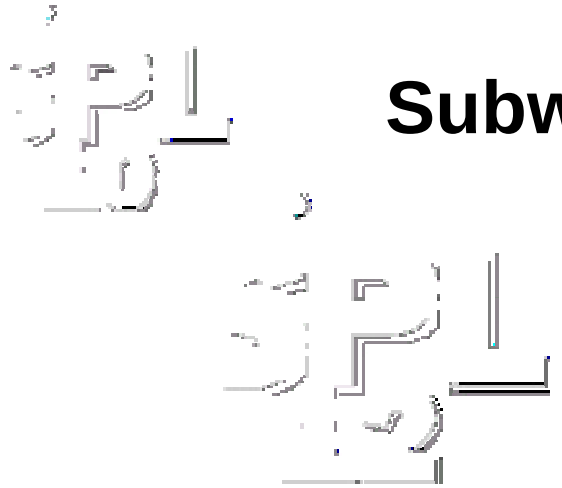
SOUNDSTREAM TECHNOLOGIES
120 Blue Ravine Road • Folsom • California 95630 USA
tel 916.351.1288 fax 916.351.0414

(REV A, 3/2/98)



Subwoofers

OWNER'S MANUAL AND INSTALLATION GUIDE

SPL10, SPL12 AND SPL15 SUBWOOFERS

CONGRATULATIONS! You have chosen a superior product for reproducing high "Sound Pressure Levels" in the car. This precision component, when properly installed, is capable of amazing output performance. The SPL10, SPL12 and SPL15 woofers are extremely high output speakers with performance made possible through outstanding design and exceptional quality in parts and construction.

Should your woofer ever require service or replacement, recording the information below for your own records will help protect your investment.

*Model Number:*_____

Serial Number: _____

Dealer's Name: _____

Date of Purchase: _____

Installation Shop: _____

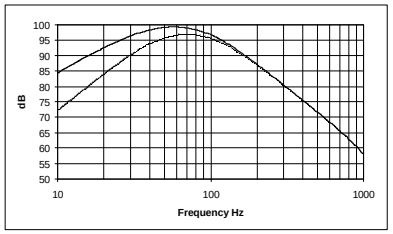
Installation Date: _____

DESIGN FEATURES

- **Long Excursion Designs --** The SPL woofers use high performance components and the **New Ultra-Excursion Surround** to achieve extra long excursion for high output and deep bass.
- **Heavy Gauge Steel Baskets** provide extra rigidity and damping.
- **Silver Powder Coating** ensures durability and lasting good looks.
- **Ultra-High power handling Voice Coils with Kapton/Epoxy formers** increase power handling and performance. Aerospace grade adhesives and materials insure longevity and high performance.
- **Dual Voice Coil Inputs** for increased flexibility in optimizing installations.
- **Computer Numerically Controlled (CNC)** machined magnet plates and pole piece precisely focus the magnetic energy for optimum performance.
- **High Emissivity Coatings** on all steel plates improve power handling.
- **Large Magnet Structures** for powerful, well-controlled output.
- **Vented Pole Pieces** for greater voice coil cooling.
- **Custom-designed High Strength Spiders** control the long travel cone assembly.

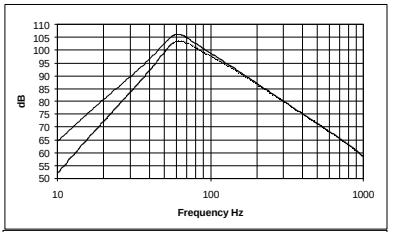
Sealed (Cont'd)

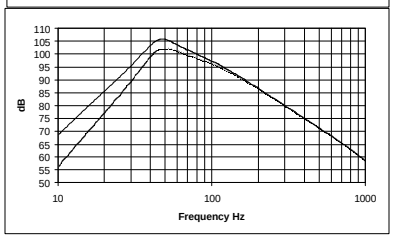
- 3.0 ft^3 - *Good linear response, excellent all around enclosure.*

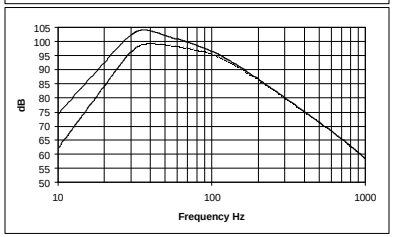


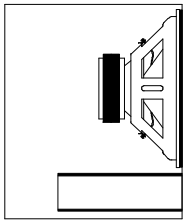
Vented

- 2.0 ft^3 @ 50 Hz (Three 4" x 12.25" ports) - *High output with good low frequency extension. Good small enclosure.*
- 3.0 ft^3 @ 40 Hz (Three 4" x 13" ports) - *High output with excellent low frequency extension. Great for Rock music or home theater applications.*
- 4.0 ft^3 @ 30 Hz (Three 4" x 18.75" ports) - *High output with low frequency extension. Great for Rock music or home theater applications.*





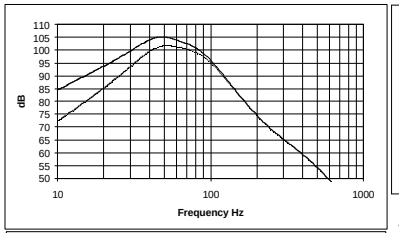


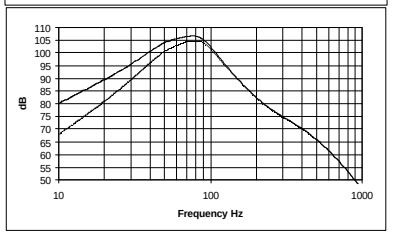


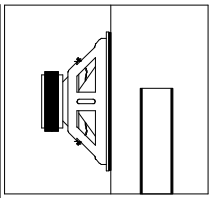
Vented (V)

Sealed Bandpass

- Rear = 3.0 ft^3 sealed
- Front = 2.2ft^3 @ 55 Hz (Three 4" x 6.75" ports) - *High output with good low frequency extension. Good for Rock or Rap.*
- Rear = 1.5 ft^3sealed
- Front = 2.2 ft^3 @ 72Hz (Four 4" x 5" ports) - *Very high*



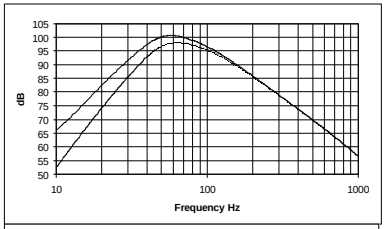




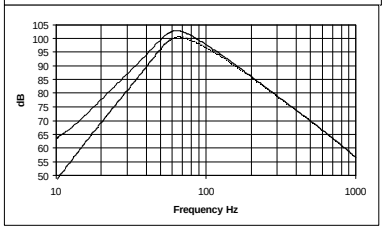
Sealed Bandpass

Vented (Cont'd)

- 1.0 ft^3 @ 40Hz (4" x 14.25" port) - *Small, versatile enclosure with good bass. Great for Rock music or home theater.*

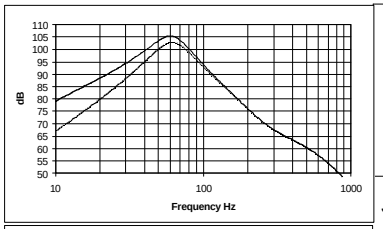


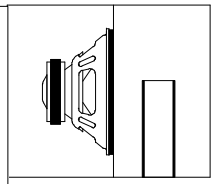
- 1.0 ft^3 @ 50Hz (4" x 8" port) - *Small enclosure with good punch. Good for Rap or Rock.*



Sealed Bandpass

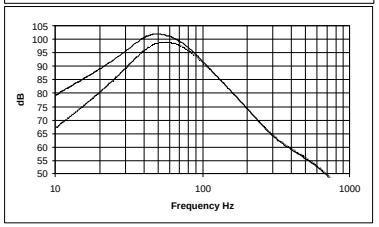
- Rear = 1.0 ft^3 sealed
- Front = 1.5 ft^3 @ 60 Hz (Three 4" x 11.25" ports) - *Very high output, narrow response. Good for Rap, Rock and SPL! Boomer!*





Sealed Bandpass (SBP)

- Rear = 1.0 ft^3sealed
- Front = 1.0 ft^3 @ 55Hz (Two 4" x 14.75" ports) - *Great*

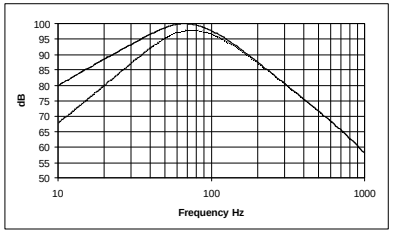


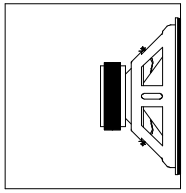
Infinite Baffle

- Excellent performance for all types of music at moderate levels.

Sealed

- 1.5 ft^3 - *Good linear response, excellent small enclosure. Excellent for high SPL, multiple driver applications.*





Sealed (S)

SPECIFICATIONS & THIELE/SMALL PARAMETERS

	SPL10	SPL12	SPL15
Frequency Response (Hz)	32-500	30-500	25-500
Sensitivity (2.83v/1m)	92 dB	94 dB	95 dB
Impedance (nominal Z, ohms)	2	2	2
Rated Program Power, Watts	250	300	400
Fs (Hz)	33	30	23
Qts	.528	.362	.360
Qms	8.31	4.77	9.22
Qes	.564	.391	.380
EBP (Fs/Qes)	58.5	76.7	60.5
Vas (ft^3)	1.51	3.20	9.82
Vas (liters)	43	91	278
Vas (m^3)	.043	.091	.278
Cms (um/N)	267	245	229
DCR (ohms)	1.53	1.53	1.60
Levc (mH) @ 1 KHz	1.2	1.2	1.80
BL (Tesla m)	7.06	9.26	11.20
Sd (in^2)	52.1	76.0	143
Sd (m^2)	.034	.049	.092
Sd (cm^2)	336	490	924
X max; one way (linear mm)	6.6	6.6	7.6
X max; one way (peak mm)	19	21	30
Vd (linear cm^3)	222	323	702
Vd (peak cm^3)	638	1029	2772
Vd (linear m^3)	.000222	.000323	0.000702
Vd (peak m^3)	.000638	.001029	0.002772
Mms (grams)	90.0	118	201
Magnet Assembly (oz)	136	172	238
Magnet Weight (oz)	42	58	100
Vf (volume of frame, in^3)	135	200	320
Coil length (mm)	23	23	27.9

SELECTING AN ENCLOSURE

There are several different enclosure designs for different applications. The SPL subwoofers work very well in all of the following enclosure designs. It is up to you to select the specific enclosure that will work the best for your particular application.

Infinite Baffle

Infinite baffle is the simplest type of subwoofer installation. In this type of installation, the woofer(s) is mounted to a baffle which is then mounted to either the rear deck or back seat of the vehicle. The best results are achieved when the trunk area is virtually airtight and isolated from the passenger compartment.

Pros

- Excellent low frequency extension
- Excellent transient response
- Uses almost no trunk space

Cons

- Lower power handling
- Low to medium efficiency

Sealed Enclosure

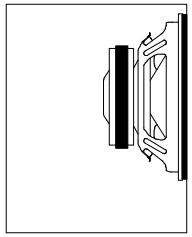
Sealed enclosures are relatively simple to build and install, as all that is required is an airtight box. The larger the sealed enclosure, the more the performance resembles that of an infinite baffle installation.

Pros

- Very good low frequency extension
- Very good transient response
- High power handling

Cons

- Medium efficiency



Sealed (S)

Vented Enclosure

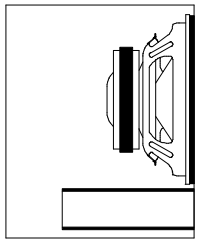
Vented enclosures use a sealed enclosure with a vent or port in the box which is tuned to resonate at a specific frequency.

Pros

- Good low frequency extension down to the tuning frequency
- High power handling down to the tuning frequency
- Higher output than sealed enclosures

Cons

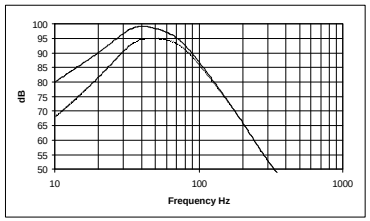
- Low power handling below the tuning frequency
- Almost no output below the tuning frequency

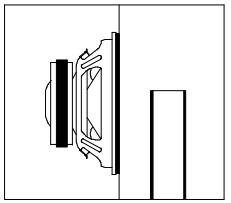


Vented (V)

Sealed Bandpass

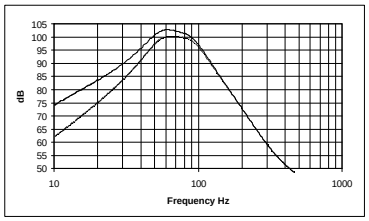
- Rear = 1.5 ft^3 sealed
- Front = .75 ft^3 @ 48 Hz (4" x 13" port) - *High output with good low frequency extension. Good for Rock or Rap.*





Sealed Bandpass (SBP)

- Rear = .5 ft^3sealed
- Front = .75 ft^3 @ 66Hz (4" x 5.25" port) - *Very high output. Great for Rap music.*

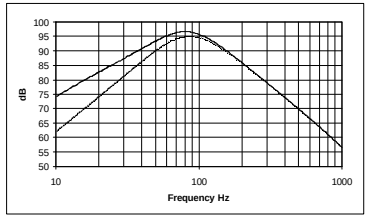


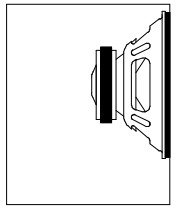
Infinite Baffle

- Excellent performance for all types of music at moderate levels.

Sealed

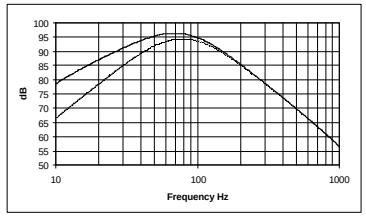
- .5 ft^3 - *Good linear response, excellent small enclosure. Excellent for high SPL, multiple driver applications.*





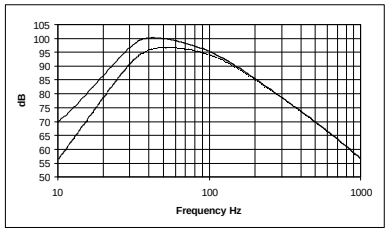
Sealed (S)

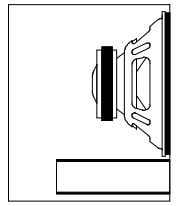
- 1.0 ft^3 - *Good linear response, excellent all around enclosure.*



Vented

- 1.5 ft^3 @ 33Hz (4" x 14" port) - *Deep bass, flat response. Good small enclosure.*





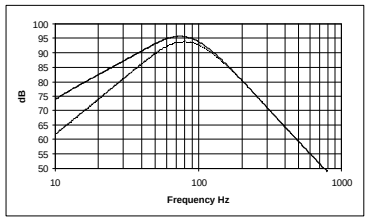
Vented (V)

SUGGESTED ENCLOSURES

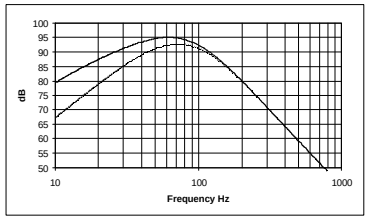
Infinite Baffle

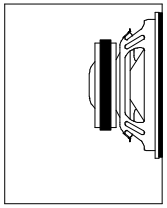
Sealed

- .5 ft^3 - *Good linear response, excellent small enclosure. Excellent for high SPL, multiple driver applications.*



- 1.5 ft^3 - *Good linear response, excellent all around enclosure.*

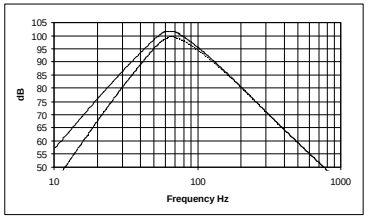




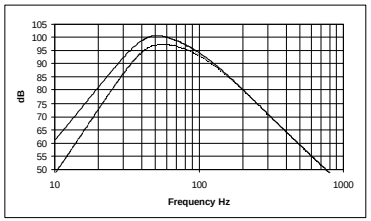
Sealed (S)

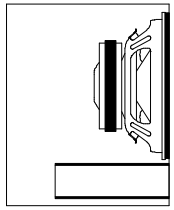
Vented

- .75 ft^3 @ 50 Hz (4" x 11.5" port) - *High output. Good small enclosure.*



- 1.0 ft^3 @ 40 Hz (4" x 14.25" port) - *High output with good low frequency extension. Great for Rock music.*



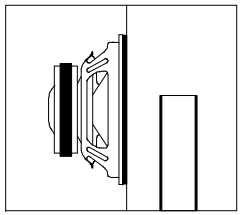


Vented (V)

Sealed Bandpass Enclosure

Sealed bandpass enclosures enclose both sides of the woofer(s). An airtight enclosure is built around the front and back of the woofer and one chamber is ported to a specific frequency.

Pros	*Cons*
• High power handling within the operating frequencies • Very high output within the range of the operating frequencies	• Low power handling beyond the tuning frequency • Poor to moderate transient response • Poor low frequency extension



Sealed Bandpass (SBP)

CALCULATING (NET) INTERNAL ENCLOSURE VOLUMES

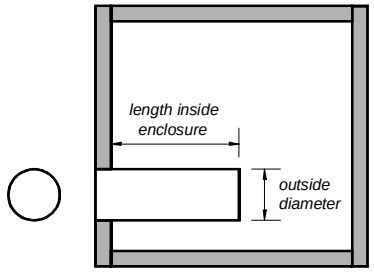
When constructing any type of enclosure, you must be aware that the outside dimensions DO NOT represent the true (Net) volume inside. Such things as woofers, ports, thickness of enclosure material, dividing walls, and any internal bracing will reduce the total amount of the actual air space available. The following worksheet has been designed to provide you with the necessary steps to accurately calculate the absolute (Net) internal volume of any given enclosure.

Calculating Cylindrical Port Volume

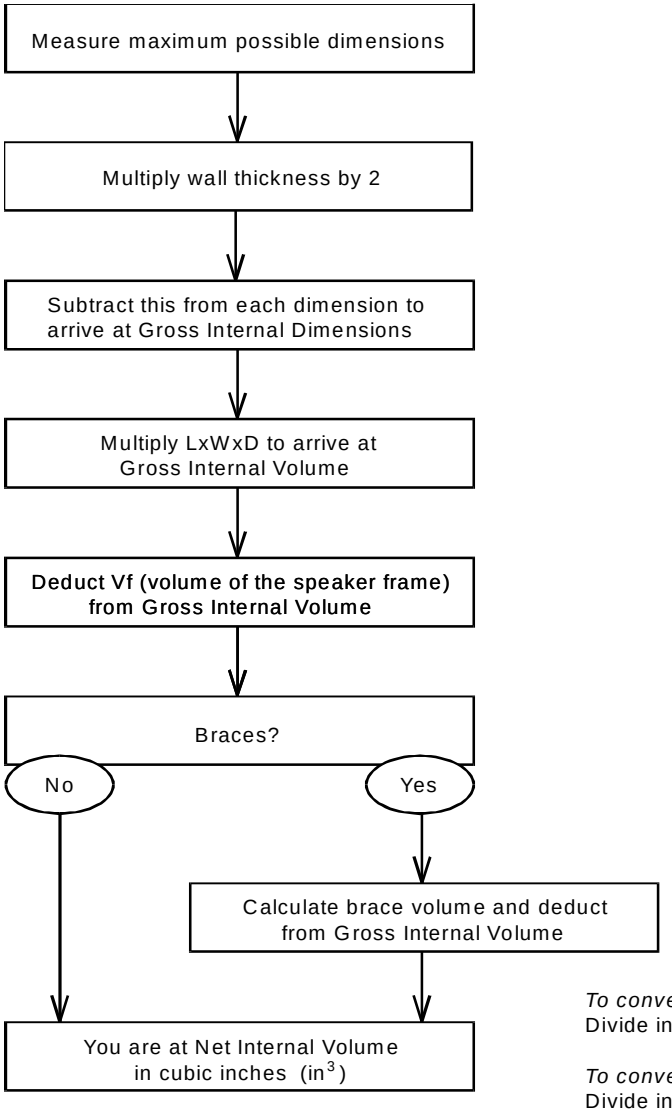
1. Measure the outside diameter of the port and divide by 2 for the radius.

2. Square the radius and multiply by 3.14 (π) to arrive at outside port area.

3. Multiply the area by the length of the port *inside* the enclosure for the port volume.



ENCLOSURE VOLUME FLOWCHART



To convert to LITERS:
Divide in^3 by 61.03

To convert to CUBIC FEET:
Divide in^3 by 1728

BUILDING THE ENCLOSURE

- Determine the dimensions of your enclosure.
- Be certain the box you have designed will fit into the location you have chosen. Sometimes making a cardboard box with the same outside dimensions is helpful.
- Use 3/4 inch thick Medium Density Fiberboard (MDF) or High Density Particleboard. It is preferable to cut the wood with a table saw to ensure straight, even joints. If a table saw is not available, a circular saw is acceptable.
- Use a "T" square to verify precise right angle gluing.
- Use a high quality wood glue and air nails or wood screws to assemble the enclosure. Elmer's® woodworker's glue and Weldwood® work well. To guarantee an airtight box, seal each inside joint with silicone sealant.
- For Sealed Enclosures, stuff the chamber with 50-75% filling (approximately 1.5 pounds per cubic foot) of fiberglass insulation or Dacron®.
- For Vented Enclosures, staple 1 inch thick fiberglass insulation or Dacron to all walls of the enclosure except the baffle to which the woofer is mounted.
- Use the supplied gasket to seal the woofer in the enclosure and eight(8) wood screws or T-nuts and bolts. Progressively tighten each of the bolts or screws to prevent warping the woofer frame.
- Use slide-on connectors to attach speaker wires. Do not solder wires to the

SUGGESTED ENCLOSURES

The following designs include a variety of enclosure sizes and types. Each design has two frequency response curves; one showing predicted "In-Car" response, and the other showing "Half-Space Anechoic" (out-of-car) frequency response. The performance difference between the two curves is a result of the natural acoustics of an "average" automotive environment. This "average" transfer function is only an approximation of what you may expect to see in your car. Every car is different. Each curve was generated using 2.83 Volts across both voice coils in parallel and measured at 1 meter. Also, each frequency response curve includes a 12 dB/octave low pass at 100 Hz for sealed and vented enclosures and 200 Hz for bandpass enclosures. The response curves can help you visualize relative performance differences between designs. Read through the descriptions given for each enclosure and select the one that suits your needs.

Remember: all suggested enclosure volumes are Net, and DO NOT include woofer, port, and bracing displacement!