

SOUNDSTREAM[®]
T E C H N O L O G I E S



RUBICON
805/405
5/3 Channel
Power Amplifiers

Owner's Manual
and
Installation Guide

SOUNDSTREAM[®]
T E C H N O L O G I E S

SOUNDSTREAM TECHNOLOGIES

120 Blue Ravine Road • Folsom • California 95630 USA

ph 916.351.1288 • fax 916.351.0414

rev A - 6/9/98

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 capabilities and features. Please retain this manual and your sales receipt for future reference.

Soundstream amplifiers are the result of American innovation and **craftmanship** with 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.*

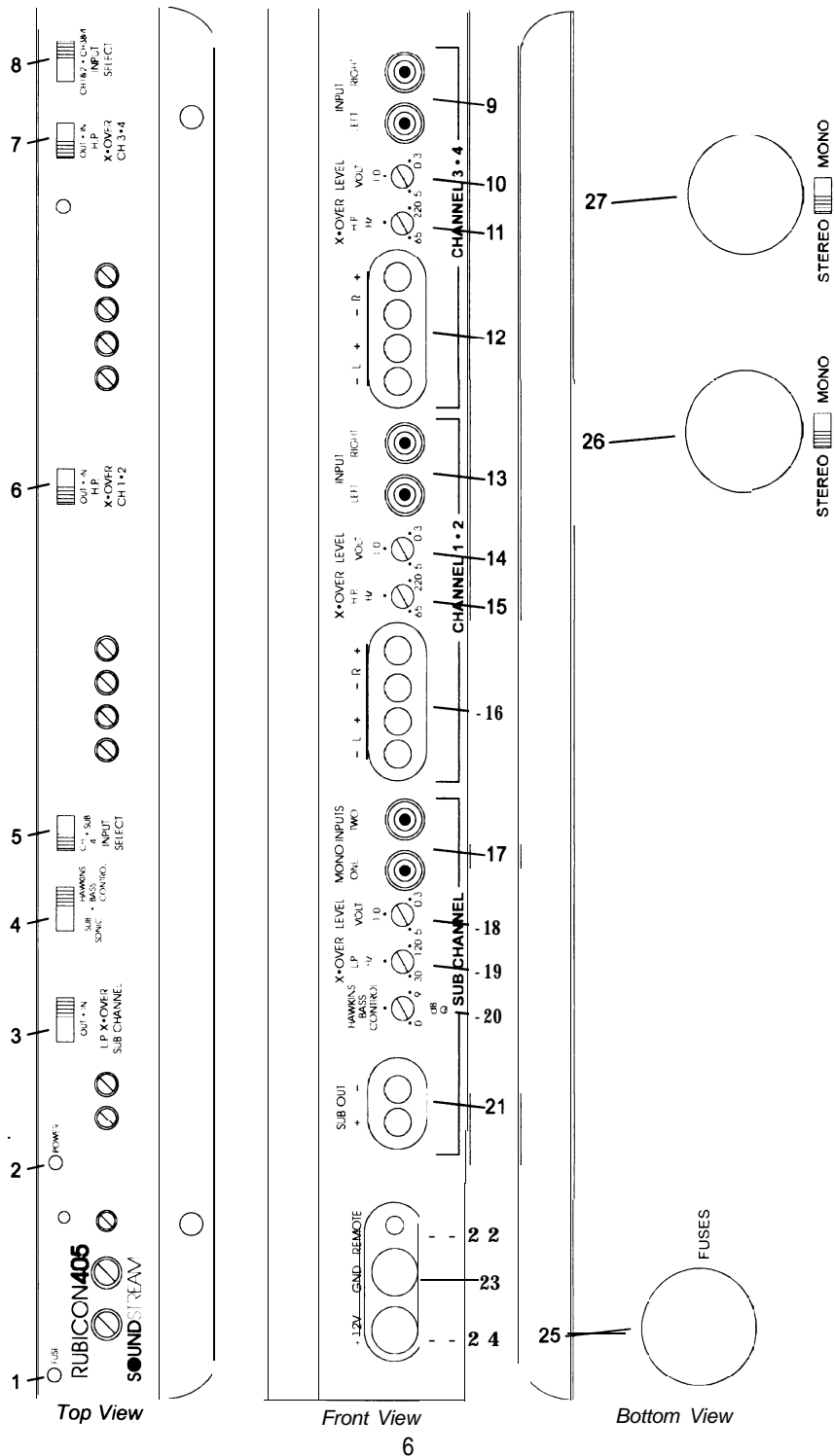
Table of Contents

Design Features	p 4 - 5
Rubicon 405 Amplifier Diagram	p 6 - 7
Rubicon 805 Amplifier Diagram	p 8 - 9
Crossover Adjustments	p 10
Hawkins Bass Control™ Theory and Use	p 11
Installation: Speaker Output Modes	p 12
Installation: Wiring	p 13
Installation: Mounting	p 14
Installation: Level Setting and Front Spoiler	p 15
Sample System Diagrams	p 16 - 20
Protection Circuitry, Service and Troubleshooting . . .	p 21
Specifications	P 22

DESIGN FEATURES

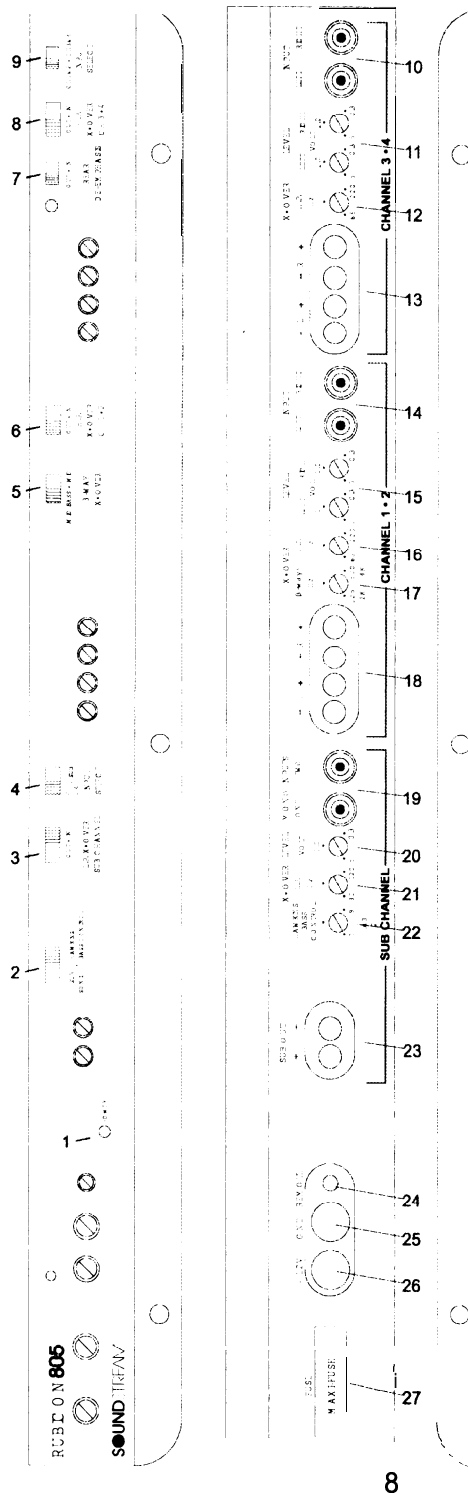
- ◆ **RUBI™** (*R*apid-*U*sed *B*ranching *I*mpulse) This new proprietary power supply topology eliminates “power sags” during low frequency reproduction by rapidly increasing the duty cycle, stabilizing the power supply and allowing it to deliver the power required when reproducing low frequencies. Also, greater reserve gate power is stored for low voltage conditions that occur during extreme conditions.
- ◆ **STACT™** (*S*tabilized *A*pex *C*urrent *T*opology) Reduces power supply stress by 50%. Typical designs degrade 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 preamplifier circuitry is run completely in-phase, no even harmonic distortion phase reversal occurs.
- ◆ **Trident™ Protection Topology** provides three types of protection:
 1. Output protection against short circuits or improper loads.
 2. Ground fault detection: Shuts down the amplifier when a significant voltage (>5 Volts) fluctuation occurs between electrical (turn-on lead) and battery ground.
 3. Thermal Protection: Puts the amplifier into thermal rollback or shuts the amplifier down in extreme thermal conditions.
- ◆ **Hawkins Bass Control** provides a focused subwoofer boost (0-9 dB at 45 Hz) and routes otherwise wasted amplifier power back to the audible bandwidth.
- ◆ **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™** Amplifier section powers up 2 to 3 seconds after the power supply eliminating turn-on pops. Turn off process is reversed: Amplifier section turns off first, followed by the power supply.
- ◆ **Dynamically Optimized Power Grid™** Power grid is evenly distributed between primary and secondary power supplies, providing greater dynamics and improved RF filtering.

- ◆ **Chassisink™** All transistors are ideally located and sandwiched between the circuit board and the heatsink to provide cool efficient amplifier operation.
- ◆ **Differentially Balance RCA Input** eliminates ground loop related noise in the audio.
- ◆ **Continuously Variable Crossover Networks: 12 dB/Octave 2-way highpass** variable from 65 to 220 Hz and 24 dB/Octave **lowpass** crossovers variable from 30 Hz to 120 Hz. **805 only** - 12 dB/Octave **3-way** crossover which can be selected for mid-bass (65 to 500 Hz) or midrange (**65 to 4,000** Hz) operation.
- ◆ **Rear Channel De-Emphasis (805 only)** A circuit based on theater surround technology in which rear fill information is rolled off with a -3 dB point at 7,000 Hz following with a 6 dB/Octave slope to provide a more realistic listening experience (in 5 channel mode only).
- ◆ **Flexible Dual Input Level Control** allows 300 mV to 5 V input sensitivity.
- ◆ **Symmetrical Discrete Balanced Class A Drive Boards** Auto-adjust for linear performance while driving low impedance loads.
- ◆ **Removable Front Spoiler** allows for stealth installation of RCA, Balanced Line, Speaker and Power wiring.



KEY TO CALLOUTS

- Fuse LED** - Indicates blown power supply fuses when lit.
- Power LED** - Indicates amplifier power.
- Low Pass XOVER Switch** - (Subwoofer Channel) Select "IN" for use with the internal crossover, or "OUT" for use with external crossover.
- Subsonic / Hawkins Bass Control Switch** - Select "SUB SONIC" to engage the Sub Sonic filter at 13 Hz. Select "HAWKINS BASS CONTROL" to engage the subwoofer channel's high pass filter @ 45 Hz with variable "Q" for optimum bass.
- Subwoofer Channel Input Select** - Selectable inputs from internal (CH 1-4) or external ("SUB" - local RCA inputs).
- High Pass XOVER Switch** - (Channels 1&2) Select "IN" for use with the internal crossover or "OUT" for use with external crossover.
- High Pass XOVER Switch** - (Channels 3&4) Select "IN" for use with the internal crossover or "OUT" for use with external crossover.
- Channels 3&4 Input Select** - Selectable inputs from internal (CH 1&2) or external (CH 3&4 local RCA inputs).
- Inputs** - Right and left channel RCA inputs for channels 3&4.
- Input Level** - Channels 3&4 input level control.
- High Pass Filter Control Adjustment** - (Channels 3&4) crossover frequency control for the internal high pass filter.
- Speaker Connection Terminal** - Speaker connections for Ch's 3&4.
- Inputs** - Right and left channel RCA inputs for channels 1&2.
- Input Level** - Channels 1&2 input level control.
- High Pass Filter Control Adjustment** - (Channels 1&2) crossover frequency control for the internal high pass filter.
- Speaker Connection Terminal** - Speaker connections for Ch's 1&2.
- Inputs** - Right and left channel RCA inputs for the subwoofer channel.
- Input Level** - Subwoofer channels input level control.
- Low Pass Filter Control Adjustment** - (Subwoofer Channel) crossover frequency control for the internal low pass filter.
- Hawkins Bass Control "Boost" Adjustment** - Varies from 0 to +9dB of boost when the Hawkins Bass Control is engaged.
- Speaker Connection Terminal** - Speaker connections for Subwoofer Channel.
- REMOTE** - Remote turn-on input from the head unit. Accepts +12V.
- GND** - Main ground connection. Bolt to a clean chassis point in the vehicle.
- +12V** - Connected to a fuse or circuit breaker, then to the battery's positive terminal.
- Main Fuse** - Main power supply fuses.
- Stereo/Mono Switch** - (Channels 1&2) Select "MONO" for bridged mono output in 3 channel operation (use right RCA input only). Select "STEREO" for stereo output in 5 channel operation.
- Stereo/Mono Switch** - (Channels 3&4) Select "MONO" for bridged mono output in 3 channel operation (use right RCA input only). Select "STEREO" for stereo output in 5 channel operation.



8

KEY TO CALLOUTS

1. **Power LED** - Indicates amplifier power.
2. **Subsonic I Hawkins Bass Control Switch** - Select "SUB SONIC" to engage the Sub Sonic filter at 13 Hz. Select "HAWKINS BASS CONTROL" to engage the subwoofer channel's high pass filter @ 45 Hz with variable "Q" for optimum bass.
3. **Low Pass XOVER Switch** - (Subwoofer Channel) Select "IN" for use with the internal crossover, or "OUT," for use with external crossover.
4. **Subwoofer Channel Input Select** - Selectable inputs from internal (CH 1-4) or external ("SUB" - local RCA inputs).
5. **Mid-Bass/Midrange Select** - Selectable mid-bass or midrange frequency control in 3-way operation.
6. **High Pass XOVER Switch** - (Channels 1&2) Select "IN" for use with the internal crossover or "OUT" for use with external crossover.
7. **High Pass XOVER Switch** - (Channels 3&4) Select "IN" for use with the internal crossover or "OUT" for use with external crossover.
8. **Rear Fill De-emphasis Switch** - (Channels 3&4) Select "IN" to activate 6 dB/Octave filter @ 7 kHz.
9. **Channels 3&4 Input Select** - Selectable inputs from internal (CH 1&2) or external (CH 3&4 local RCA inputs).
10. **Inputs** - Right and left channel RCA inputs for channels 3&4.
11. **Input Level** - Channels 3&4 input level control.
12. **High Pass Filter Control Adjustment** - (Channels 3&4) crossover frequency control for the internal high pass filter.
13. **Speaker Connection Terminal** - Speaker connections for Ch's 3&4.
14. **Inputs** - Right and left channel RCA inputs for channels 1&2.
15. **Input Level** - Channels 1&2 input level control.
16. **High Pass Filter Control Adjustment** - (Channels 1&2) crossover frequency control for the internal high pass filter.
17. **3-way Filter Control Adjustment** - Channels 1&2 3-way high pass crossover frequency control and channels 3&4 3-way low pass crossover frequency control.
18. **Speaker Connection Terminal** - Speaker connections for Ch's 1&2.
19. **Inputs** - Right and left channel RCA inputs for the subwoofer channel.
20. **Input Level** - Subwoofer channels input level control.
21. **Low Pass Filter Control Adjustment** - (Subwoofer Channel) crossover frequency control for the internal low pass filter.
22. **Hawkins Bass Control "Boost" Adjustment** - Varies from 0 to +9dB of boost when the Hawkins Bass Control is engaged.
23. **Speaker Connection Terminal** - Speaker connections for Subwoofer Channel.
24. **REMOTE** - Remote turn-on input from the head unit. Accepts +12V.
25. **GND** - Main ground connection. Bolt to a clean chassis point in the vehicle.
26. **+12V** - Connected to a fuse or circuit breaker, then to the battery's positive terminal.
27. **Main Fuse** - Main power supply fuse.
28. **Stereo/Mono Switch** - (Channels 1&2) Select "MONO" for bridged mono output in 3 channel operation (use right RCA input only). Select "STEREO" for stereo output in 5 channel operation.
29. **2-way | 3-way Switch** - (Channels 1&2) Select "2-way" for 2-way internal crossover. Select "3-way" for 3-way (band pass) internal crossover.
30. **Stereo/Mono Switch** - (Channels 3&4) Select "MONO" for bridged mono output in 3 channel operation (use right RCA input only). Select "STEREO" for stereo output in 5 channel operation.
31. **2-way | 3-way Switch** - (Channels 1&2) Select "2-way" for 2-way internal crossover. Select "3-way" for 3-way (band pass) internal crossover.

9

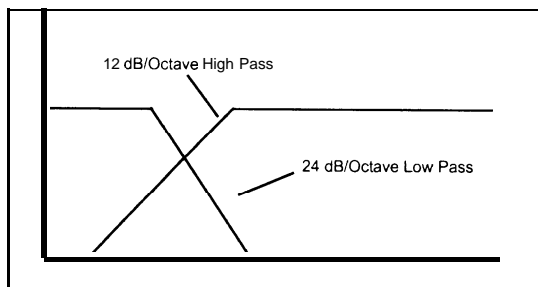
CROSSOVER ADJUSTMENTS

The RUBICON amplifiers incorporate an on-board staggered electronic crossover, with RCA outputs to drive an external amplifier. No external electronic crossover is necessary. However, if you do desire to use an external crossover you still have the option. The high and low pass portions of the crossover can be set independently of one another.

In many 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 in this region, the final response is very smooth and natural sounding. The high pass crossover is independently variable from 65 to 220 Hz at 12 dB/Octave, and the low pass crossover is independently variable from 30 to 120 Hz at 24 dB/Octave.

For initial crossover setup, try setting the low pass filter to approximately 60 Hz, and the high pass filter to approximately 100 Hz. Change the crossover points to accommodate a good mixture of frequency response, power handling, and personal preference.

2-WAY

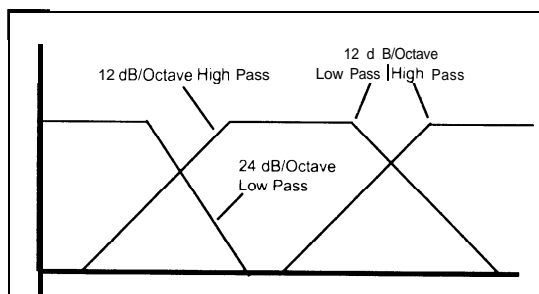


3-WAY (805 ONLY)

MIDBASS/MIDRANGE BAND PASS

The RUBICON805 can be operated in midrange or midbass "band pass" configuration. In the three way mode, you can tri-amplify with "active" midbass or midrange to maximize control over individual drivers. The bandpass includes a low pass and high pass filter, which work independent of one another, to drive the midrange or midbass speakers.

3-WAY



Hawkins Bass Control - Theory and Use

Hawkins Bass Control (variable) is a unique subwoofer control circuit included with the Soundstream RUBICON405 & 805 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 (0 to +9 dB).

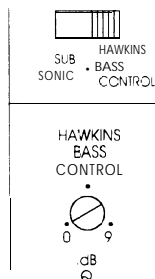


FIG. 1

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 subsonic filter only. The simple act of removing potentially harmful low frequencies can improve system output by as much as 3 dB.

Application

Subwoofer drivers in general have excellent power handling characteristics over their operational bandwidth. This bandwidth is determined 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.

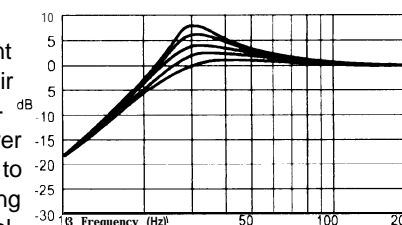


FIG. 2 VARIABLE BOOST

Adjustment

An easy method of optimizing your existing subwoofer enclosure with Hawkins Bass Control is as follows:

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.

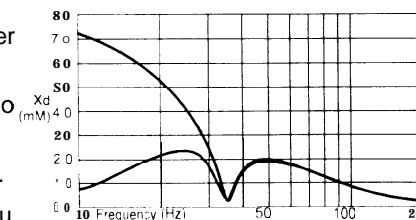


FIG. 3 Limited Excursion

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

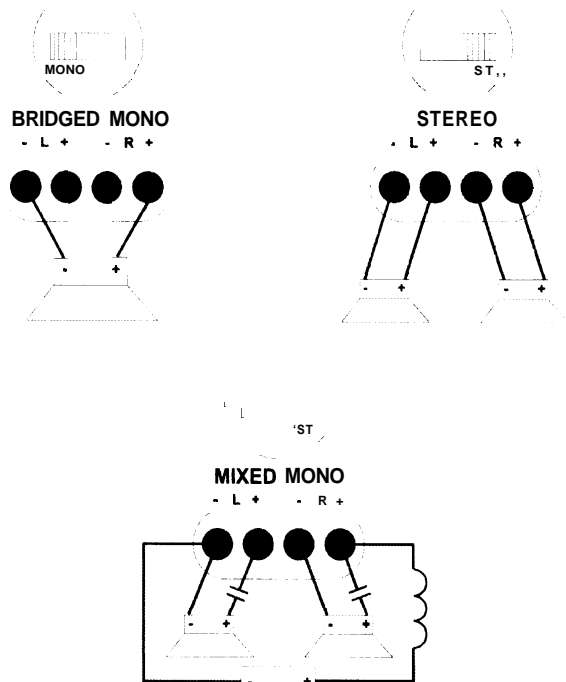
SELECTING THE SPEAKER OUTPUT MODE

Channels 1 through 4 of the RUBICON405 & 805 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.

Bridged Mono: Use this mode to get a bridged mono output while using only the right channel input for 3 channel operation.

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 RUBICON amplifiers 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'
RUBICON405	4 or 8 gauge	4 gauge only
RUBICON805	4 or 8 gauge	4 gauge only

CIRCUIT BREAKERS AND FUSES

EXTERNAL

Like all audio components, the RUBICON amplifier 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 RUBICON405 amplifier is fused with two automotive-type fuses and the RUBICON805 is fused with a single Maxi-Fuse. In the event of blown power supply fuses, 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!*

RUBICON405 & 805 Amplifier Fuse Values

	Amplifier Fuse	Battery Fuse / Circuit Breaker
RUBICON405	(2) 20 amp automotive	50 amp
RUBICON805	60 amp Maxi-Fuse	80 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.

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.

INSTALLATION STEP 3

INSTALLATION AND MOUNTING

AMPLIFIER LOCATION

The RUBICON amplifier employs highly efficient circuitry, a custom-engineered heat sink, and a unique Chassisink construction to maintain lower operating temperatures. 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. Re-connect the fuse or circuit breaker.

POWER UP

Power up the system and look at the Power LED; there may be a 2-3 second delay from the time the source unit is turned on to the time that the LED on the amp turns on, which is normal. Once the **amplifier** 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 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 amplifier, follow these steps for setting the input levels:

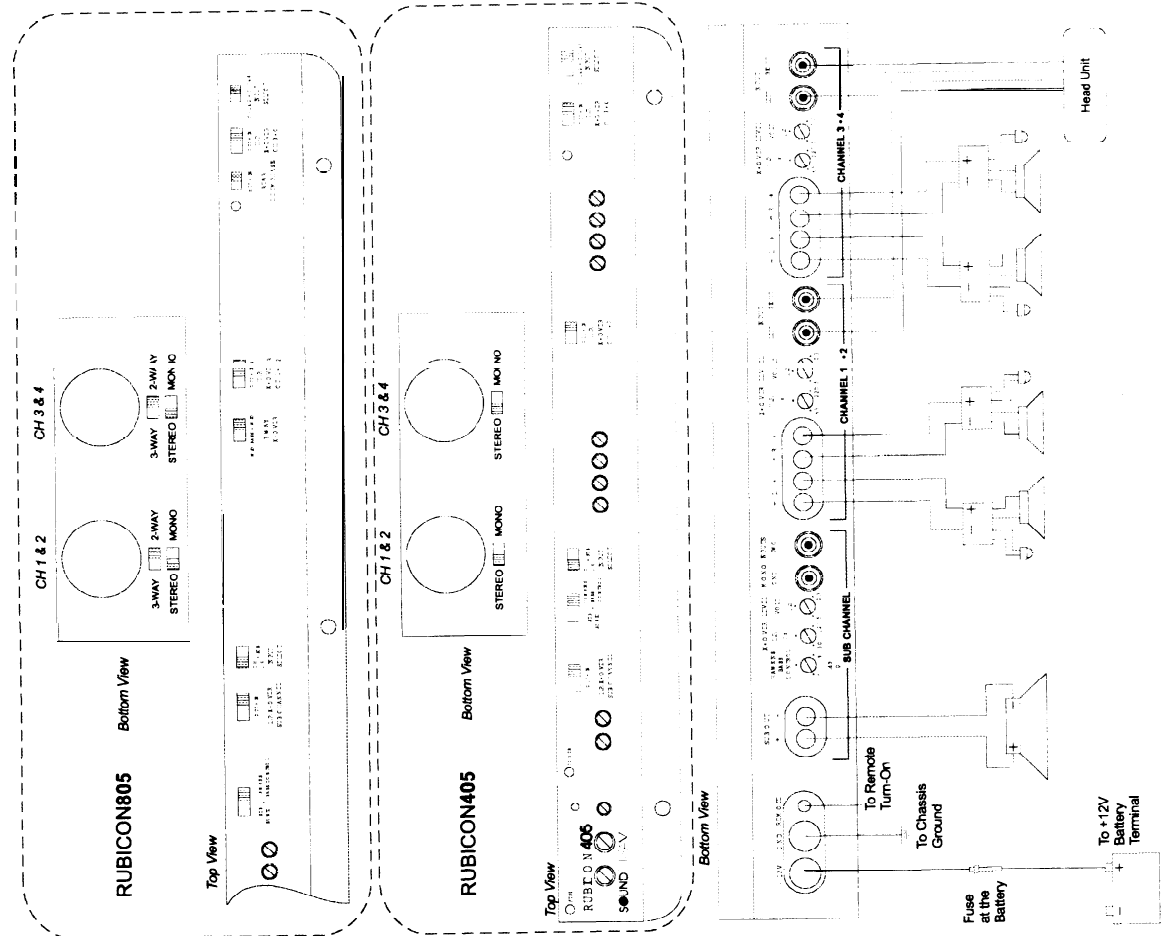
1. Turn the amplifier's input levels to minimum position (counter-clockwise)
2. Set the source unit volume to approximately $\frac{3}{4}$ of full volume.
3. While playing dynamic source material, slowly increase the amplifiers' input level until a near maximum undistorted level is heard in the system.

FRONT SPOILER

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

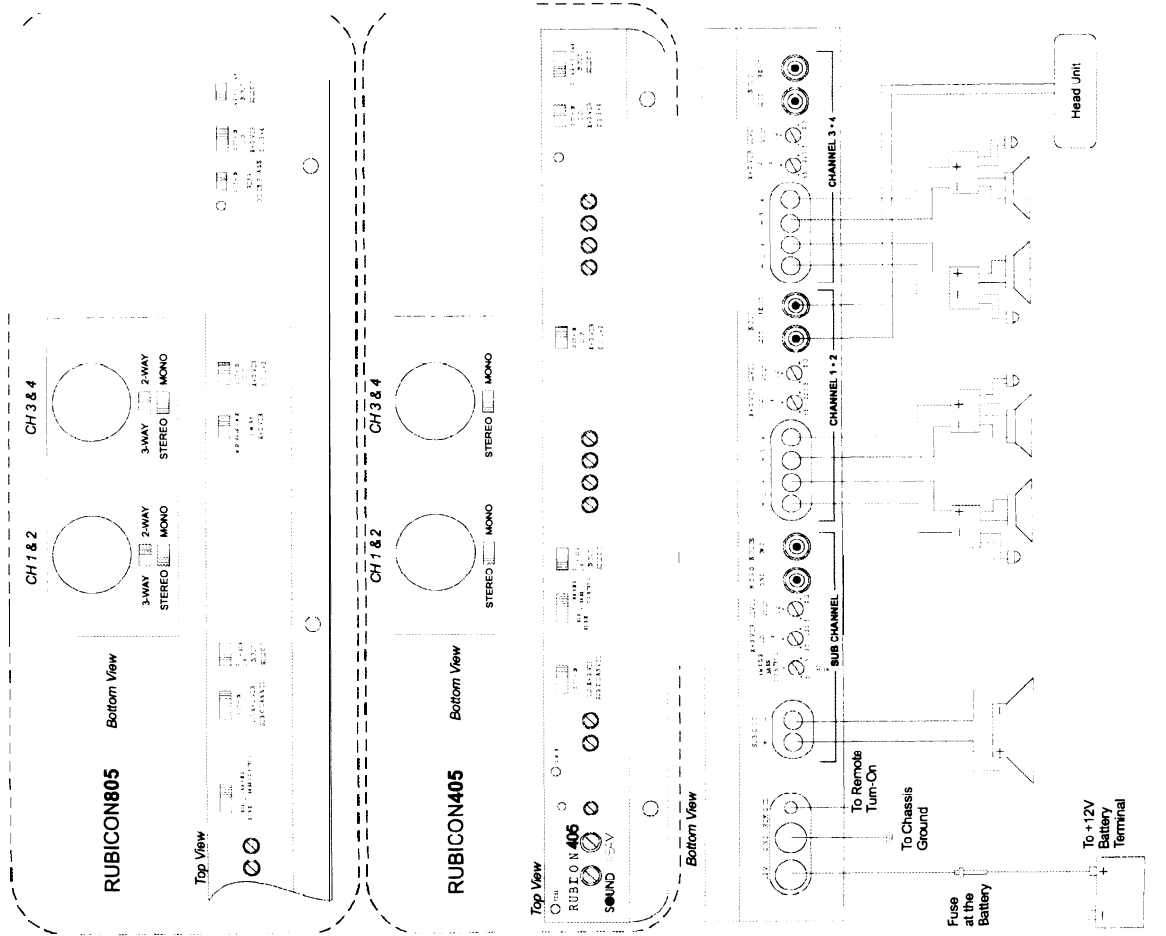
SAMPLE SYSTEM #1

4 channels of input
 2-way front/rear fade with constant level bass
 4 channels of 2-way high pass (rear fill de-emphasis engaged on 805)
 subwoofer channel in low pass



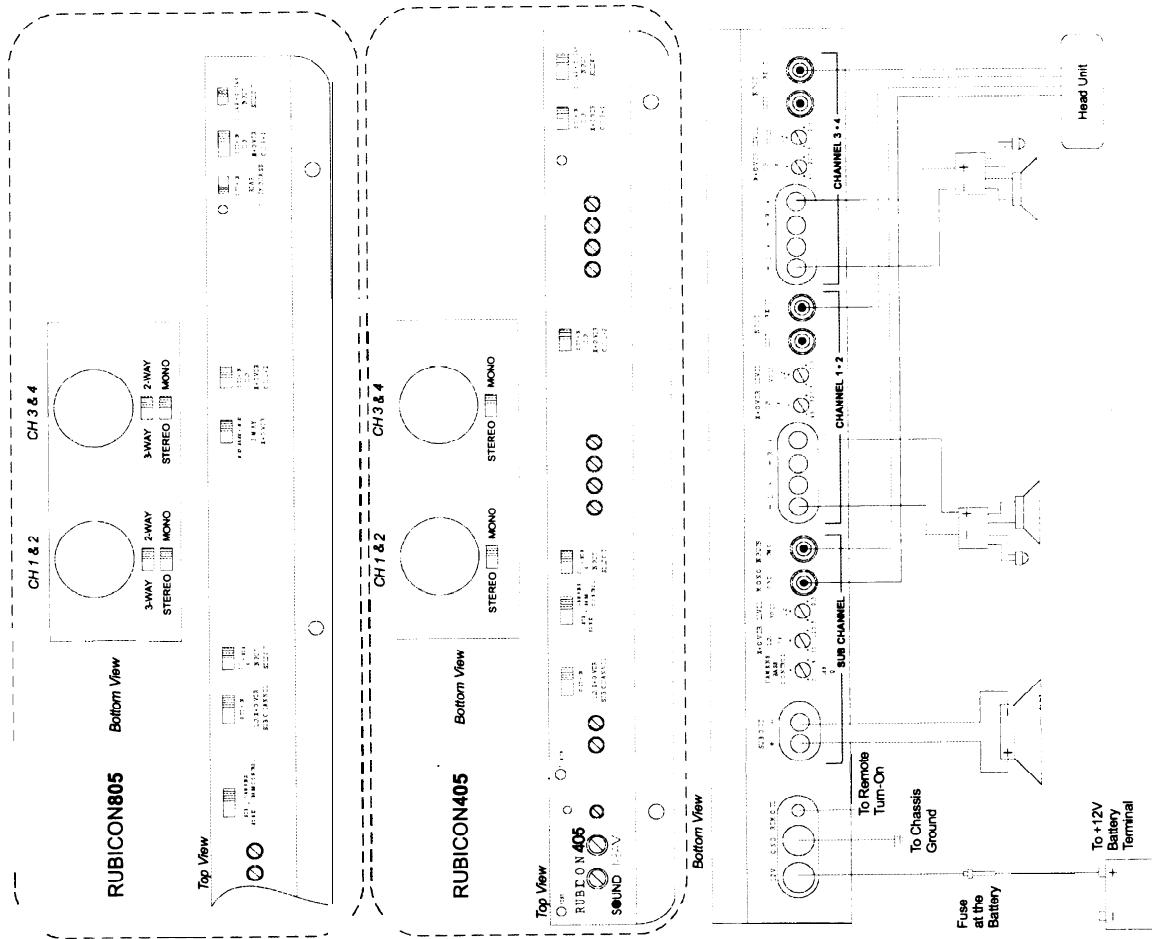
SAMPLE SYSTEM #2

2 channels of input
 4 channels of 2-way high pass, (rear fill de-emphasis engaged on 805)
 subwoofer channel in low pass



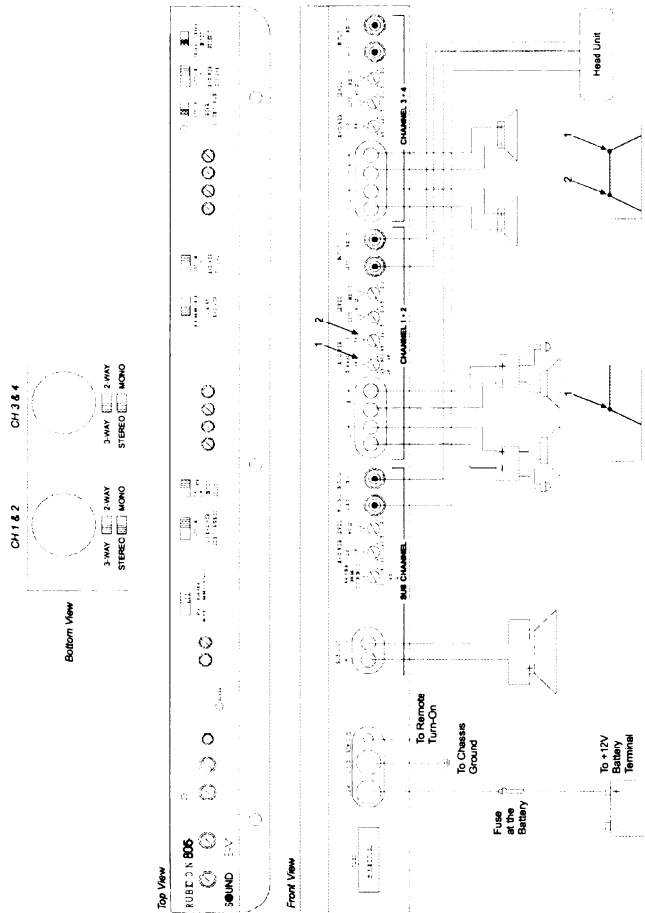
SAMPLE SYSTEM #3

- 4 channels of input
- 3 channel operation with satellite to subwoofer fading
- 2 channels of bridged 2-way high pass, subwoofer channel in low pass



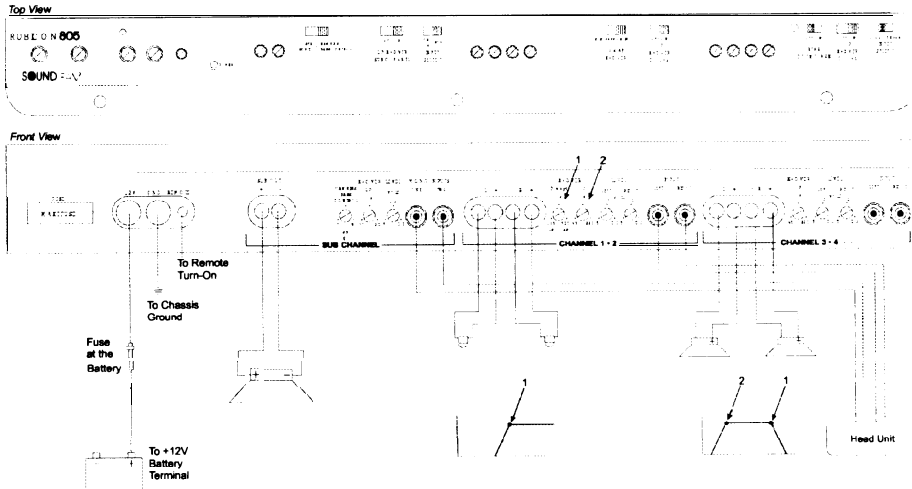
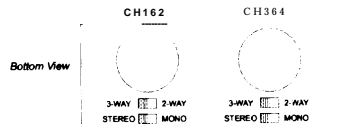
SAMPLE SYSTEM #4 (805 ONLY!)

- 4 channels of input, 3-way mode
- 5 channel operation with satellite to subwoofer fading
- 2 channels high pass (midrange), 2 channels mid-bass subwoofer channel in low pass



SAMPLE SYSTEM #5 (805 ONLY!)

4 channels of input, 3-way mode
 5 channel operation with satellite to subwoofer fading
 2 channels high pass (tweeters), 2 channels midrange
 subwoofer channel in low pass



TRIDENT PROTECTION CIRCUITRY

Your RUBICON405 & 805 amplifiers are protected against both overheating and short circuits by means of main power fuses and the following circuits:

- ◆ Speaker Protection
- ◆ Smart Power Supply Thermal Rollback
- ◆ A fail-safe thermal protection circuit

NOTE: If you experience **blown** main power supply fuses, it is likely 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 warranty and may damage your amplifier.

TROUBLESHOOTING

PROBLEM	CAUSE
No Sound and power LED is not lit	<ol style="list-style-type: none"> 1. No power or ground at the amp 2. No remote turn-on signal 3. Blown fuse near the battery
No sound, power LED is lit.	<ol style="list-style-type: none"> 1. No signal input 2. The AIRBASS/Accessory switch is in the "IN" position Move it to the "OUT" position
Amplifier output cuts off and on repeatedly	<ol style="list-style-type: none"> 1. Speaker output may be shorted to ground. Check for resistivity with an Ohm meter. 2. Speaker leads-may be shorted to each other. Check for continuity with an Ohm meter
Repeatedly blow amp fuse; frequent activation of Smart Power Supply Circuit	<ol style="list-style-type: none"> 1. Speaker or leads may be shorted 2. Verify adequate amp ventilation
Fuse LED is lit	The power supply fuses on the bottom of the amplifier are blown.

SERVICE

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

SPECIFICATIONS

Channels 1 & 2; 3 & 4

MODEL	4 Ω Stereo (8 Ω Bridged) (12.5 Vdc)	2 Ω stereo (4 Ω Bridged) (14.4 Vdc)
405	25W x 4 (50W x 2)	50W x 4 (100W x 2)
805	50W x 4 (100W x 2)	100W x 4 (200W x 2)

Subwoofer Channel

MODEL	4 Ω (12.5 Vdc)	2 Ω (14.4 Vdc)	1 Ω (14.4 Vdc)
405	100W x 1	150W x 1	200W x 1
805	200W x 1	300W x 1	400W x 1

THD	<0.1%
Signal to Noise	>100 dB
Frequency Response	20 Hz to 20 kHz \pm 0.5 dB
Stereo Separation	>90 dB
Damping	>200
Input Sensitivity	300 mV to 5.0 Volts
Input Impedance	10k Ohms

Crossover Specifications

Low Pass: 30 Hz - 120 Hz at 24 dB/Octave

High Pass: 65 Hz - 220 Hz at 12 dB/Octave

Band Pass (805): 65 Hz - 500 Hz at 12 dB/Octave (Mid-Bass)
65 Hz - 4 kHz at 12 dB/Octave (Mid)

Hawkins Bass Control

0 to +9 dB Boost; Boost Frequency = 45 Hz (Hawkins Bass Control "IN")

Sub Sonic filter frequency = 13 Hz

Dimensions (W x D x H)

RUBICON405: 15.0" X 9.8" X 2.25" (381 mm X 288mm X 57mm)

RUBICON805: 19.0" X 9.8" X 2.25" (483mm X 288mm X 57mm)

INSTALLATION NOTES AND DIAGRAMS

