## *SPECIFICATIONS*

| POWER | 4 Ω Stereo (8 Ω Bridged) (12.8 Vdc) | 4 Ω Stereo (8 Ω Bridged) (14.4 Vdc) | 2 Ω Stereo (4 Ω Bridged) (14.4 Vdc) | 1 Ω Stereo (2 Ω Bridged) (14.4 Vdc) | Maximum Rated output |
|---|---|---|---|---|---|
| 102 | 25W x 2 (50W x 1) | 40W x 2 (80W x 1) | 50W x 2 (100W x 1) | NA | 100 Watts |
| 202 | 50W x 2 (100W x 1) | 75W x 2 (150W x 1) | 100W x 2 (200W x 1) | NA | 200 Watts |
| 302 | 75W x 2 (150W x 1) | 100W x 2 (200W x 1) | 150w x 2 (300W x 1) | 150w x 2 (300W x 1) | 300 Watts |

**THD** <0.1%
**Signal to Noise** >100 dB
**Frequency Response** 20 Hz to 20 kHz ± 0.5 dB
**Stereo Separation** >90 dB
**Damping** >200
**input Sensitivity** 300 mV to 5.0 Volts
**Input Impedance** 1 Ok Ohms

## *Crossover Specifications*

**Low Pass SIP: 89** Hz at **12** dB/Octave
**High Pass SIP:** 150 Hz at 12 dB/Octave

## *Hawkins Bass Control*

**Sub Sonic Filter: No** boost, High Pass filter at 13 Hz.
**Hawkins Bass Control: 0** to **+9 dB** Boost(variable), 6 dB Boost (fixed); Boost and Sub Sonic filter frequency at 45 Hz.

## *Dimensions (W x D x H)*

**RUBICON102: 7" X 9.8" X 2.25"**
**RUBICON202: 7" X 9.8" X 2.25"**
**RUBICON302: 8.5" X 9.8" X 2.25"**

SOUNDSTREAM®
*TECHNOLOGIES*

**SOUNDSTREAM TECHNOLOGIES**
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ph 916.351.1288 .fax 916.351.0414
*rev A - 3/10/98*

SOUNDSTREAM®
*TECHNOLOGIES*


# RUBICON
# 102
# 202
# 302
# Power Amplifiers

Owner's Manual
and
Installation Guide

## Congratulations!

You now own the Soundstream RUBICON amplifier, the product of an uncompromising design and engineering philosophy. Your Soundstream RUBICON amplifier will outperform any other amplifier in the world.

To Maximize the performance of your system, we recommend that you thoroughly acquaint yourself with its capabilites and features. Please retain this manual and your sales receipt for future reference.

Soundstream amplifiers are the result of American innovation and the highest quality control standards. When properly installed, they will provide you with many years of listening pleasure. Should your amplifier ever need service or replacement due to theft, please record the following information which will help protect your investment.

Model and Serial #_____

Dealer's Name_____

Date of Purchase_____

Installation Shop_____

Installation Date_____

***CAUTION!***

***Prolonged listening at high levels may result in hearing loss. Even though your new Soundstream Rubicon amplifier sounds better than anything you've ever heard, exercise caution to prevent hearing damage.***

## *Table of Contents*

## *DESIGN FEATURES*

- **RUBI Power Supply** (Rapid-Use Branched Impulse) Our new power supply eliminates "power sags" during-low frequency reproduction by rapidly increasing the duty cycle, stabilizing the power supply and allowing it to deliver the power required when reproducing low frequencies. Also, greater reserve gate power is now stored for low voltage conditions that occur during extreme conditions.

- **STACT™** (Stabilized Apex Current Topology) Reduces power supply stress by 50%. Use of inverted channels usually degrades the stereo image due to phase reversal of even order harmonic distortion that occurs between the inverted channels. In the STACT design inversion is done at the power amplifier drive stage. Since the fully symmetrical power amplifier produces no even harmonic distortion itself and all preamp circuitry (which does produce even harmonics) is run completely in phase, no even harmonic distortion phase reversal occurs.

- **Trident™ Protection** Three types of protection for RUBICON amplifiers;
  1. Output protection against short circuits or improper loads.
  2. Ground fault detection. Shuts down the amplifier when a significant (5 volt or greater) voltage fluctuation occurs between electrical (turn on lead) and battery ground.
  3. Thermal protection. Will put the amplifier into thermal rollback or shut the amplifier down in extreme thermal conditions.

- **Hawkins Bass Control** Provides focused subwoofer boost and routes wasted subsonic power to the audible bandwidth. The RUBICON202 & 302 have the variable version of Hawkins Bass Control which allows you to boost bass from 0 to 9dB at 45Hz. A built-in subsonic filter at 45Hz helps protect the speakers. The RUBICON102 contains the fixed Hawkins Bass Control which allows you to boost bass 6dB at 45Hz. A built-in subsonic filter at 45Hz helps protect the speakers.

- **Harmonic Bass Alignment™** The 2nd and 3rd order harmonic peaks are critically aligned to fundamental peaks at low frequencies. This produces tighter, more accurate bass reproduction.



- **Drive Delay II Muting™** Amplifier section now powers up 2 - 3 seconds after power supply eliminating turn on pops. Turn off process is reversed. Amplifier section turns off first, followed by power supply.

- **Dynamically Optimized Power Grid™** Power grid is now evenly distributed between primary and secondary power supplies, providing greater dynamics and improved RF filtering.

- **High Power/High Current Switch(302 *only*)** Allows user to match the amplifier to the load being driven allowing greater system flexibility and greater output.

- **Chassisink™** All transistors are sandwiched between the circuit board and the heatsink to provide cool efficient amplifier operation in a smaller package.

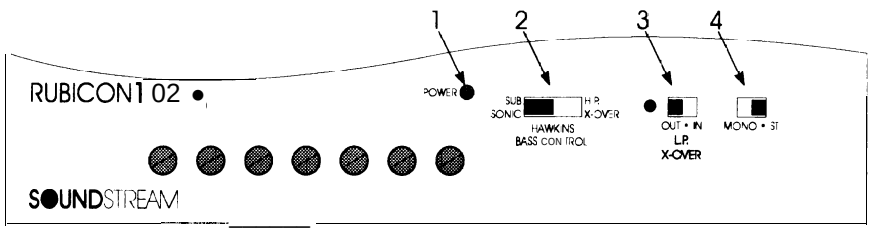
- **Differentially Balanced RCA Input** Eliminates ground loops related noise in the audio.

- **Built-in Staggered S.I.P. Crossover Networks** Built-in two-way electronic crossover is designed to send either high or low pass information to the amplifier. 12dB/oct Highpass and Lowpass.

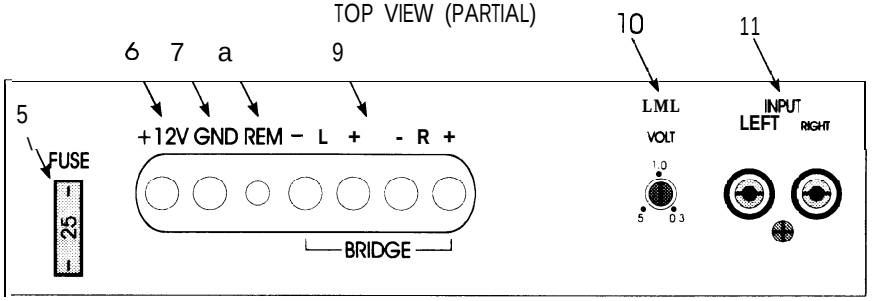
- **Flexible Dual Input Level Control** (202 *&* 302 only): 300mV to 5V input sensitivity. Separate left and right level controls allows user to optimize system level control.

- **Symmetrical Discrete Balanced Class** A **Drive Boards** Auto-adjusts for linear performance in low impedance loads.

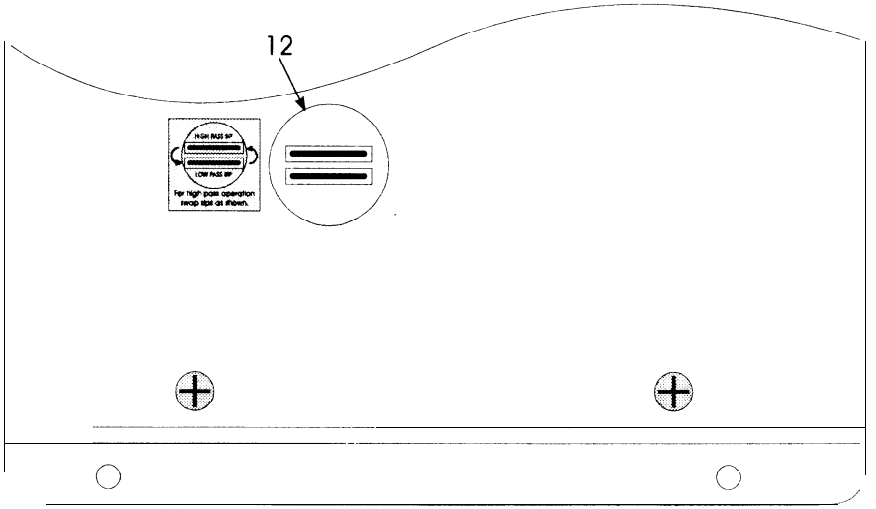
- **Removable Front Spoiler** Allows for stealth installation of RCA, Balanced Line, Speaker and Power wiring.




TOP VIEW (PARTIAL)



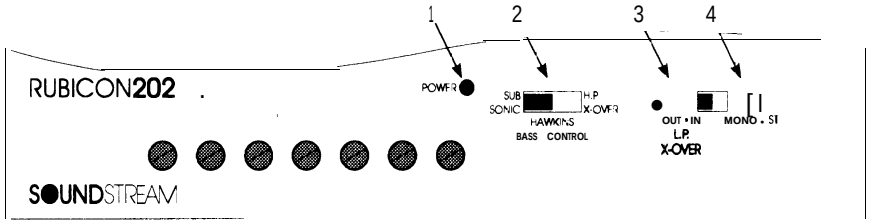

FRONT VIEW



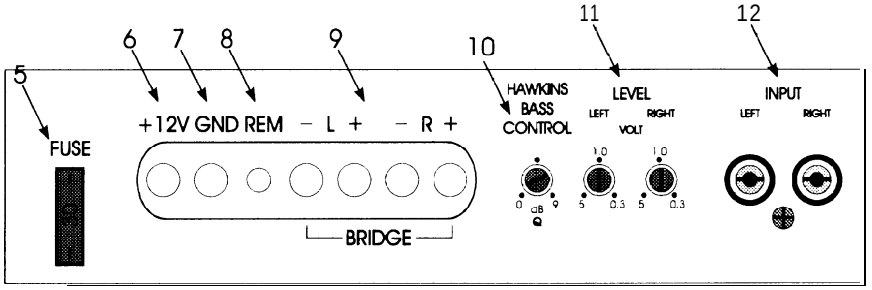

BOTTOM VIEW (PARTIAL)

# ***KEY TO CALLOUTS***

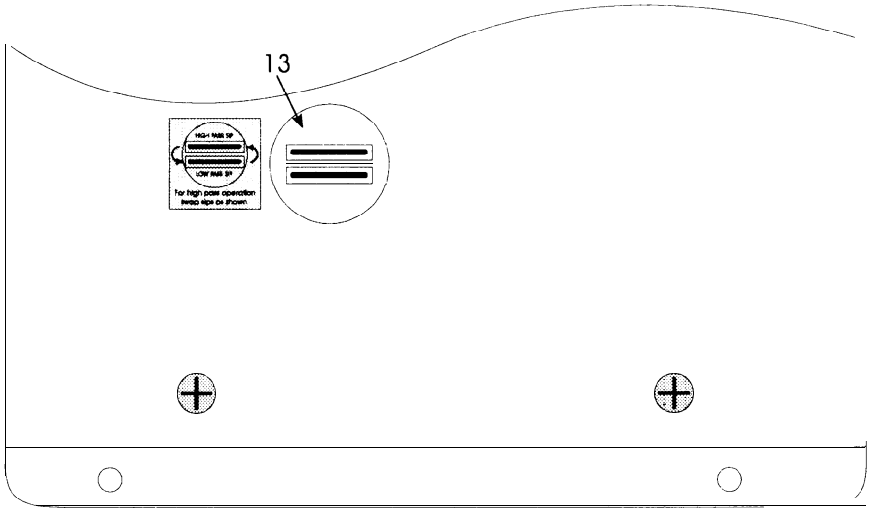
1. Power **LED -** Indicates amplifier power.
2. **Subsonic, Hawkins Bass Control, H.P. Xover Switch -** Selectable high pass filter frequency range. Select "SUB SONIC" to engage the Sub Sonic filter at **13Hz** with no boost. Select "Hawkins Bass Control" to engage the Sub Sonic filter at 45 Hz with available boost. Select "H.P. XOVER" to engage the amplifier's high pass filter at 45Hz or **150Hz** for running satellite speakers.
3. Low **Pass XOVER Switch -** Selectable low pass filter for driving subwoofers at **89Hz**. *Note: Do* ***not have the "L.P. XOVER" and the "H.P. XOVER"*** *engaged at the same time.*
4. **MONO/ST Switch -** "MONO" for bridged mono operation with a single input signal (right channel only). "ST" for normal stereo operation.
5. **FUSE -** Main power supply fuse. *Warning: Replace only with the same value fuse!*
6. **+12V -** Connected to a fuse or circuit breaker, then to the battery's positive terminal
7. GND **-** Main ground connection. Bolt to a clean chassis point in the vehicle.
8. **REMOTE -** Remote turn-on input from the head unit. Accepts **+12V**.
9. **Speaker Connection Terminal -** Speaker connections for Ch's 1 & 2.
10. **Input Levels -** Independent Left and Right input level controls.
11. **RCA Inputs -** Right and Left channel RCA inputs.
12. **Crossover S.I.P.'s -** Crossover frequency settings for amplifier.




TOP VIEW (PARTIAL]



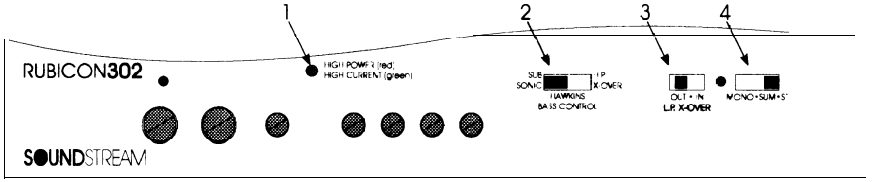

FRONT VIEW



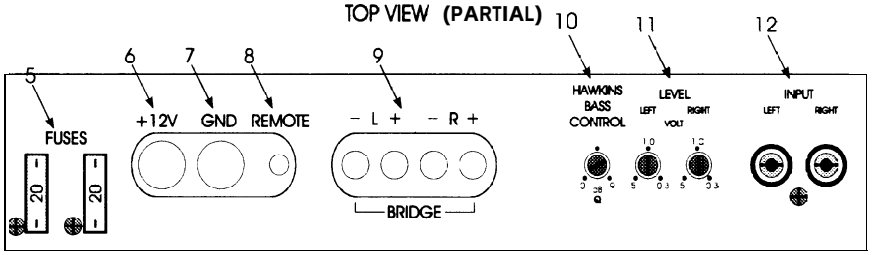

**BOTTOM VIEW (PARTIAL)**

# ***KEY TO CALLOUTS***

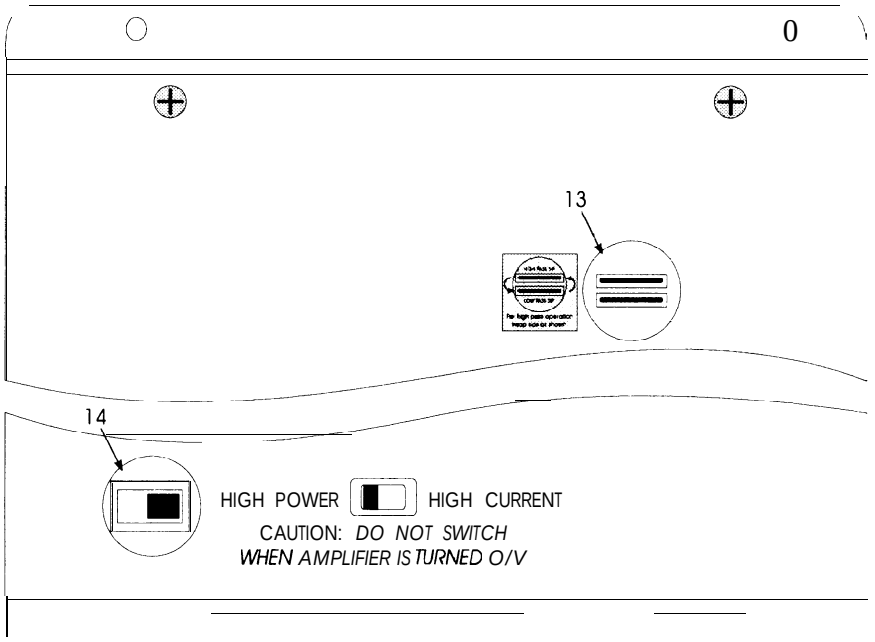
1. **Power LED -** Indicates amplifier power
2. **Subsonic, Hawkins Bass Control, H.P. Xover Switch -** Selectable high pass filter frequency range. Select "SUB SONIC" to engage the Sub Sonic filter at 13Hz with no boost. Select '"Hawkins Bass Control" to engage the Sub Sonic filter at **45** Hz with available boost. Select "H.P. XOVER" to engage the amplifier's high pass filter at 45Hz or **150Hz** for running satellite speakers.
3. **Low Pass XOVER Switch -** Selectable low pass filter for driving subwoofers at 89Hz. ***Note:*** *Do not have the "L.P. XOVER" and the "H.P. XOVER" engaged at the same time.*
4. *MONO/ST* **Switch** - "MONO" for bridged mono operation with a single input signal (right channel only). "ST" for normal stereo operation.
5. **FUSE -** Main power supply fuse. *Warning: Replace* ***only*** **with** *the same value fuse!*
6. **+12V -** Connected to a fuse or circuit breaker, then to the battery's positive terminal
7. GND **-** Main ground connection. Bolt to a clean chassis point in the vehicle.
8. **REMOTE -** Remote turn-on input from the head unit. Accepts **+12V**.
9. **Speaker Connection Terminal -** Speaker connections for Ch's **1&** 2.
10. **Hawkins Bass Control "Boost" Adjustment -** Varies from **0** to **+9dB** of boost when **the** Hawkins Bass Control circuit is engaged
11. **Input Levels -** Independent Left and Right input level controls.
12. **RCA Inputs -** Right and Left channel RCA inputs.
13. **Crossover S.I.P.'s -** Crossover frequency settings for amplifier.




TOP VIEW (PARTIAL)




FRONT VIEW




BOTTOM VIEW (PARTIAL)



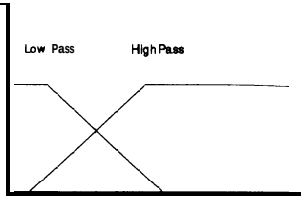
# KEY TO CALLOUTS

1. Power **LED -** Indicates amplifier power, either in High Power or *Auto High Current.*
2. **Subsonic, Hawkins Bass Control, H.P. Xover Switch -** Selectable high pass filter frequency range. Select 'SUB SONIC" to engage the Sub Sonic filter at 13Hz with no boost. Select "Hawkins Bass Control" to engage the Sub Sonic filter at 45 Hz with available boost. Select "H.P. XOVER" to engage the amplifier's high pass filter at 45Hz or **150Hz** for running satellite speakers.
3. Low Pass **XOVER Switch -** Selectable low pass filter for driving subwoofers at **89Hz**. Note: *Do not have the "L.P. XOVER" and the 'HP. XOVER" engaged at the same time.*
4. **MONO/SUM/ST Switch -** "MONO" for bridged mono operation with a single input signal (right channel only). "SUM" for bridged mono operation summing two input signals (left and right). "ST" for normal stereo operation.
5. **FUSE -** Main power supply fuse. Warning: Replace only with the same value fuse!
6. **+12V -** Connected to a fuse or circuit breaker, then to the battery's positive terminal
7. GND **-** Main ground connection. Bolt to a clean chassis point in the vehicle.
8. REMOTE **-** Remote turn-on input from the head unit. Accepts **+12V**.
9. **Speaker Connection Terminal -** Speaker connections for Ch's 1 **&** 2.
10. **Hawkins Bass Control "Boost" Adjustment -** Varies from 0 to **+9 dB** of boost when the Hawkins Bass Control circuit is engaged.
11. **Input Levels -** Independent Left and Right input level controls.
12. RCA **Inputs -** Right and Left channel RCA **)** inputs.
13. **Crossover S.I.P.'s -** Crossover frequency settings for amplifier.
14. **High Power / High Current Switch -** Use HIGH CURRENT for loads at 1 ohm stereo (2 ohms mono).
    CAUTION: DO NOT SWITCH WHEN AMPLIFIER **IS** TURNED ON.

## *CROSSOVER & HAWKINS BASS CONTROL ADJUSTMENTS*

### CROSSOVER

In most car audio installations, there is a tendency for a "midbass boom." Because of their interior dimensions, most cars will resonate or ring at these midbass frequencies. If we design the system so there is reduced output information in this region, the final response is very smooth and natural sounding.

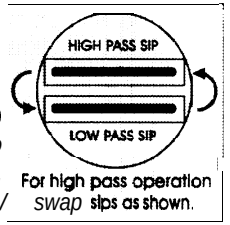



**Staggered Crossover**
12 dB/octave low pass,
12 dB/octave high pass

The RUBICON**102, 202** & 302 incorporates staggered electronic crossovers. The high and low pass portions of the crossover can be set independent of one another.

### CHANGING FREQUENCIES

The RUBICON102, 202 & 302 come with a 90Hz Low Pass S.I.P. and a 45Hz Hawkins and High Pass S.I.P. (Series In-line Package resistor network) If you are using this amplifier in the Low Pass Configuration, you will not need to change the S.I.P. crossover. If you are using the amplifier in a **High Pass** configuration we reccomend that you use a higher frequency (150Hz) for your crossover. *In order to receive a higher crossoverpoint,* remove *the factory Low Pass/ S. I. P. (The S.I. P. with the* ***white*** *dot), and the factory High Pass/Hawkins S.I. P out of the amplifier. Place the S.I. P. with the white dot in the socket for High Pass/Hawkins. This will give a High Pass frequency of 150Hz.* Then place the remaining S.I.P. in the Low Pass socket. **Make Sure That the Low Pass Crossover is NOT Engaged while the High Pass crossover is engaged!** If you want to use a frequency other than the factory preset frequencies follow the chart to the left or the formula below to select your own crossover points.



For high pass operation swap sips as shown.

| SIP (KΩ) | LP (Hz) | HP (Hz) |
|---|---|---|
| 180 | NA | 22 |
| 120 | NA | 26 |
| 82 | NA | 33 |
| 62 | NA | 39 |
| 47 | 23 | 47 |
| 43 | 25 | 50 |
| 30 | 36 | 66 |
| 22 | 49 | 86 |
| 15 | 71 | 120 |
| 12 | 89 | 146 |
| 8.2 | 130 | 208 |
| 4.7 | 228 | 353 |
| 3.3 | 324 | 498 |
| 2 | 535 | 813 |


S.I.P.

***NOTE:*** *The following formulas may be used to determine values in creating "custom" resistor packs.*

*The* ***LowPass*** *frequency is equal to 1,070,000 divided by the individual resistor value, or 1,070,000 / Ohms = X Hz.*

*Example: 1,070,000 / 12,000 = 89 Hz*

*The* ***High Pass*** *frequency is equal to 1,600,000 divided by the individual resistor value plus 13, or (1,600,000 / R ohms) + 13 = X Hz.*

*Example: (1,600,000 / 12,000) + 13 = 146 Hz*

*To make a custom S.I.P., use 4 identically valued resistors of 2% or tighter tolerance. See the drawing of the S.I.P. for more information.*



## *Hawkins Bass Control - Theory and* Use

**Hawkins Bass Control (variable)** is a unique subwoofer control circuit included with the Soundstream **RUBICON202 & 302** amplifiers. It is capable of removing subsonic energy in program material below 45 Hz at 12 **dB/Octave,** while boosting subwoofer frequencies. The circuit consists of two controls. One engages a subsonic High Pass filter at 45 Hz, and the other adjusts the amount of boost from 0 to **+9 dB(+6dB** for the RUBCON102). The Hawkins Bass Control functions on either pair of channels **(1&2** or **3&4)** if their low pass filter is engaged.

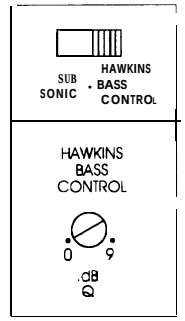


**FIG.** 1

The **Boost control** adjusts the amount of level applied at the set frequency, and is adjustable from 0 to **+9 dB** (see figure 2). When the boost is set to 0, Hawkins Bass Control acts as a sub sonic filter only. The simple act of removing potentially harmful low frequencies can improve system output by as much as 3 **dB.**

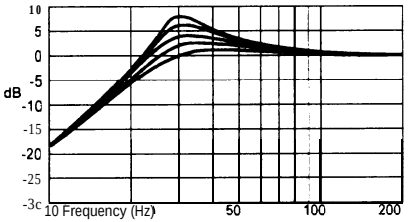


FIG. 2 VARIABLE BOOST

**Application**

Subwoofer drivers in general have excellent power handling characteristics over their operational bandwidth. This bandwidth is **de**termined by many factors, including driver design, and enclosure type. It is possible to overdrive any subwoofer driver by sending powerful signals outside of its operational bandwidth. These potentially damaging signals can be removed by adding a subsonic filter. Figure 3 shows the effectiveness of the Hawkins Bass Control on woofer excursion in a vented enclosure. The woofer travels 7.5 mm at 10 Hz. With Hawkins Bass Control properly adjusted, this excursion can be reduced to less than 1 mm. This is of great benefit to lowering woofer distortion and increasing output.

**Adiustment**

An-easy method of optimizing your existing subwoofer enclosure with **Hawkin's** Bass Control is as follows:

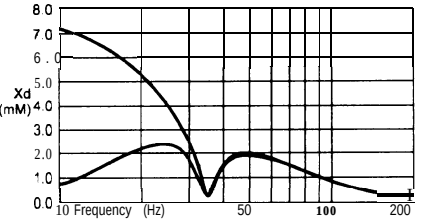


FIG. 3 Limited Excursion

1. Adjust the boost control to full counter clock-wise (0) position.
2. Set the bass control switch to 'HAWKINS BASS CONTROL".
3. Play moderate to loud bass material.
4. Adjust the boost (Q) control until you reach the desired level.

With Soundstream's Hawkins Bass Control, the boost and frequency control can provide the "tailoring" needed for any type of "assisted" design and any woofer in any type of installation.

# INSTALLATION STEP 1

## SELECTING THE SPEAKER OUTPUT MODE

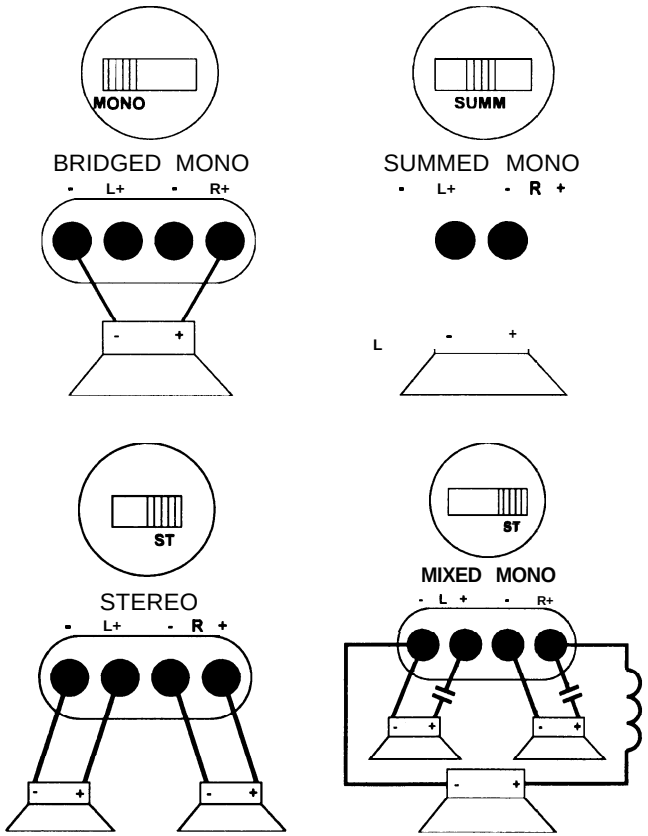
The RUBICON**102, 202 and 302** amplifiers have the ability to operate in any one of the following modes:

***Stereo (STACT / Mixed Mono):*** Use this mode for either stereo operation (left and right channels) or for Mixed Mono operation (stereo left and right channels plus bridged mono for a subwoofer).

***Summed* Mono (302 *only)***: Use this mode to get a bridged mono output while using both the left and right inputs and gain controls.

***Bridged Mono:*** Use this mode to get a bridged mono output while using only the right channel input and gain control (for use with a singular mono input).

Please follow the wiring schemes below for the correct operation:






# INSTALLATION STEP 2

## WIRING

### POWER AND GROUND

To ensure maximum output from your RUBICON amplifier, use high quality, low-loss power and ground cables and connections. The RUBICON102 & 202 amplifiers will accept up to 8 gauge power and ground cables. The RUBICON302 will accept up to 4 gauge power and ground cables. Determine from the chart below the minimum gauge power and ground wire for your application.

| | *up to 10'* | *up to* 20' |
|---|---|---|
| ***RUBICON 102*** | ***8*** or 10 gauge | ***8*** gauge only |
| ***RUB/CON 202*** | ***8*** or 10 gauge | ***8*** gauge only |
| ***RUB/CON 302*** | ***4*** or 8 gauge | 4 gauge only |

### CIRCUIT BREAKERS AND FUSES

***EXTERNAL***

Like all audio components, the RUBICON amplifiers must be fused near the battery. A fuse or circuit breaker must be located within 18" of the battery. This will prevent a fire in the event of a shorted cable. See the chart below to determine the correct fuse value.

***INTERNAL***

The RUBICON amplifiers are fused with an automotive-type or Maxi-fuse. In the event of a blown power supply fuse(s), replace with the correct value fuse found in the chart below. Never **replace the fuse with a higher value than what is supplied.** ***This may result in amplifier damage and will void the warranty!***

### RUB/CON Amplifier Fuse Values

| | *Amplifier Fuse* | ***Battery** Fuse / Circuit Breaker* |
|---|---|---|
| **RUB/CON *102*** | ***25*** amp automotive | ***30*** amp |
| ***RUBICON 202*** | ***30*** amp automotive | ***40*** amp |
| ***RUBICON 302*** | ***(2) 20*** amp automotive | ***50*** amp |

### REMOTE TURN-ON

Connect the "Remote" line to the turn-on lead from the source unit. When +12 Volts is received, the amplifier will turn on.

## *WIRING cont'd*

### *SIGNAL CABLE*

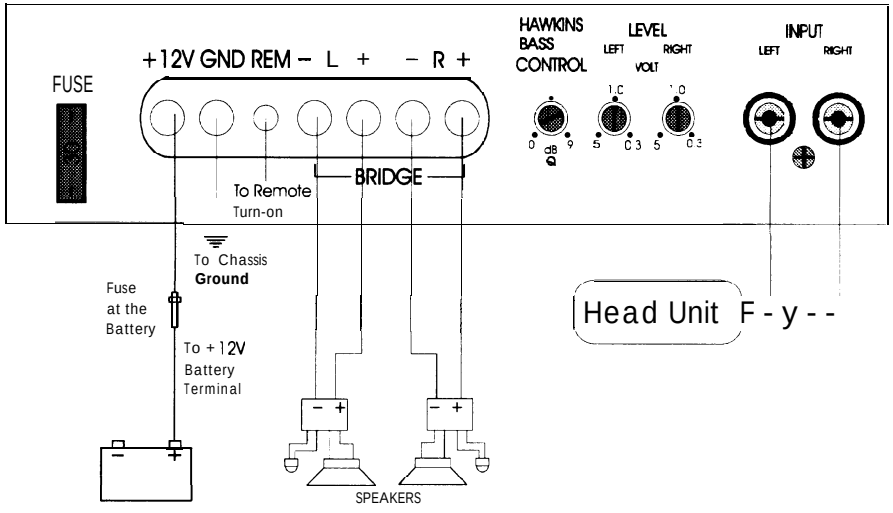
Use a high quality cable that will be easy to install and has minimal signal loss to guarantee optimum performance.

### *SPEAKER CABLE*

The RUBICON amplifiers will accept up to 8 gauge speaker cable. Use a high quality, flexible, multi-strand cable for best performance and longevity.

## *SAMPLE WIRING DIAGRAM*

(RUBICON**202** shown)






# INSTALLATION STEP 3

## *INSTALLATION AND MOUNTING*

### *AMPLIFIER LOCATION*

The RUBICON amplifiers employ highly efficient circuitry, a custom-engineered heat **sink,** and a unique Chassisink construction to maintain lower operating **tem**peratures. Additional cooling may be required if the amplifier is located in a tightly confined area or when driving especially low impedance loads at extremely high levels.

When mounting the amplifier, it should be securely mounted to either a panel in the vehicle or an amp board or rack that is securely mounted to the vehicle. The mounting location should be either in the passenger compartment or in the trunk of the vehicle, away from moisture, stray or moving objects, and major electrical components. To provide adequate ventilation, mount the amplifier so that there are at least two inches of freely circulating air above and to the sides of it.

### *MOUNTING THE AMPLIFIER*

a. Using the amplifier as a template, mark the holes on the mounting surface.
b. Remove the amplifier and drill **the holes for the mounting screws.**
c. Secure the amplifier to the mounting surface using the supplied hardware.

### *WIRING*

a. Run and connect the audio signal and remote turn-on cables to the amplifier from the source unit.
b. Carefully run the positive cable from the amplifier to a fuse or circuit breaker within 18" of the battery.
c. Connect the fuse or circuit breaker lead to the battery. Leave the circuit breaker off or the fuse out until everything is bolted down.
d. Secure the ground cable to a solid chassis ground on the vehicle. It may be necessary to sand paint down to raw metal for a good connection.
e. Double check each and every connection!
f. Reconnect the fuse or circuit breaker.

### *POWER UP*

Power up the system, there may be a 2-3 second delay from the time the source unit is turned on to the time that the amplifier turns on, which is normal. Once the amplifer LED is on and the source unit is playing, you should have sound coming from the speakers.

# INSTALLATION STEP 4

## LEVEL SETTING

The input levels are adjusted by means of the individual channel input level controls located on the front of the amplifier. This is a unique dual-stage circuit that adjusts both level and gain. This topology maintains better S/N Ratio even when using sources with minimal output.

In the ideal situation, all components in the audio system reach maximum undistorted output at the same time. If you send a distorted signal to an amplifier, it is simply going to amplify distorted information. The same holds true if an outboard processor or crossover begins to distort before you have maximum output from the amplifier. By setting all components to reach clipping at the same time, you can maximize the output of your system. For the RUBICON amplifiers, follow these steps for setting the input levels:

1. Turn the amplifiers' input levels to minimum position (counter-clockwise)
2. Set the source unit volume to approximately 3/4 of full volume.
3. While playing dynamic source material, slowly increase the amplifiers' input level until a near maximum undistorted level is heard in the system.

## FRONT SPOILER

Once the amplifier is installed and the proper levels set, place the front spoiler in position, and bolt it on using the supplied hardware.



## TRIDENT PROTECTION CIRCUITRY

Your Rubicon amplifier *is* protected against both overheating and short circuits by means of main power supply fuses and the following circuits:

- Speaker Output Protection
- Ground Fault Differential
- A failsafe thermal protection circuit

***NOTE**: If you experience blown main power supply fuses, it is like/y that the amplifier is seeing a dead short, either in the speaker wire or in the speaker itself. **Rectify** the problem before blowing multiple fuses! DO NOT increase values beyond the original fuse value! Doing so will void your warrant and may damage your amplifer.*

## TROUBLESHOOTING

| PROBLEM | CAUSE |
|---|---|
| No Sound and power LED is not lit | 1. No power or ground at the amp.<br>2. No remote turn-on signal<br>3. Blown fuse near the battery |
| No sound, power LED is lit. | 1. No signal input<br>2. The AIRBASS/Accessory switch is in the "IN" position. Move it to the "OUT" position. (302 only) |
| Repeatedly blow amp fuse; frequent activation of Trident protection or Smart Power Supply Circuit | 1. Speaker or leads may be shorted<br>2. Amplifier load my be too low<br>3. Verify adequate amp ventilation |
| Very little output, or output is muffled. | Make sure that ***both*** the L.P. and the H.P. crossvers ***aren't*** engaged |

## SERVICE

Your Soundstream RUBICON amplifier is protected by a limited warranty. Please read the enclosed warranty card for details.