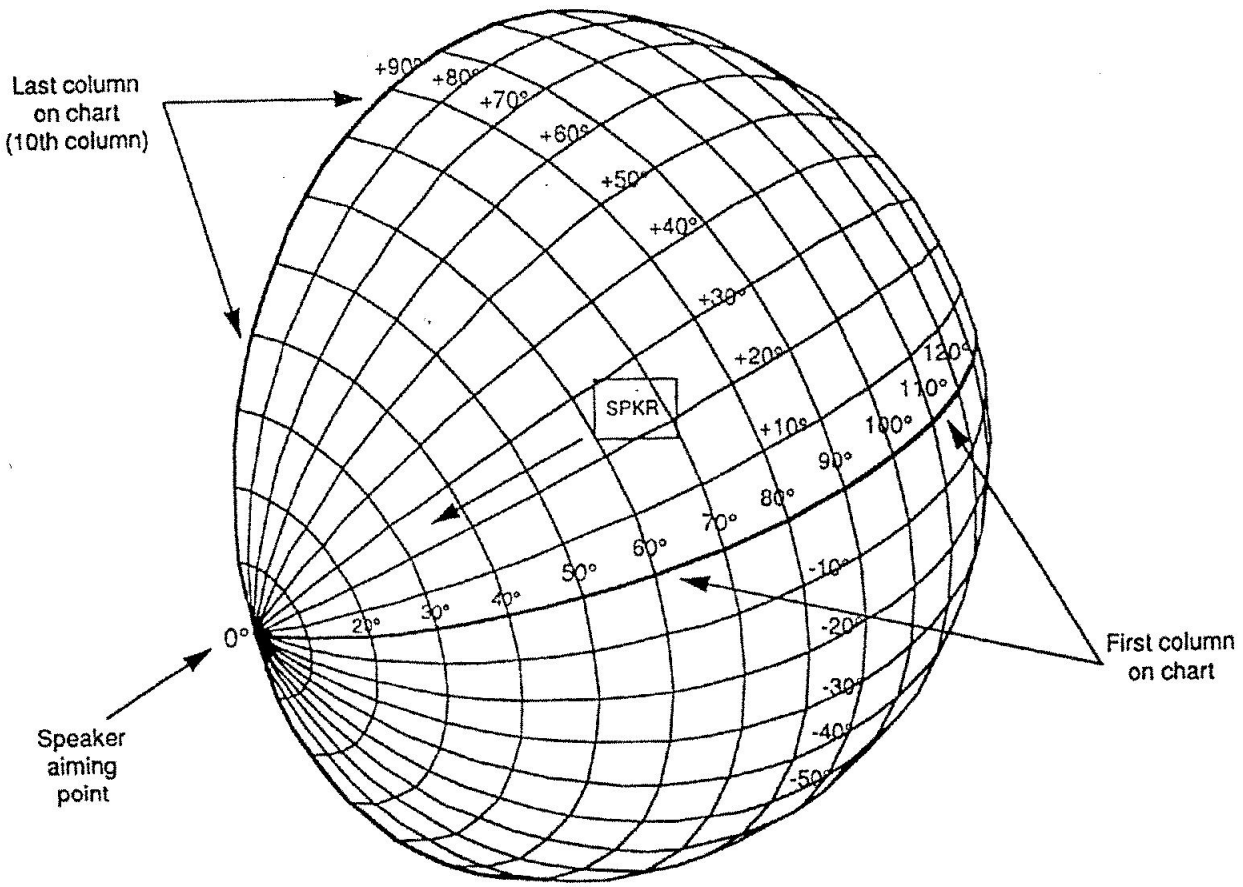
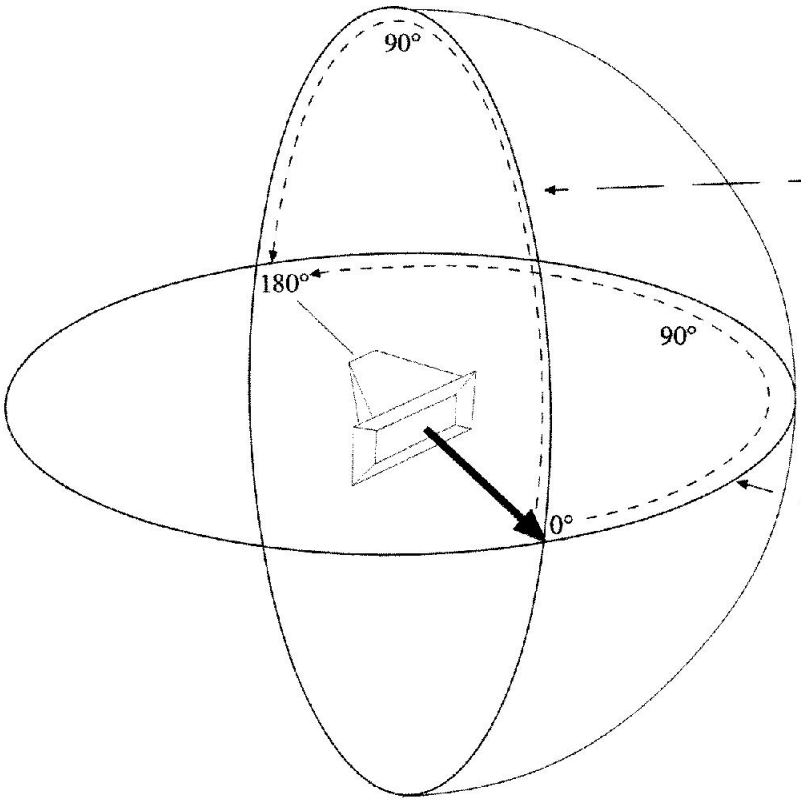
Database Measurements for EASEBASE

The EASE loudspeaker database can be generated by two measurement methods and the EASEBASE 2.0 software program. Simple horizontal and vertical polars can be entered and then extrapolated by the program to create a complete datafile, or measurements representing one complete hemisphere can be made in 10 degree increments and then entered into the database. The measurements should be made with 1-octave band-limited pink noise with 125, 250, 500, 1000, 2000, 4000 and 8000 Hz center frequencies. Care should be taken to assure reflection-free accurate measurements. The coordinate and measurement geometry used is shown below.

Coordinate and Measurement Geometry



Upper Lobe

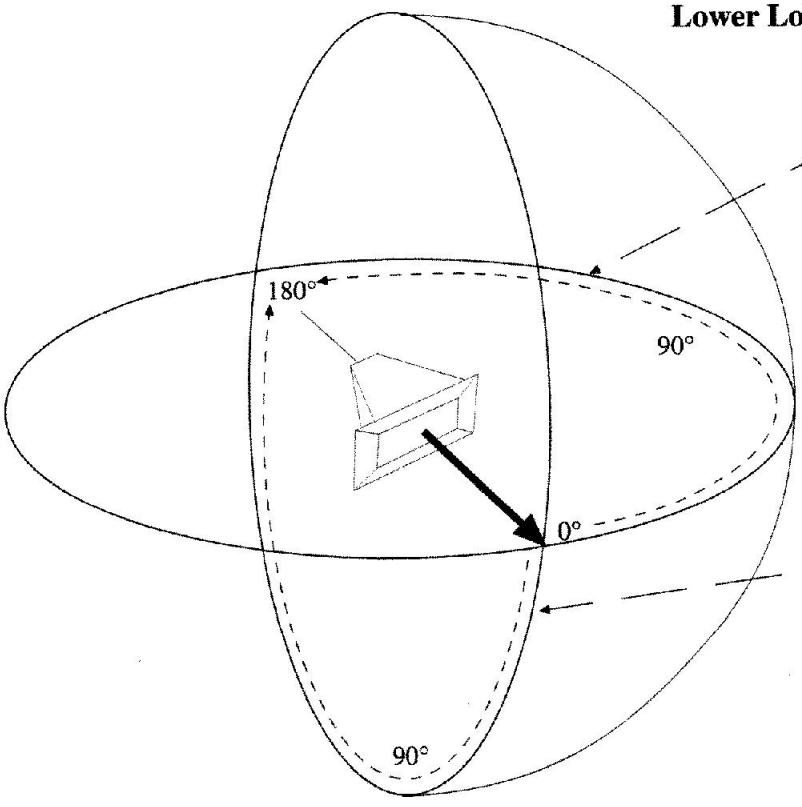


Vertical Polar
(measure from 0° to 180° in 10° increments)

Upper Lobe Measurements

Horizontal Polar
(measure from 0° to 180° in 10° increments)

Lower Lobe



Horizontal Polar
(measure from 0° to 180° in 10° increments)

Lower Lobe Measurements

Vertical Polar
(measure from 0° to 180° in 10° increments)

EASEBASE Loudspeaker Data Format

For use in entering the minus (-) quadrant of the Vertical Polar
(refer to the attached "Database Measurements for EASEBASE"
for further details)

SPEAKER NAME/MODEL			0°	-10°	-20°	-30°	-40°	-50°	-60°	-70°	-80°	-90°
COMPANY NAME		0°										
FREQUENCY (center freq.)	Hz	10°										
RELATIVE LEVEL	dB	20°										
SENSITIVITY (1 w @ 1m)	dB	30°										
IMPEDANCE	Ohms	40°										
MAXIMUM POWER	Watts	50°										
DATA ORIGIN		60°										
		70°										
		80°										
		90°										
		100°										
		110°										
		120°										
		130°										
		140°										
		150°										
		160°										
		170°										
		180°										

EASEBASE Loudspeaker Data Format

Each row in the Data Tables represents 10° of rotation in the vertical plane. Each column represents one half (180°) of a polar plot; the first column is for a horizontal polar, the last column is a vertical polar. The software recognizes only attenuation from the highest reference point, so the highest SPL point in the polar should be designated 0 (zero) and all other points referenced to it. Do not include a minus sign in your data entries.

SPEAKER NAME /MODEL			0°	+10°	+20°	+30°	+40°	+50°	+60°	+70°	+80°	+90°
COMPANY NAME		0°										
FREQUENCY (center Freq.)	Hz	10°										
RELATIVE LEVEL	dB	20°										
SENSITIVITY (1w @ 1m)	dB	30°										
IMPEDANCE	Ohms	40°										
MAXIMUM POWER	WATTS	50°										
DATA ORIGIN		60°										
		70°										
		80°										
		90°										
		100°										
		110°										
		120°										
		130°										
		140°										
		150°										
		160°										
		170°										
		180°										

Note: To view the data in display form at any time during the data entry process:

A) Click on OK to accept the data you have entered

B) Press ESC twice to return to the Menu Bar; Select LSP, then select *Draw Base*; choose the correct model number and Click OK or press Enter

The "Left" button on the bottom of the screen toggles the left side of the screen between the POLAR ATTENUATION and the 3D DIRECTIVITY PATTERN displays. To switch, either click on the button or type L. The "Right" button toggles the right side "3-6-9- dB COVERAGE ISOBARS" between rectangular and polar coordinates.

Notes:
1) In the measurement fields, data can be entered by simply overwriting the red default figures shown and then using the Tab Key to step down to the next field. Remember that the program is looking for dB attenuation from the 0 (zero) reference level. Do not use any minus numbers!

2) The first (0°) and last (180°) rows are actually single points on the sphere and EASEBASE will change the black figures in these rows to correspond with the figures you insert into the first column when you accept (click on OK) the data you have entered.

A) If you only have Horizontal and Vertical polar information to enter;
1) At the end of the data listing, Press F2, choose ELLIPTIC LOBE, and then click on OK or press Enter. EASEBASE then extrapolates the remaining figures based on the assumption the directivity pattern is symmetrical and inserts them into the chart.

2) Click on OK to accept the data.
Note: Don't overlook this step as all the information you have entered will be lost if you attempt to proceed without accepting the data by clicking OK.

B) If you have complete measurement data to enter:

1) At the end of the data listing, Press F2 and click OK: EASEBASE will then compute the Directivity and Efficiency figures for you and enter them into the data file.

2) Click on OK to accept the data
Note: Don't overlook this step as all the information you have entered will be lost if you attempt to proceed without accepting the data by clicking OK.

12) This is a good point to Save the Data you have entered. To do so:

A) Press ESC two times to return to the Menu Bar; Select LSP and choose *Save Base*; then answer "Yes" at the "Overwrite (y/n)?" prompt. If you press ESC too many times, type W at the prompt to renter the program.

13) Continue to enter data until you have completed a file for each of the eight frequency bands. Remember, you are actually modifying default figures and if you don't change them, the program is going to accept them as being correct. You must enter data for all the frequency bands!!

This is true even if you are entering data for a device having a narrow frequency response range, such as a horn or low frequency enclosure. In the case of a horn, the recommended procedure is to factor into the data your suggested low frequency roll off (12 dB per octave for example). This can be accomplished by factoring the roll off (12 dB per octave for example) into the Sensitivity and Relative Level figures as you enter them into the program. Low frequency enclosures can be handled in the same fashion by factoring in the high frequency roll off recommended.

Two-box systems, such as those having separate low frequency and mid/high frequency cabinets may be measured together and treated as a single device or entered as two separate devices.

14) Repeat the procedure until data has been entered on all the loudspeakers you wish to have listed in EASE; then send the disk to us.

Select the frequency desired for data entry and press Enter again.

Entering your loudspeaker's data is done by replacing the default data shown in red on the screen with data on your loudspeaker. This is accomplished by selecting the information box and simply typing in the correct data. This overwrites the default data. The Tab key is used to advance from one box to the next one.

The Mouse and Cursor can also be used to move from box to box or to select a box out of sequence. However, this method does not provide automatic "overwriting " of the default data. Instead, it only introduces an insertion point.

Note: Don't become adventurous at this point and try pressing the F2 Keys Pressing F2 locks up the program unless and until the "SPHERE" has been renamed (See Step 1 below). If this should happen to you, pressing "Ctrl, Alt, Delete" will take you out of the program and allow you to start over.

Start with the left hand information column;

1) Replace "SPHERE" with the model number of your loudspeaker (up to 12 characters allowed).

2) Replace "LOUDSPEAKER, Inc." with the name of your company (up to 20 characters allowed).

3) Ignore the " Data Good" box; EASEBASE will decide if the data entered is complete and logical and then classify it accordingly.

4) The "Relat. Level" figure is associated with the frequency response chart included with the polar/isobar displays. It determines the scale reading for the frequency being entered. We recommend using this chart to show the relative sensitivities by entering the 1w/1m sensitivity figures in this space.

Another way of using this chart is as a display of the maximum SPL in frequency response form. If you elect to follow this approach, enter the appropriate maximum SPL figures in the "Relat. Level" box. EASEBASE will then display these SPL figures in the frequency response chart.

5) "Directivity" can be skipped as EASEBASE will calculate this figure for you from the data being entered.

6) Enter the 1w/1m "Sensitivity" figure for the frequency being entered into the data base.

7) Enter the"Impedance", if different than 8 ohms.

8) "Efficiency" can be skipped as EASEBASE will calculate this figure for you from the data being entered.

9) Under "Max. Power", replace 100 with the power rating of your loudspeaker for the 1-octave frequency band being entered into the data base. The rating should be the maximum continuous program power rating based on the use of 1-octave band-limited pink noise.

10) Ignore "Data Origin" as EASEBASE will provide the appropriate source.

11) Enter Measurement Data in the fields provided

EASEBASE 2.0

Data Entry Guide

Mouse Conventions: The left button is used to select menus and to answer "Yes" to Y/N prompts; the right button answers "No" to the Y/N prompt.

Insert EASEBASE disk into A: or B: drive and select that drive (for example A: [Enter]).
If using Windows, click on the A: or B: drive under File Manager, click on FILE and then on RUN; then type INSTALL C: or INSTALL D: and Enter. Note that a space is required after the word "INSTALL".

At the prompt, type INSTALL C: or INSTALL D: etc, where C: or D: is the drive on which you want to install EASEBASE; press Enter. Note that a space is required after the word "INSTALL".

Select C: or D: drive (for example C: [Enter]).
If using Windows, click on the Drive letter.

Type CD\EASEBASE at the prompt ; press Enter.
If using Windows, click on EASEBASE directory.

Type EASEBASE at the prompt; press Enter
If using Windows, double click on EASEBASE. EXE

The Welcome to EASEBASE Screen appears; click OK or press Enter.

Select EASEBASE from the Menu Bar; then select *Your Name*; use the Backspace Key to erase the default name, enter your name in the name box and either click OK or press Enter.

Select EASEBASE from the Menu Bar; then select *Length Unit*; choose "Feet" or "Meter" and either click OK or press Enter.

Select EASEBASE from the Menu Bar; then select *Printer*; choose your printer type and either click OK or press Enter.

Note: The preceding three steps need to taken only during the initial setup; thereafter, you may skip these steps and proceed directly to the step below.

Select LSP from the Menu Bar; then select *Edit Base* and when the green speaker screen appears, press *Insert* to add a new speaker to the data base.

Then press Enter.

Note that each frequency appears twice; once followed by a (+) and once followed by a (-). This corresponds to the upper (+) and lower (-) vertical semi-circles (refer to the attached EASEBASE Loudspeaker Data Format tables for further information).

Relat. Level:
Determines the frequency response. We recommend using the 1w, 1m sensitivity figure at 1 kHz as the 0 dB reference.

Directivity:
Should be skipped as EASEBASE will calculate this figure from the entered data.

Sensitivity:
Enter the 1w, 1m **Sensitivity** figure for that frequency band.

Note: Flat frequency responses achieved with associated equalizers, usually require higher applied power at some frequencies. In order for the efficiencies calculated by EASE to be correct, it is necessary to input the correct 1 w, 1m sensitivities at all frequencies and to provide for flat frequency response by adjusting the applied power, within the maximum power handling of the loudspeakers.

Impedance:
Enter the nominal speaker impedance.

Efficiency:
Should be skipped as EASE will calculate this figure.

Max. Power:
Replace 100 W with the max. **continuous program power** rating of your loudspeaker for this one-octave frequency band. *Note: maximum rms values may also be used, however, under normal audio system usage max. **rms** values are usually not relevant.*

Data Origin:
EASE will indicate whether the data came from the detailed lists, or were calculated with the elliptical approximation from horizontal and vertical polar data.

Entering the measured data into the table

NOTE 1: The dB attenuation data can be entered into the data fields by overwriting the red default figures. Use the **[Tab]** key to advance to the next field. Remember, EASE assumes dB attenuation from the 0 (zero) reference level. Do not enter negative numbers!

NOTE 2: In case a speaker's maximum gain is not on axis, reduce the "on axis" numbers by the required number of dB's so that the maximum (off axis) gain can be 0 dB.

NOTE 3: Since the first (0°) row and last (180°) row each represent single points on the sphere, EASE will change the black figures in these rows to correspond with the figures inserted into the first column.