

Sheet1

Loudspeaker Enclosure Designer for sealed and vented alignments, v0.5
by David Kakenmaster, 1992.

- 1) The driver data and max flat design area can be accessed by pressing ALT-F. Press ALT-I to return to these instructions.
- 2) DATA MAY BE ENTERED IN HIGHLIGHTED AREAS ONLY!
- 3) You can either enter a driver's parameters in cells B23 - B31 or press ALT-R to import an existing driver data file.
- 4) The diameter (B33) and number of ports (B34) are user selected and may be changed to calculate different port sizes in a given enclosure. Port parameters are ignored for sealed alignments.
- 5) LED automatically recalculates all alignments whenever you change any parameters. You may enter data in highlighted areas only.
- 6) After importing or entering driver & port parameters, you can view the maximally flat alignments (as calculated) on the right.
- 7) Press ALT-1 or ALT-2 to load the USER1 or USER2 alignment screens.
- 8) ALT-G loads the graph menu. F10 views the selected graph.
- 9) ALT-P prints the selected graph.
- 10) ALT-H loads the hot-key help menu.

Loudspeaker Enclosure Designer for sealed and vented alignments, v0.5

Driver:
Brand:
Fs: 0.000
Vas: 0.000
Qts: 0.000
Qms: 0.000
Qes: 0.000
Sd: 0.000
Xmax: 0.000

Port dia: 2.00
ports: 1

ALT-G for graph menu
F10 to view graph

Date: 01/29/23

User specified alignments for:

for sealed: Enter:
Vb: 1.50

for vented:

Sheet1

Port dia: Vb: 2.00
3.00
ports: 1

ALT-H for help
ALT-G for graph menu
F10 to view graph

Date: 01/29/23

User specified alignments for:

for sealed: Enter:
Qtc: 1.000

for vented:
Vb: 2.50
Fb: 25.00
Port dia: 3.00
ports: 1

ALT-H for help
ALT-G for graph menu
F10 to view graph

Date: 01/29/23

Optimal internal enclosure dimensions:

MAX FLAT: SEALED
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
USER 1: 1.50
22.25
13.74
8.52
USER 2: #DIV/0!
#DIV/0!
#DIV/0!

#DIV/0!

Max flat

Hz	dB
1.000	#DIV/0!
4.000	#DIV/0!
7.000	#DIV/0!
10.000	#DIV/0!
15.000	#DIV/0!
20.000	#DIV/0!
25.000	#DIV/0!
30.000	#DIV/0!
35.000	#DIV/0!
40.000	#DIV/0!
45.000	#DIV/0!
50.000	#DIV/0!
55.000	#DIV/0!
60.000	#DIV/0!
65.000	#DIV/0!
70.000	#DIV/0!
75.000	#DIV/0!
80.000	#DIV/0!
90.000	#DIV/0!
100.000	#DIV/0!
115.000	#DIV/0!
130.000	#DIV/0!
145.000	#DIV/0!
160.000	#DIV/0!
175.000	#DIV/0!
190.000	#DIV/0!
215.000	#DIV/0!
240.000	#DIV/0!
265.000	#DIV/0!
290.000	#DIV/0!
315.000	#DIV/0!
355.000	#DIV/0!
395.000	#DIV/0!
435.000	#DIV/0!
475.000	#DIV/0!
515.000	#DIV/0!
565.000	#DIV/0!
615.000	#DIV/0!
665.000	#DIV/0!
715.000	#DIV/0!
765.000	#DIV/0!

Sheet1

865.000	#DIV/0!
965.000	#DIV/0!

INSTRUCTIONS:

The optimum enclosure for
this driver is:

Hz
ft^3

#DIV/0! dB (free

M^2
mm

MAX
Sealed Box (BW):

FLAT AMPL

inches

Vb: #DIV/0!
Fc(Hz): #DIV/0!
F-3dB: #DIV/0!
Peak: 0.000
Qtc: 0.707
Pmax: #DIV/0!
SPLmax: #DIV/0!

ALT-H for help
ALT-1 for user

1 alignments

0

USER1:

Solve for desired Vb

ft^3

Sheet1

ft^3
inches

Sealed Box:

USER1

Fc(Hz):	0.000
F-3dB:	#DIV/0!
Qtc:	0.000
Peak:	0.000
Pmax:	#DIV/0!
SPLmax:	#DIV/0!

ALT-2 for user

2 alignments

0

USER2:

Solve for: desired Qtc or Fb and Vb

Qtc=0.577
Qtc=0.707
Qtc>=0.80

Bessel alignment
Butterworth alignment
Chebychev alignments

ft^3
Hz
inches

Sealed Box:

USER2

Vb:	#DIV/0!
Fc(Hz):	#DIV/0!
F-3dB:	#DIV/0!
Peak:	
Pmax:	#DIV/0!
SPLmax:	#DIV/0!
Qts:	0.000

VENTED

FT^3
" H
" W
" D

0.000 FT^3
0.00 " H
0.00 " W
0.00 " D

FT^3
" H
" W
" D

2.00 FT^3
24.49 " H
15.12 " W
9.37 " D

FT^3
" H
" W

2.50 FT^3
26.38 " H
16.29 " W

" D

10.10" D

OUTPUT CALCULATIONS - IN-ROOM

VENTED

User 1 dB	User 2 dB	Hz
#DIV/0!	#DIV/0!	1.000
#DIV/0!	#DIV/0!	4.000
#DIV/0!	#DIV/0!	7.000
#DIV/0!	#DIV/0!	10.000
#DIV/0!	#DIV/0!	15.000
#DIV/0!	#DIV/0!	20.000
#DIV/0!	#DIV/0!	25.000
#DIV/0!	#DIV/0!	30.000
#DIV/0!	#DIV/0!	35.000
#DIV/0!	#DIV/0!	40.000
#DIV/0!	#DIV/0!	45.000
#DIV/0!	#DIV/0!	50.000
#DIV/0!	#DIV/0!	55.000
#DIV/0!	#DIV/0!	60.000
#DIV/0!	#DIV/0!	65.000
#DIV/0!	#DIV/0!	70.000
#DIV/0!	#DIV/0!	75.000
#DIV/0!	#DIV/0!	80.000
#DIV/0!	#DIV/0!	90.000
#DIV/0!	#DIV/0!	100.000
#DIV/0!	#DIV/0!	115.000
#DIV/0!	#DIV/0!	130.000
#DIV/0!	#DIV/0!	145.000
#DIV/0!	#DIV/0!	160.000
#DIV/0!	#DIV/0!	175.000
#DIV/0!	#DIV/0!	190.000
#DIV/0!	#DIV/0!	215.000
#DIV/0!	#DIV/0!	240.000
#DIV/0!	#DIV/0!	265.000
#DIV/0!	#DIV/0!	290.000
#DIV/0!	#DIV/0!	315.000
#DIV/0!	#DIV/0!	355.000
#DIV/0!	#DIV/0!	395.000
#DIV/0!	#DIV/0!	435.000
#DIV/0!	#DIV/0!	475.000
#DIV/0!	#DIV/0!	515.000
#DIV/0!	#DIV/0!	565.000
#DIV/0!	#DIV/0!	615.000
#DIV/0!	#DIV/0!	665.000
#DIV/0!	#DIV/0!	715.000
#DIV/0!	#DIV/0!	765.000

Sheet1

#DIV/0!
#DIV/0!

#DIV/0!
#DIV/0!

865.000
965.000

		Hz
		1.000
		4.000
		7.000
		10.000
	Date: 01/29/23	15.000
		20.000
		25.000
		30.000
	#DIV/0! #DIV/0!	35.000
air) efficiency		40.000
		45.000
		50.000
		55.000
ITUDE ALIGNMENTS		60.000
	Vented Box (B4):	65.000
ft^3	Vb: 0.000	70.000
Hz	Fb(Hz): #NUM!	75.000
Hz	F-3dB: #NUM!	80.000
dB	Ripple: #DIV/0!	90.000
	Port L: #NUM!	100.000
watts	Pmax: #NUM!	115.000
dB	SPLmax: #NUM!	130.000
	Ql: 7.000	145.000
		160.000
		175.000
		190.000
		215.000
		240.000
		265.000
		290.000
		315.000
		355.000
		395.000
		435.000

ALIGNMENTS				475.000
				515.000
		Vented Box:		565.000
	Hz	Fb(Hz):	#DIV/0!	615.000
	Hz	F-3dB:	0.000	665.000
	dB	Ripple:	Err:502	715.000
dB in		Port L:	#DIV/0!	765.000
	watts	Pmax:	#DIV/0!	865.000
	dB	SPLmax:	#DIV/0!	965.000
		Ql:	7.000	

ALIGNMENTS				Hz
				1.000
				4.000
				7.000
				10.000
				15.000
				20.000
				25.000
				30.000
				35.000
				40.000
				45.000
				50.000
				55.000
				60.000
				65.000
				70.000
				75.000
				80.000
				90.000
				100.000
				115.000
				130.000
				145.000
				160.000
				175.000
				190.000
				215.000
				240.000
				265.000
				290.000
				315.000
				355.000
				395.000
				435.000

Port design by calculated				90.000
minimum port diameter:				100.000
(Enter # of ports used)				115.000
	#NUM!	Hz (Fb)	#NUM!	130.000
	#NUM!	" ID each	#NUM!	145.000
	#NUM!	" L each	#NUM!	160.000
		1 port		175.000
				190.000
	#DIV/0!	Hz (Fb)	#DIV/0!	215.000
	#DIV/0!	" ID each	#DIV/0!	240.000
	#DIV/0!	" L each	#DIV/0!	265.000
		1 port		290.000
				315.000
				355.000
				395.000
				435.000

Sheet1

#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!

#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!

This program is distributed free of charge, for use with As-Easy-As or other Lotus-compatible spreadsheet programs. It was written with As-Easy-As version 5.0 in mind, due to that program's superior graphics capabilities. As-Easy-As 5.01a and above include graphics bug fixes for even better preformatted graph displays.

No guarantees of any kind are offered. You are encouraged to freely distribute this program, as long as no more than a reasonable cost is charged for distribution material, ie diskettes, and that the files LEDV0_5.WKS, SPKRDATA.WKS, LDSPKR05.DOC and READ.ME are all included in unmodified form. It is recommended that a shareware version of As-Easy-As 5.01 spreadsheet or above be available at the same site.

An upgraded version of this template is available. Press <ENTER> for information regarding this upgraded version, LED v1.0.

For the small price of \$20.00, you can get the upgraded version of

Version 1.0: Calculates and plots 5 TIMES as many data points as

Sheet1

To obtain this program, send \$20.00 to:

Press

Press

Sheet1

#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!

this program (version 0.5).

If you're serious about modeling your box designs, this program will give you the power to do it! Note that you will need a total of 384k of free RAM (conventional + expanded) to load and operate this program. With As-Easy-As, virtual memory may be used.

There are many more features, too, including:

- 30 preformatted graph functions
- User adjustable QI
- Built-in support for multiple driver arrays.
- Built-in support for normal or compound driver mount.
- More flexible user design areas.
- And much, MUCH more.

<ENTER>

HOT KEY HELP FOR LED v0.5 IN AS EASY AS.

HOT KEY

ALT-1
ALT-2
ALT-E

ALT-F
ALT-G
ALT-H
ALT-I
ALT-O
ALT-P
ALT-R
ALT-S
ALT-V

<ENTER>

Sheet1

#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!

Distribution notice.

Press

Loudspeaker Enclosure Designer:

to continue.

Load USER 1 design work area.
Load USER 2 design work area.
Load optimum diameter port design and optimum enclosure dimensions work area.
Load MAX FLAT alignment and driver data work area.
Load to graph menu
Load hot key help area (this area).
View basic instructions for LED v0.5.
Print current graph in draft (fast) mode.
Print current graph in NLQ mode.
Load data file import menu.
Save entire design file for a specific driver.
Load in-room output calculations area.

to return.

Sheet1

Intermediate calcs for:
(USER 1 alignments)
Port area:

Sealed ripple:

Err:502

Intermediate
User1 (vented) calculations:
#DIV/0!

{home}{goto s130}{goto o130}/rfl112..s150~{goto o130}{tone 500,300}{?}
{goto s130}{pgdn}{goto M150}{tone 500,300}{?}
/rfl112..s150~{home}{goto B3}{calc}{tone 500,600}

Intermediate

User1 (sealed) calculations:

#DIV/0!

#DIV/0!

<ENTER>

to continue.

FUNCTION

Sheet1

#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!

15 March 1992.

David Kakenmaster
890 N. Tabor Ct.
Castle Rock, CO 80104-9715

/gnu{ESC}{?}~v{ESC 2}

{home}{pgdn 2}{goto b44}

{home}{goto B3}

{home}{pgdn 5}{goto a103}

{home}{pgdn 4}{goto h100}

/fs{?}~{ESC 2}

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!

Sheet1

{home}{pgdn}{goto b23}

#DIV/0!

{home}{pgdn 3}{goto b64}

#DIV/0!

{HOME}{goto B23}/fmrB3..b11~vr{?}~{home}{pgdn}{goto b23}{calc}{tone 500,600}

/gpih8.25~w11~lnqgqq

/gpih8.25~w11~ldqgqq

/rfrl154..s173~{home}{goto s173}{goto m173}{?}/rfrl154..s173~{home}{pgdn}{goto b23}

#DIV/0! #DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

#DIV/0!

Sheet1

#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!

Vented In-car corrective	Vented Max flat In-car	Vented User 1 In-car	Vented User 2 In-car
Hz +dB	dB	dB	dB
1.000	#DIV/0!	#DIV/0!	#DIV/0!
4.000	#DIV/0!	#DIV/0!	#DIV/0!
7.000	#DIV/0!	#DIV/0!	#DIV/0!
10.000	#DIV/0!	#DIV/0!	#DIV/0!
15.000	#DIV/0!	#DIV/0!	#DIV/0!
20.000	#DIV/0!	#DIV/0!	#DIV/0!
25.000	#DIV/0!	#DIV/0!	#DIV/0!
30.000	#DIV/0!	#DIV/0!	#DIV/0!
35.000	#DIV/0!	#DIV/0!	#DIV/0!
40.000	#DIV/0!	#DIV/0!	#DIV/0!
45.000	#DIV/0!	#DIV/0!	#DIV/0!
50.000	#DIV/0!	#DIV/0!	#DIV/0!
55.000	#DIV/0!	#DIV/0!	#DIV/0!
60.000	#DIV/0!	#DIV/0!	#DIV/0!
65.000	#DIV/0!	#DIV/0!	#DIV/0!
70.000	#DIV/0!	#DIV/0!	#DIV/0!
75.000	#DIV/0!	#DIV/0!	#DIV/0!
80.000	#DIV/0!	#DIV/0!	#DIV/0!
90.000	#DIV/0!	#DIV/0!	#DIV/0!
100.000	#DIV/0!	#DIV/0!	#DIV/0!
115.000	#DIV/0!	#DIV/0!	#DIV/0!
130.000	#DIV/0!	#DIV/0!	#DIV/0!
145.000	#DIV/0!	#DIV/0!	#DIV/0!
160.000	#DIV/0!	#DIV/0!	#DIV/0!
175.000	#DIV/0!	#DIV/0!	#DIV/0!
190.000	#DIV/0!	#DIV/0!	#DIV/0!
215.000	#DIV/0!	#DIV/0!	#DIV/0!
240.000	#DIV/0!	#DIV/0!	#DIV/0!
265.000	#DIV/0!	#DIV/0!	#DIV/0!
290.000	#DIV/0!	#DIV/0!	#DIV/0!
315.000	#DIV/0!	#DIV/0!	#DIV/0!
355.000	#DIV/0!	#DIV/0!	#DIV/0!
395.000	#DIV/0!	#DIV/0!	#DIV/0!
435.000	#DIV/0!	#DIV/0!	#DIV/0!

Sheet1

475.000	#DIV/0!	#DIV/0!	#DIV/0!
515.000	#DIV/0!	#DIV/0!	#DIV/0!
565.000	#DIV/0!	#DIV/0!	#DIV/0!
615.000	#DIV/0!	#DIV/0!	#DIV/0!
665.000	#DIV/0!	#DIV/0!	#DIV/0!
715.000	#DIV/0!	#DIV/0!	#DIV/0!
765.000	#DIV/0!	#DIV/0!	#DIV/0!
865.000	#DIV/0!	#DIV/0!	#DIV/0!
965.000	#DIV/0!	#DIV/0!	#DIV/0!

Sealed In-car corrective	Sealed Max flat In-car	Sealed User 1 In-car	Sealed User 2 In-car
Hz +dB	dB	dB	dB
1.000	#DIV/0!	#DIV/0!	#DIV/0!
4.000	#DIV/0!	#DIV/0!	#DIV/0!
7.000	#DIV/0!	#DIV/0!	#DIV/0!
10.000	#DIV/0!	#DIV/0!	#DIV/0!
15.000	#DIV/0!	#DIV/0!	#DIV/0!
20.000	#DIV/0!	#DIV/0!	#DIV/0!
25.000	#DIV/0!	#DIV/0!	#DIV/0!
30.000	#DIV/0!	#DIV/0!	#DIV/0!
35.000	#DIV/0!	#DIV/0!	#DIV/0!
40.000	#DIV/0!	#DIV/0!	#DIV/0!
45.000	#DIV/0!	#DIV/0!	#DIV/0!
50.000	#DIV/0!	#DIV/0!	#DIV/0!
55.000	#DIV/0!	#DIV/0!	#DIV/0!
60.000	#DIV/0!	#DIV/0!	#DIV/0!
65.000	#DIV/0!	#DIV/0!	#DIV/0!
70.000	#DIV/0!	#DIV/0!	#DIV/0!
75.000	#DIV/0!	#DIV/0!	#DIV/0!
80.000	#DIV/0!	#DIV/0!	#DIV/0!
90.000	#DIV/0!	#DIV/0!	#DIV/0!
100.000	#DIV/0!	#DIV/0!	#DIV/0!
115.000	#DIV/0!	#DIV/0!	#DIV/0!
130.000	#DIV/0!	#DIV/0!	#DIV/0!
145.000	#DIV/0!	#DIV/0!	#DIV/0!
160.000	#DIV/0!	#DIV/0!	#DIV/0!
175.000	#DIV/0!	#DIV/0!	#DIV/0!
190.000	#DIV/0!	#DIV/0!	#DIV/0!
215.000	#DIV/0!	#DIV/0!	#DIV/0!
240.000	#DIV/0!	#DIV/0!	#DIV/0!
265.000	#DIV/0!	#DIV/0!	#DIV/0!
290.000	#DIV/0!	#DIV/0!	#DIV/0!
315.000	#DIV/0!	#DIV/0!	#DIV/0!
355.000	#DIV/0!	#DIV/0!	#DIV/0!
395.000	#DIV/0!	#DIV/0!	#DIV/0!
435.000	#DIV/0!	#DIV/0!	#DIV/0!

Sheet1

475.000	#DIV/0!	#DIV/0!	#DIV/0!
515.000	#DIV/0!	#DIV/0!	#DIV/0!
565.000	#DIV/0!	#DIV/0!	#DIV/0!
615.000	#DIV/0!	#DIV/0!	#DIV/0!
665.000	#DIV/0!	#DIV/0!	#DIV/0!
715.000	#DIV/0!	#DIV/0!	#DIV/0!
765.000	#DIV/0!	#DIV/0!	#DIV/0!
865.000	#DIV/0!	#DIV/0!	#DIV/0!
965.000	#DIV/0!	#DIV/0!	#DIV/0!

