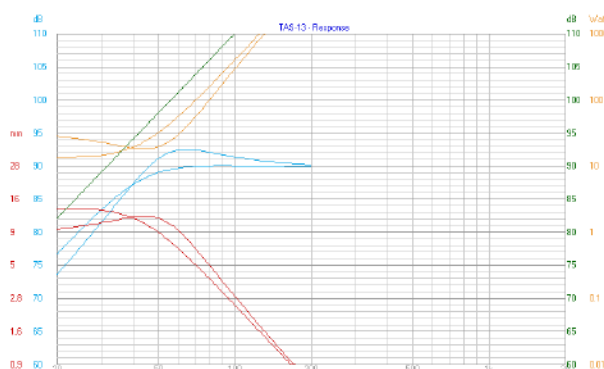
R_A or the added mass M_A .

Once the project has been calculate, the software shows the parameters assumed by the system both with the empty case, on the left column, and full of absorbent, on the right column. The -3 dB frequency is also calculated as well the maximum excursion values and corresponding frequency in the two situations.

By the two selectors **empty** is **full** it is possible to select which of the two configurations will be plotted on the graph.

Empty	Filled
Graph: <input type="radio"/> empty	<input checked="" type="radio"/> full
Vc (dm³): 199,27	Vc (dm³): 199,27

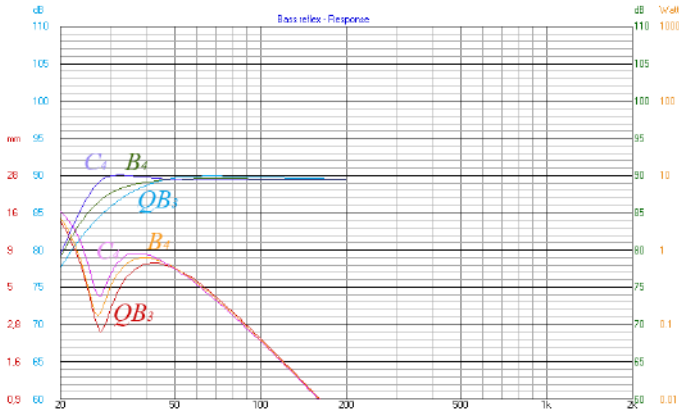
The following figure shows curves plotted for an empty and a full absorbent checkout.



Bass reflex

As for the acoustic suspension it is given the opportunity to calculate some standard alignments. With reference to the Thiele alignment table, published below, are calculated the **QB₃** n° 1, the **QB₃** n° 4, the **B₄** n° 5, **C₄** n° 9 alignments, and another that requires an electronic filter to be placed before the amplifier, the **B₆** n°. 15. It is possible to calculate another alignment, **BL₄** (*fourth-order Bessel*) which it is characterized by a highly damped response at low frequencies, which is useful when the speaker is placed close to the walls.

In the figure a comparison between the various reflex alignments using the same loudspeaker.



Moving from **QB₃** n° 1 to the **C₄** the extension towards the low frequencies and the volume of the cabinet increase. The **BL₄** presents a very damped response and the best phase response of all the alignments considered.

The software also calculates the length of a vent of circular cross-section. The diameter of this vent can be chosen freely as long as it is not too much small, which would cause excessive speed air inside it and probable turbulence at the exit, which could cause unwanted noise.

The length of the duct of agreement is calculated with the formula

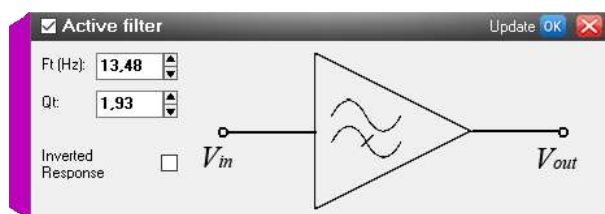
$$L_V = \frac{2362 \cdot D_T^2}{V_B \cdot F_B^2} - 1.7 \frac{D_T}{2}$$

The software gives however the possibility to input, for the vent diameter, a value lower than the minimum for not create turbulence at the mouth. In this case this value is displayed in white with a red background. To calculate

the minimum value, simply delete the D_i field or enter a null value.

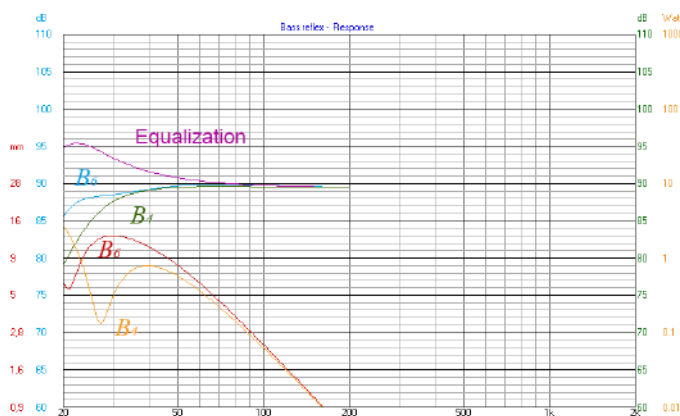
Active Filter

For the design the **B₆** n° 15 alignment of the Thiele table, it is necessary to connect an electronic second



order high-pass filter to the input of the amplifier. This filter is characterized by a cut-off frequency F_T centered on the tuning frequency of the reflex, the Q filter Q_T is set next to 2.

The software is able to calculate and display both the response of the system speaker+filter then the response of the electronic filter. The graph displays a comparison between the alignment **B₆** and **B₄** from which it derives.



The equalization curve is displayed in **violet**.

The **B₆** alignment allows you to extend the response of about one-half octave towards the low frequencies with respect to the alignment **B₄** from which it derives.

On the next page shows the complete table of reflex

alignments (for Q_L equals to infinity) published for the first time by Neville Thiele and rewritten by DB Keele Jr.

Bass reflex alignment table

Rewritten Alignment Data													
Alignment Detail				BoxDesign				Auxiliary Circuits				Impedance Peak Frequencies	
N°	Type	K	Ripple (dB)	f3/fs	fb/fs	Vb/Vas	Qts	faux/fs	Xaux	Peak Lift (dB)	fpk/fs	fl/fs	fh/fs
Quasi Third Order	1	QB3		2,680	2,000	0,0954	0,180					0,5127	3,901
	2	QB3		2,280	1,730	0,1337	0,209					0,5161	3,346
	3	QB3		1,770	1,420	0,2242	0,259					0,5282	2,681
	4	QB3		1,450	1,230	0,3390	0,303					0,5406	2,273
Fourth Order	5	B4	1,000		1,000	0,7072	0,383					0,5688	1,758
	6	C4	0,800		0,867	0,927	0,9479					0,5771	1,607
	7	C4	0,600	0,13	0,725	0,829	1,3720					0,5741	1,445
	8	C4	0,25	0,25	0,641	0,757	1,7900					0,5615	1,348
	9	C4	0,55	0,600	0,716	2,0620	0,557					0,5499	1,302
Fifth Order	9.5	C4	1,52	0,520	0,638	2,6000	0,625					0,5166	1,235
	10	B5	1,000		1,000	1,0000	0,447					0,6180	1,618
	11	C5	0,700		0,852	0,912	1,7150		1,000			0,6451	1,414
	12	C5	0,400	0,25	0,724	0,814	3,6630		1,218			0,6666	1,221
	13	C5	0,355	0,50	0,704	0,798	4,4050		1,810			0,6713	1,189
Sixth Order Class I	14	C5	0,278	1,00	0,685	0,781	5,2360		2,060			0,6725	1,161
	15	B6	1,000		1,000	1,000	0,3660		2,470	+6,0	1,070	0,4710	2,123
	16	C6	0,800		0,850	0,979	0,4290		1,000	+7,7	0,901	0,4864	2,013
	17	C6	0,600		0,698	0,931	0,5520		0,858	+10,1	0,733	0,5032	1,850
	18	C6	0,500		0,620	0,888	0,6620		0,712	+11,6	0,651	0,5094	1,743
	19	C6	0,414	1,00	0,554	0,841	0,8000		0,639	+13,2	0,576	0,5123	1,642

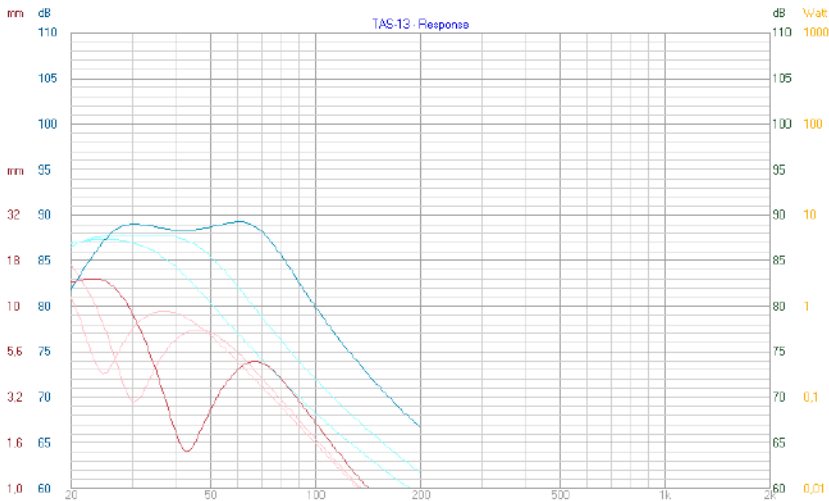
(DB Keele Jr)

BandPass 4th Order

This configuration is used in the design of subwoofers. The frequency response is comparable to a high pass and a low pass both with two poles (with a slope of 12 dB/octave).

In analogy with the sealed enclosure, the system response will vary depending on the quality factor q obtained and the parameter α , that influences the sensitivity of the system.

Three alignments are available, in analogy with the acoustic suspension, respectively $q = 0.577$, $q = 0.707$ and $q = 1$, with a value calculated of $\alpha = 1$. The software allows you to vary within rather wide limits, all possible parameters, so you can also calculate other "non-standard" alignments.

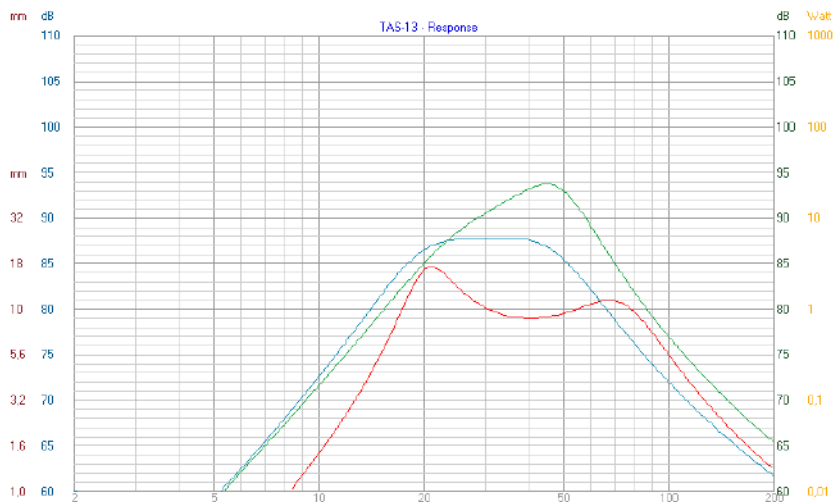


In this graph are plotted the characteristic bell shaped curves of a BandPass 4TH Order. If you adopt the alignment $q = 0.577$ the bell will be centered on the lower frequencies, and its performance will be very damped. In

contrast, $q = 1$, the bell will be placed at higher frequencies and the response will have bumps towards its extremes. With $q = 0.707$ the response will be very smooth and free of bumps.

It is also possible to design "detuned" systems, in which the resonant frequency of the closed box F_C is different from the tuning frequency of the reflex enclosure F_B . In this case, the response will be asymmetric.

The following figure shows the curves of two *detuned* systems compared with a symmetrical design.

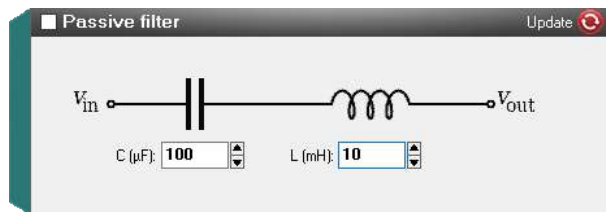


In **red** the curve with $F_B > F_C$ in **green** with $F_C > F_B$, compared with a symmetrical design (in **light blue**).

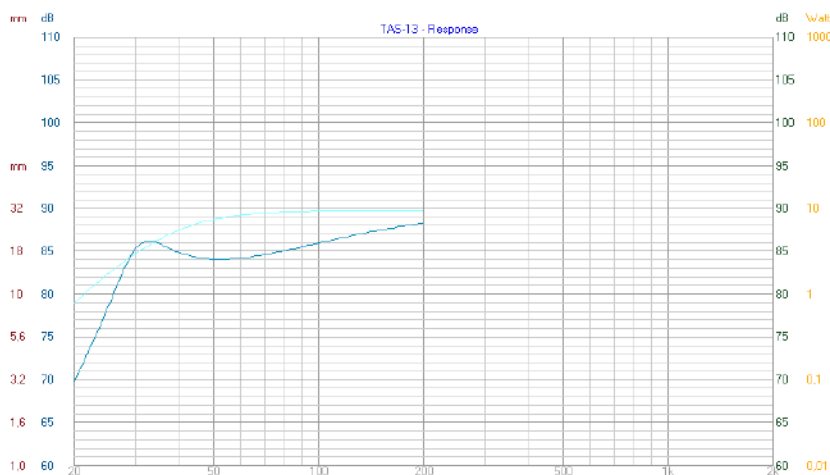
Passive Filter

The software allows to calculate the effect on the response and speaker impedance, of two passive filters: one first order high pass, made with a single condenser, and one first order low-pass, made with a single coil. This filter can also be seen as a first order band pass filter.

Using a capacitor in series to the loudspeaker it is possible to filter the low frequency emission, for example to limit the excursion to the frequencies, not reproduced by the woofer, or to simulate a sub+satellite crossing.



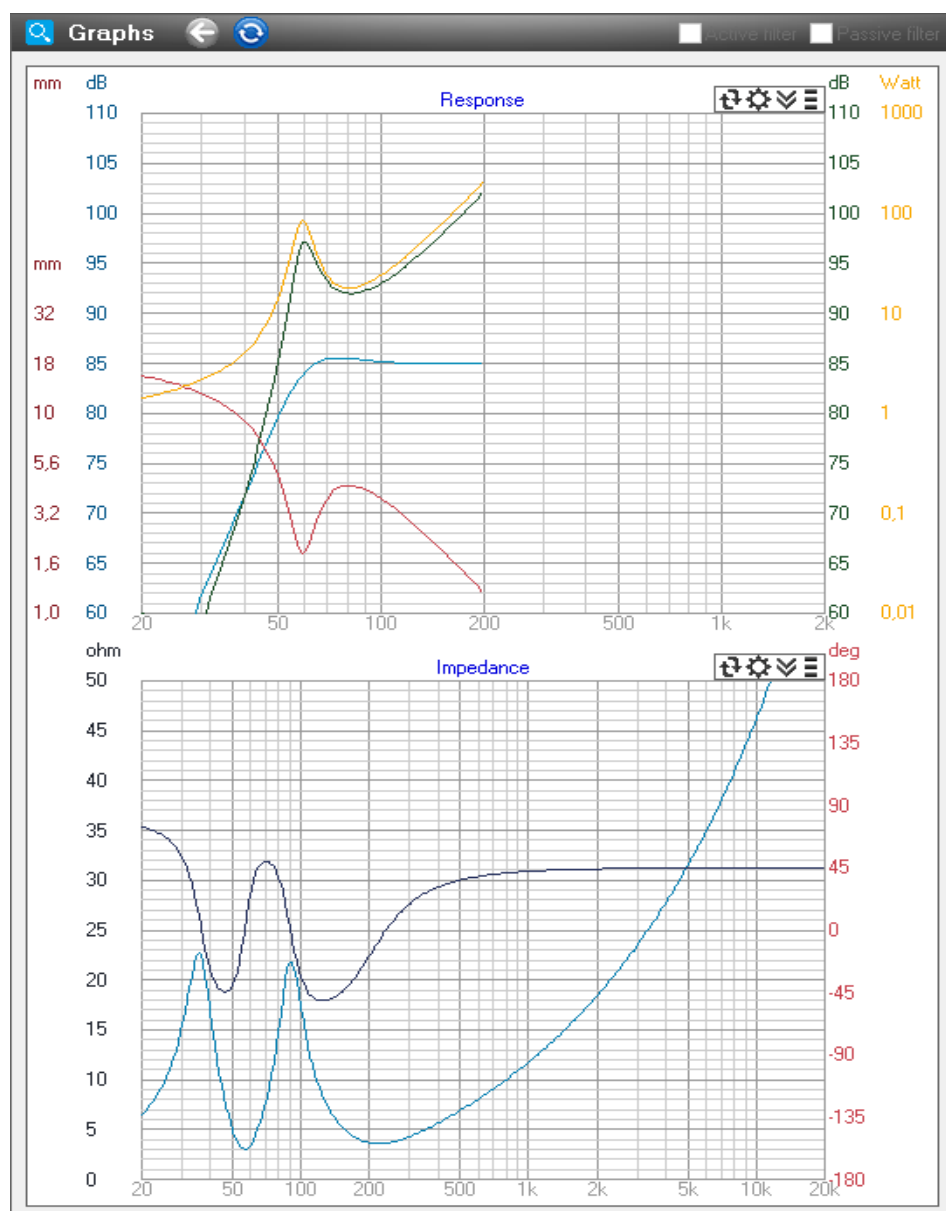
In a BandPass 4th order system, the use of this filter, designed as a bandpass, allows, with some expedients, to have a total response of the 6th order.



In the figure the response of an acoustic suspension system with a capacitor in series.

7 - Graphs

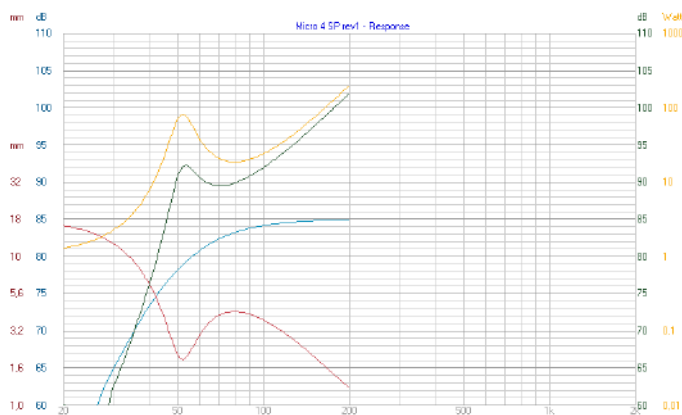
Bass 5 graphs have a high degree of customization. Two graphs are shown in the window: in the first one the frequency response and the other characteristic curves are displayed, in the second one the impedance curve.



Response Graph

The graph shows the *frequency response* of the system in **blue** and *cone excursion* in **red**. The excursion scale, (in mm and with logarithmic pattern) is shown in red at the left of the graph.

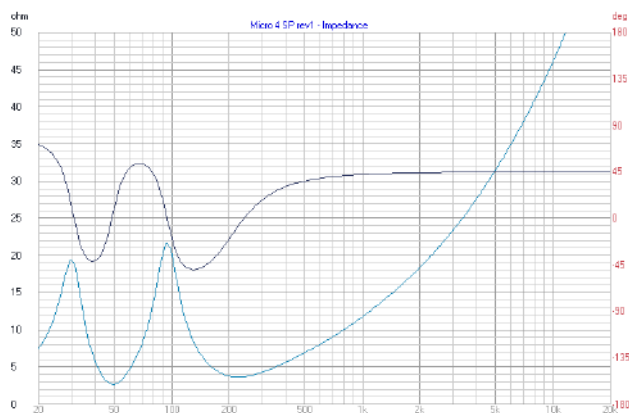
Ql:	5.00	▲▼
Dt (mm):	30.00	▲▼
Lt (mm):	-5.84	▲▼




the curves are also displayed *M.I.L.* (Maximum input level) in **yellow** and *M.O.L.* (Maximum input level) in **green**. The respective scales are shown on the right of the graph.

Impedance Graph

The graph shows the impedance module in **light blue** and the impedance phase in **dark blue** of the system.





Update, copy and save graphics

By clicking the right mouse button on the graph, or with the left button , You can copy the graph image to the clipboard, so you can paste it into a text document, or export it as an image to a photo editing program. it is also the possible to save the graph image in popular formats (jpg, gif, tiff, etc.).




Every time you vary a graphical value of the project, it is recalculated and the various curves are superimposed to those present. Older curves have lighter color than the new ones.

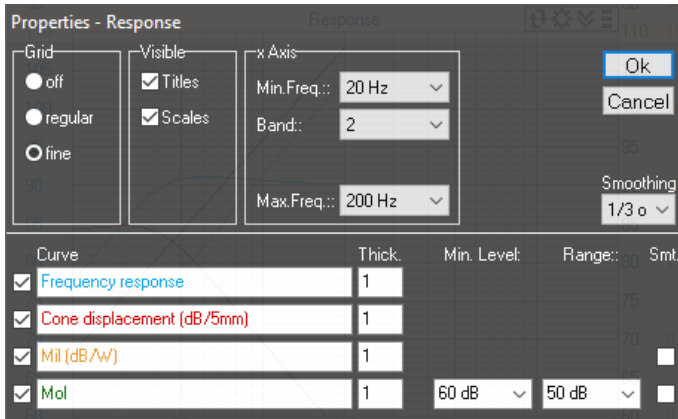


Clicking *updates* or the button  or icon  located in the window title bar, the graph is 'cleaned' and only those that refer to the last recalculation are displayed.

Graph Properties

The button  or voice *Property* in the graph menu pops up the graph properties window. You can select curves to be displayed and the width of the portion of each curve. It is also possible to decide whether

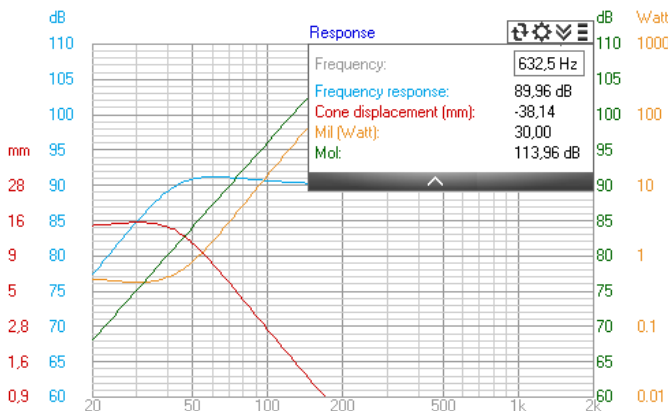
or not to display the grid, titles or scales.





Cursor

The cursor allows you to show the numerical values of each curve displayed at each frequency.

To activate the cursor just click wherever on the graph: it is immediately displayed a red dotted line at the point where you clicked.



To activate the cursor you can also click on the button  located in the upper right of the graph. To hide the curves panel will be sufficient to click on the bar  located at the bottom of the panel.

The cursor pad lets you view the values of each curve at each frequency. You can input, in the field *Frequency*, a value between 20 Hz and 20 kHz, and the cursor will be positioned at the frequency chosen.

You can also move the cursor by moving the mouse while holding down the left mouse button, or using the cursor keys *left* and *right* on the keyboard.

It should be noted that both the excursion curve and the *MIL* curve have a logarithmic scale: the first is drawn in dB related to 5 mm, the second in dB related to 1W. In the first case the value of 5.6 mm corresponds to 75 dB in the graph, in the second the value of 1W corresponds to the line of 80 dB.

MIL and MOL curves

The *MIL* curve highlights the resilience in power speaker, identifying the maximum power applicable to the diffuser, frequency by frequency, in such a way that the total intermodulation distortion is less than a fixed value, which in our case is equal to 5%. The *MOL* instead it expresses the maximum undistorted level reproducible from the speaker under test, always with a maximum distortion of 5%, and is calculated by summing the curve *MIL* and the frequency response of the speaker. The program calculates and displays these curves using the following formulas:

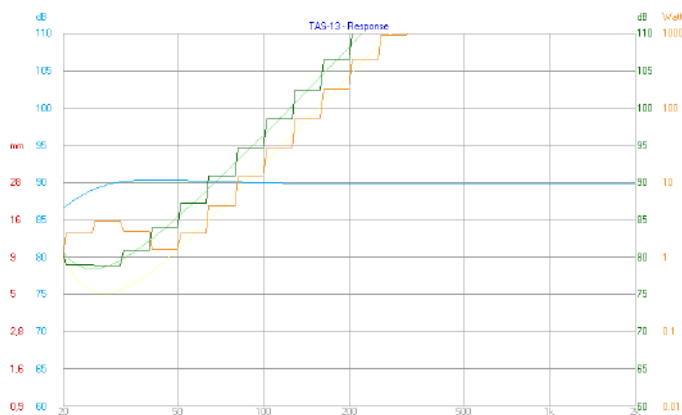
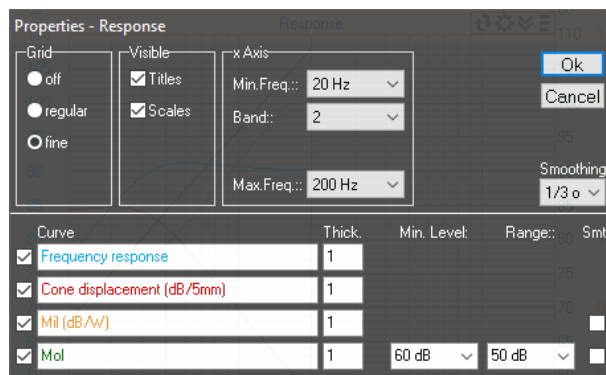
$$MIL(f)_{dB} = X_{MaxDB} - Esc(f)_{dB} + P_{MaxDB}$$

$$MOL(f)_{dB} = Res(f)_{dB} + MIL(f)_{dB} - 6$$

where X_{MaxDB} is the ratio in dB between the speaker X_{MAX} and the reference value (5mm), $Esc(f)_{dB}$ and $Res(f)_{dB}$ are

respectively the excursion of the cone and the frequency response in dB, P_{maxDB} is the maximum power applied to the loudspeaker expressed in dB/1 watt. The calculated values for the excursion are limited by the maximum power applied to the loudspeaker; in this way you can evaluate the actual achievable sound pressure frequency by frequency from the transducer with a given power amplifier. The **MIL** and **MOL** curves instead are calculated with a maximum applied power of 1000W.

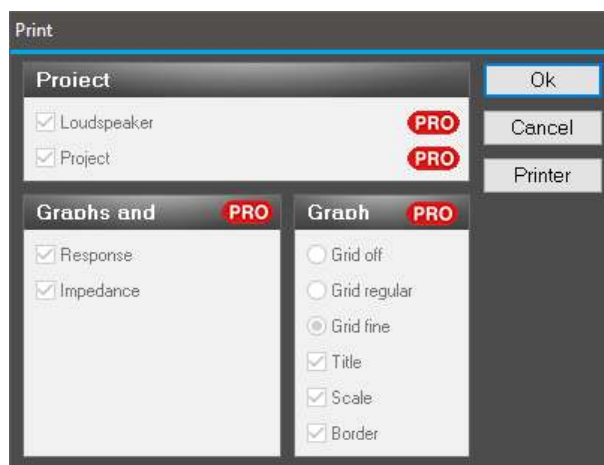
The two check boxes on the right of the Mil and Mol curves, in conjunction with the Smoothing control just above, allow you to view these two curves in the traditional continuous way or with octave, 1/3 octave, or 1/6 smoothing.



This is the effect of smoothing on the Mil and Mol curves. In lighter color the unfiltered curves.

8 - Prints

Clicking on the menu *File* and then on *Print ...* you access to the print window of the project.



By clicking on the button *Printer* you can select the printer and the corresponding options.

9 - The new project Wizard

By choosing New... from File menu you can access the new project design wizard.

At first it shows the window for entering the project's properties as the name, the date and the the signature of the designer. It can also include a brief project description.

Next it shows the window in which it is possible to load a speaker.

Once the speaker loaded are displayed **Project**, **Configuration** and

Graphs windows. At this point it will be possible to choose the speaker configuration, including single, double coil, coupled or push-pull speakers, and select the loading between acoustic suspension, bass reflex or bandpass 4th system.

You can also enter a value for added resistance R_A , an added mass M_A and also input a value for the applied power P_G , that is necessary for calculate the cone excursion.

Project		Update
Acoustic Suspension		
Alignment:	B2	
System		
Fm (Hz):	40,00	
Pg (W):	100	
Vg (V):	28,28	
Empty		Filled
Graph:	<input checked="" type="radio"/> empty	<input type="radio"/> full
Vc (dm³):	199,27	Vc (dm³): 199,27
Fc (Hz):	29,97	Fc (Hz): 26,28
Qtc:	0,71	Qtc: 0,54
Qec:	0,74	Qec: 0,65
Qmc:	15,37	Qmc: 3,08
dB SPL:	89,78	dB SPL: 89,78
F-3dB (Hz):	29,97	F-3dB (Hz): 36,94
FXMax (Hz):	40,00	FXMax (Hz): 40,00
XMax (mm):	13,23	XMax (mm): 11,24

Once you have chosen an alignment or input the values in the various fields, the response, excursion, the **MIL**, the **MOL** curves and the curve of the module and the phase of impedance are immediately calculated and shown. (See chapter 5 - Graphs).

RCF L12P48 R.G.

Update OK

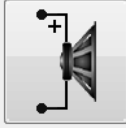
Configuration

single

Coils:

parallel

series



System

Ma (g):

0.00

Ra (ohm):

0.50

Thiele-Small Parameters

D (mm):

248.00

Xmx (mm):

0.00

Re (ohm):

5.00

Fs (Hz):

19.50

Le (mH):

0.00

Mms (g):

80.00

Vas (dm³):

271.31

Cms (mm/N):

0.83

Qts:

0.42

Qms:

10.00

Qes:

0.44

Bxl (Wb/m):

10.57

dB SPL:

90.61

Configuration

D (mm):

248.00

Xmx (mm):

0.00

Re (ohm):

5.50

Fs (Hz):

19.50

Le (mH):

0.00

Mms (g):

80.00

Vas (dm³):

271.31

Cms (mm/N):

0.83

Qts:

0.46

Qms:

10.00

Qes:

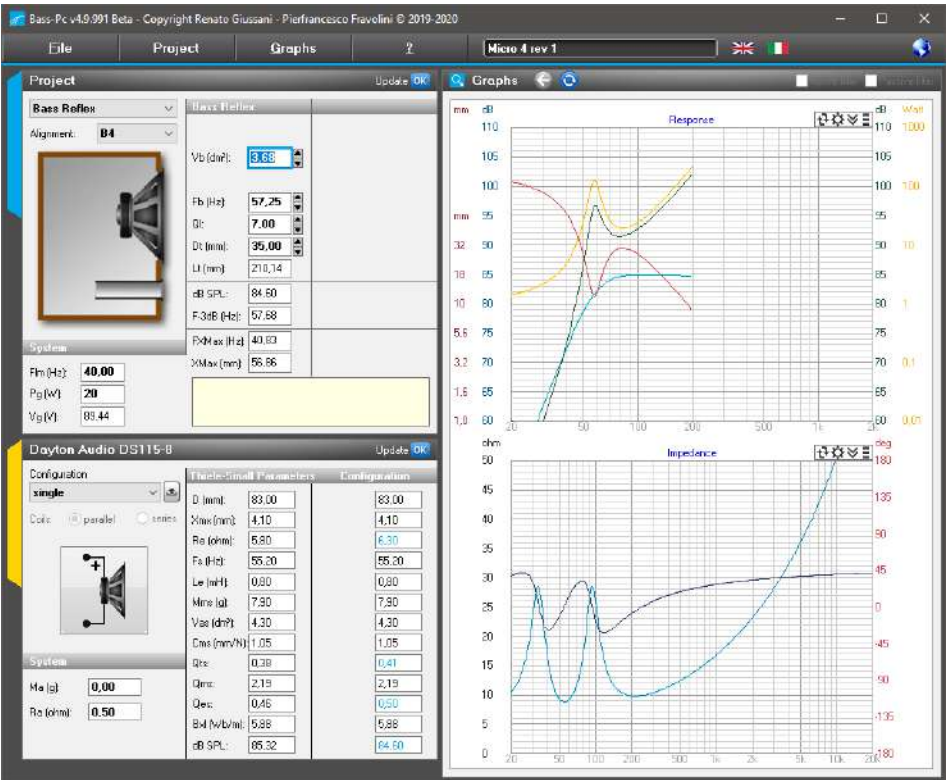
0.48

Bxl (Wb/m):

10.57

dB SPL:

89.78



10 - Preferences

In the *Preferences* window, you can adjust the software operation in some situations.

Preferences

Start-up

☐ No action

☐ Load Project

☒ Load last project ☐ Confirm

☐ Project Wizard

System

Ra (ohm): 0,50

Pg (W): 1000

Fm (Hz): 40,00

Port Thickness (mm): 2,5

Advanced Mode **PRO**

☒ Check for updates ☐ Allow sharing of data

☐ Automatic Update ☒ Show Tips

Ok Cancel

In the Startup section, you can decide whether to start, the software loads the last project (the default) or ask you to load one or start the wizard.

Check for updates causes the software to automatically search for updates at the startup. You must have an active internet connection and the connection must not be blocked by a firewall.

In *System* you can input the default values for the added resistance, the amplifier power and the lower limit of the music program.