

**RUBICON
BALANCED X.0
2-WAY/3-WAY
ELECTRONIC
CROSSOVER**

**OWNER'S MANUAL
AND
INSTALLATION GUIDE**

CONGRATULATIONS!

You now own **the BALANCED X.0 crossover**, the product of an uncompromising design and engineering philosophy.

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 and installation receipts for future reference.

Soundstream products are the result of American craftsmanship and the highest quality control standards, and when properly installed, will provide you with many years of listening pleasure. Should your crossover 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 _____

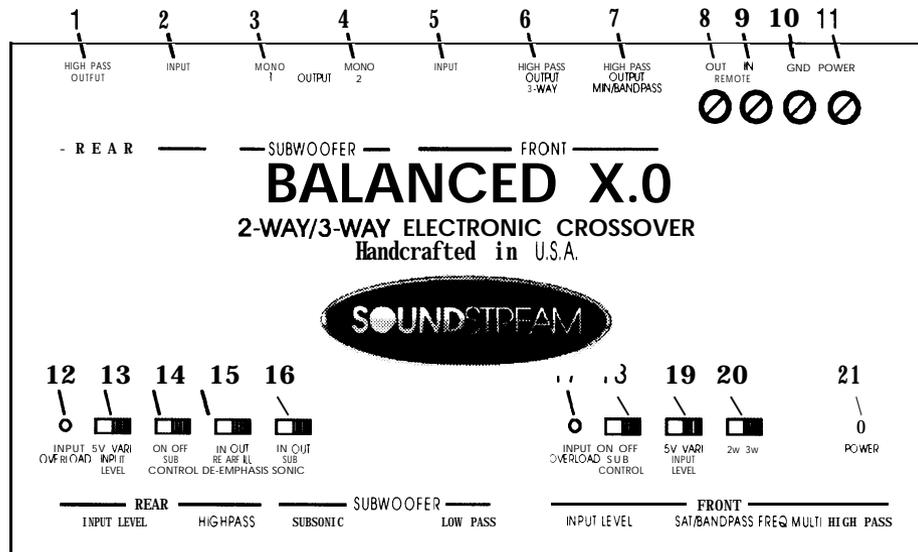
Installation Shop _____

Installation Date _____

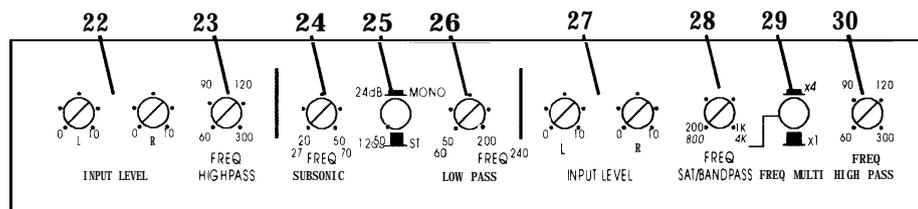
DESIGN FEATURES

- ◆ **Pure RUBICON Design Quality** including mil-spec glass epoxy circuit boards and 1% tolerance components.
- ◆ **True Balanced Input / Output** for professional-quality performance and noise cancellation, utilizing industry compatible 6-pin Mini-Din input / output connectors. The 6-pin din plug carries (+) and (-) signal information for left and right channels (front and rear) and audio ground.
- ◆ **Phantom Powered or Standard Power Connections:** The BALANCED X.0 can be powered conventionally by the connecting barrier strip to remote, +12 V and ground. Or, it can receive power (and remote) from the balanced input of the RUBICON amplifier it is connected to (phantom power). The BALANCED X.0 also passes this phantom power to drive the Soundstream **BLT™** or **BLT4™** (Balanced Line Transmitter) at the head unit.
- ◆ **Staggered Asymmetrical Electronic Crossover** - Continuously variable 2 or 3-way crossover with 12 dB/octave high pass and 24 dB/octave subwoofer low pass. In 3-way mode, bandpass can be selected for midrange or midbass.
- ◆ **Rear Channel De-emphasis** - A circuit based on theater surround technology in which rear fill information is rolled off at 6 dB/octave with a -3 dB point at 7,000 Hz to provide a more realistic listening experience (in 5 channel mode only).
- ◆ **Direct Input** switches allow the input stage of the BALANCED X.0 to be completely bypassed for use with the **BLT™** or **BLT4™**.
- ◆ **Input Overload Indicators** - Indicates the signal input level or input gain level is too high.
- ◆ **Selectable Subwoofer Fading** allows the subwoofer input to come from the front or the rear balanced input, or both.
- ◆ **Multiple Subwoofer Output Connectors** allows easy connection of multiple subwoofer amplifiers.
- ◆ **Subsonic Filter (Subchannels)** An adjustable subsonic filter which protects woofers from potentially harmful low frequency information and maximizes output in a usable and adjustable range.
- ◆ **Remote In and Out (External Power Supply Only)** Helps eliminate turn on and off pops by turning the X.0 *on* before the amplifiers and turning the X.0 off after the amplifiers.

Key to Cal/outs



TOP VIEW



FRONT VIEW

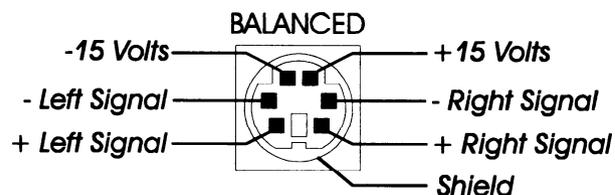
1. **High Pass Rear Output**- Balanced output to the amplifier driving the rear satellite speakers.
2. **Input** - Balanced rear inputs (left and right).
3. **Mono 1 Output** - Balanced subwoofer output (Subwoofer Left output in Stereo mode).
4. **Mono 2 Output** - Balanced subwoofer output (Subwoofer Right output in Stereo mode).
5. **Input** - Balanced front inputs (left and right).
6. **High Pass Front Output** - Balanced front tweeter/satellite output in 3-way mode.
7. **High Pass Front Output** - Balanced front midrange / midbass output in 3-way mode, or front satellite output in 2-way mode.
 - a. **REM Out**- Remote turn-on output to an amplifier. Passes +12V. (Except when powered via the Mini-Din connector from a RUBICON amplifier.)
9. **REM In**- Remote turn-on input from the head unit. Accepts +12V. (Except when powered via the Mini-Din connector from a RUBICON amplifier.)
10. **GND** - Main ground connection. Bolt to a clean chassis ground in the vehicle. (Except when powered via the Mini-Din connector from a RUBICON amplifier.)
11. **Power** - Connected to a fuse or circuit breaker, then to the battery's positive post. (Except when powered via the Mini-Din connector from a RUBICON amplifier.)
12. **Input Overload Indicator** - Rear channels input; Indicates the signal input level or input gain level is too high.
13. **Input Level Switch** - Rear channels input; Select "VARY" to use the gain controls, or "5V" to bypass the rear input controls of the BALANCED X.0.
14. **Sub Control** - Rear channels input; Select "IN" to send low frequency information from the rear channels input to the subwoofer mono output.
15. **Rear Fill De-Emphasis** - Select "IN" to include de-emphasis in the rear channels high pass output. (De-emphasis is a 6 dB/octave low pass filter at 7 kHz.)
16. **Subsonic Filter** - Select "IN" to include a subsonic filter in the subwoofer mono output.
17. **Input Overload Indicator** - Front channels input; Indicates the signal input level or input gain level is too high.
18. **Sub Control** - Front channels input; Select "IN" to send low frequency information from the front channels input to the subwoofer mono output.
19. **Input Level Switch** - Front channels input; Select "VARI" to use the gain controls, or "5V" to bypass the front input controls of the BALANCED X.0.
20. **2-Way/3-Way Switch** - Selectable 2-way or 3-way crossover output for the front channels.
21. **Power LED** - Indicates the unit is "ON".
22. **Input Level** - Rear channels; Independent left and right channel input level controls.
23. **High Pass Crossover Adjustment Pot** - Crossover frequency setting for the high pass filter on the rear left and right high pass outputs.
24. **Subsonic Frequency Adjustment Pot** - Subsonic frequency setting for the subwoofer output.
25. **12 dB / 24 dB Button** - Selectable 12 dB/octave or 24 dB/octave low pass filter for the subwoofer output. (Note: For 12 dB/octave, use the grey markings on the subwoofer controls. For 24 dB/octave, use the white markings on the subwoofer controls.)
26. **Low Pass Crossover Adjustment Pot** - Crossover frequency setting for the low pass filter for the subwoofer output.
27. **Input Level** - Front channels; Independent left and right channel input level controls.
28. **Bandpass Crossover Adjustment Pot** - 3-way mode only; Crossover frequency setting for the internal bandpass filter for the front channels.
29. **Bandpass Crossover Switch** - 3-way mode only; Select "x1" for use with midbass drivers and satellite speakers. Select "x4" for use with midrange drivers and tweeters, and use the markings written in italics.
30. **High Pass Crossover Adjustment Pot** - Crossover frequency setting for the high pass filter on the front left and right high pass outputs.

BALANCED INPUT/OUTPUT

The BALANCED X.0 crossover is designed with true balanced "Pro Audio" input/output topology. When used with the Soundstream **BLT™** or **BLT4™** Balanced Line Transmitters or any other balanced line audio source, and Soundstream amplifiers, the BALANCED X.0 is the heart of a flexible professional quality audio system.

	BALANCED INPUT
ADVANTAGES	<ol style="list-style-type: none"> 1. Improved Signal-to-Noise Ratio. (S/N Ratio) 2. Excellent noise cancellation characteristics. 3. Immune to noise radiated in the car audio environment.

The Mini-Din input and output connectors on the BALANCED X.0 carry BOTH the left and right channel balanced audio signals. When used with a Soundstream amplifier, the connectors also carry the ± 15 Vdc "phantom voltage" which supplies power to the BALANCED X.0, and also to the Balanced Line Transmitter at the head unit. (See the diagram below:)



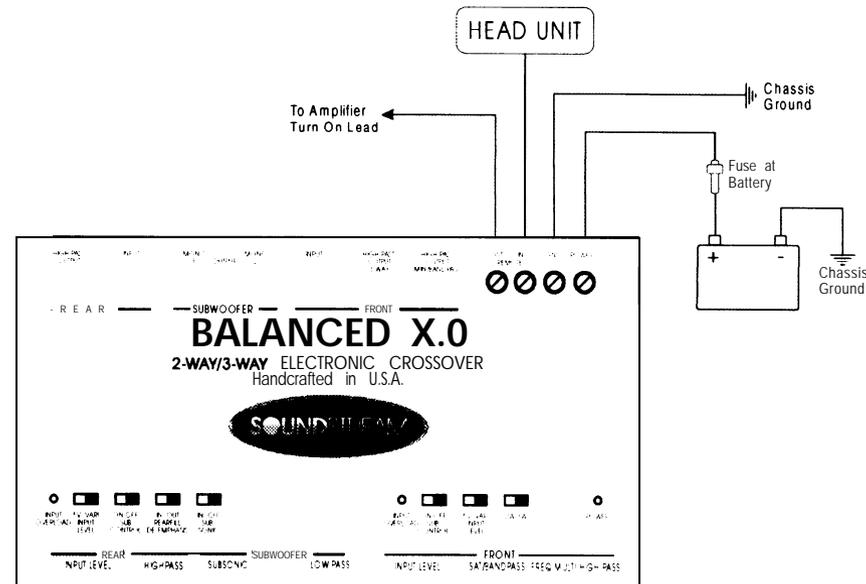
NOTE: The pin configuration shown in the diagram is the view looking into the Balanced input / output jacks on the crossover.

WIRING

POWER AND GROUND

If you are using the BALANCED X.0 with amplifiers other than Soundstream's RUBICON or Reference Series, you may have to connect the +12 Volt power, ground and remote on the BALANCED X.0. Please review the owner's manuals for the other components to determine your system wiring.

Note: If you use the external power, ground and remote connections, the phantom voltage inputs for the Mini-Din connectors will not be used.



CIRCUIT BREAKERS/FUSES

When using the external power connectors, the BALANCED X.0 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.

REMOTE TURN-ON

Connect the "Remote In" to the turn-on lead from the source unit. When +12 volts is received, the crossover will turn on. Connect the "Remote Out" to the amplifiers in the system.

SIGNAL CABLE

The BALANCED X.0 uses special six-conductor cables. For the inputs, you can use the cable supplied with the Soundstream **BLT™** or **BLT4™**. For the outputs, use the cables supplied with the BALANCED X.0

INSTALLATION AND MOUNTING

1. CROSSOVER LOCATION

When mounting the crossover, it should be securely mounted to either a panel in the vehicle or an amplifier 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. Make sure the switches and trim pots are accessible for setting the crossover.

2. SWITCHES AND ADJUSTMENT POTS

Set the switches on top of the crossover for your system configuration (see the examples on pages 14 - 17). The adjustment pots can be set when the system is fully installed and operating.

3. MOUNTING THE CROSSOVER

- Using the crossover as a template, mark the mounting surface.
- Remove the crossover and drill the holes.
- Mount the crossover to the surface using the provided hardware.

4. WIRING

- Disconnect any fuses or circuit breakers pertaining to the audio system.
- Run and connect the audio signal cables to the balanced line audio source and the amplifiers. If using the BALANCED X.0 with Soundstream RUBICON amplifiers with a balanced input (or other amplifiers which use the same connector with phantom power), this is the only wiring that is necessary. Go on to step 5. If using the BALANCED X.0 with amplifiers which don't supply phantom power, continue with the following steps:
- Connect the remote turn-on cables to the crossover from the source unit and also to the amplifiers. Carefully run the positive cable from the amplifier to a fuse or circuit breaker within 18" of the battery.
- Connect the fuse or circuit breaker to the battery. Leave the circuit breaker off or the fuse out until everything is bolted down.
- 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.
- Double check each and every connection!
- Re-connect the fuse or circuit breaker.

5. POWER UP

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

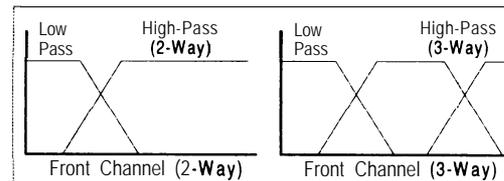
SETTING THE SYSTEM CONFIGURATION

The BALANCED X.0 is designed to be a flexible component for planning and building your ideal car audio system. This three-channel electronic crossover is equipped with separate front and rear stereo inputs (each balanced pair in one connector), and includes controls for configuring two-way or three-way crossover systems. With this design, the fader control (on the head unit) always remains active, allowing you to achieve a desired front / rear sound balance.

2-WAY / 3-WAY MODE

In the **2-way** configuration, the BALANCED X.0 provides high pass and subwoofer outputs. In **3-way** mode, incoming stereo audio is divided into band-limited outputs for **2-way** operation on the front speaker, high pass output for the rear speakers, and low frequency outputs for subwoofers.

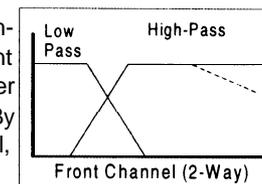
Select either **2-way** or **3-way** operation by setting the switch on top of the BALANCED X.0 labeled "2W 3W". When the **3-way** mode is selected, use the crossover marking written in "yellow".



The crossover frequency range for the front channel **2-way** output can be selected to drive either **midbass** and satellite speakers, or midrange speakers and tweeters. Select either **midbass/satellite (x1)** or **midrange/tweeter (x4)** operation with the pushbutton on the front of the BALANCED X.0 labeled "FREQ MULT". When the button is "out" (x1), use the yellow markings in standard text. When the button is "in" (x4) use the yellow markings in *italics*.

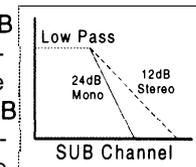
REARFILL DE-EMPHASIS

The rear channel features an innovative **rearfill** de-emphasis circuit which places more emphasis on the front stage of the audio system. The circuit is a 6 dB per octave low pass filter at 7 kHz, and is defeatable. By removing upper frequency information from the rear fill, a more natural sounding rear fill effect is created.



SUBWOOFER CONTROL

The subwoofer channel contains selectable 12 dB or 24 dB per octave filters to set the "tightness" contour of bass frequencies. This is set with the pushbutton on the front of the crossover. When the pushbutton is "out" (i.e., in the 12 dB per octave setting) use the yellow subwoofer frequency control markings. Also, when the subwoofer crossover is in the 12 dB setting, the Mono 1 and Mono 2 outputs are in stereo (Mono 1 = Left, Mono 2 = Right). In the 24 dB setting, the Mono 1 and Mono 2 outputs are summed left and right signals, identical on the two outputs.



(Continued on page 10)

(Continued from page 9)

The subwoofer channel has separate On/Off controls on both the front and rear inputs for constant for **fadeable** bass. When the switch labeled "SUB CONTROL" for either the front or rear channels is in the "ON" position, low frequencies from those channels are directed to the subwoofer output. In the "OFF" position, low frequencies from those channels are ignored.

SUBSONIC FILTER

The subwoofer channel also has the option of an 12/24dB per octave filter to suppress harmful subsonic signals. When the switch labeled "SUB-SONIC" is in the "IN" position, there is an 12/24dB per octave high pass filter placed on the subwoofer outputs, variable from 20 to 50 Hz (or 27 to 70 Hz, depending on the lowpass filter setting).

APPLICATION

Woofers in vented enclosures have good power handling characteristics above the tuning frequency, but below the tuning frequency, power handling drops off considerably. This is due to the loss of any appreciable resistive air mass. At frequencies below resonance, the woofer starts to behave as if it were mounted in "free-air". If we wish to improve the performance of a vented system, we should remove these unwanted signals. They can be removed by adding the subsonic filter. Figure 1 shows the effectiveness of a subsonic filter on woofer excursion. Woofer travel is 7.5 mm at 10 Hz, with the subsonic filter properly adjusted, this excursion can be reduced to less than 1 mm. This is of great benefit to lowering woofer distortion and increasing output.

ADJUSTMENT

An easy method of optimizing your existing subwoofer enclosure with the X.0 subsonic filter control is as follows:

1. Adjust frequency control to full CCW position.
2. While listening to music with strong bass content at a moderate level, slowly adjust frequency control clockwise. Listen for a reduction of bass response. Now, rotate frequency control slightly backwards. This serves the purpose of removing the "subsonic" bass energy.

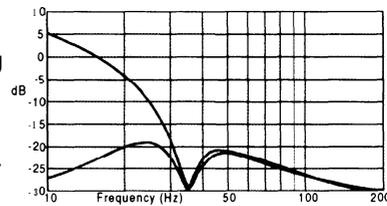


FIG 1 Limited Excursion

LEVEL SETTING

The BALANCED X.0 has variable input levels which are adjusted by means of the individual channel level controls located on the front of the crossover. However, all of the input and outputs gain controls of the BALANCED X.0 are bypassed when the switches on top of the crossover labeled "Input Level" are set to "IN". Either way, the BALANCED X.0 will have enough flexibility to get a good audio balance in any car stereo system. By setting all components to reach clipping at the same time, you can maximize the output of your system. For the RUBICON amplifiers, follow the steps below for the quickest, easiest means of setting the levels. For systems which incorporate the BLT™, BLT4™ BALANCED X.0 and RUBICON amplifiers equipped with the balanced signal input, please follow these steps for the quickest, easiest means of setting the levels.

Level Setting the BALANCED X.0 with the Direct 5V Input (Recommended)

1. Disconnect any speakers from the amplifiers.
2. Switch the inputs of the amplifiers receiving the balanced input to the "BAL" position.
3. Turn the amplifiers' input level controls to the minimum (5 volts) position (fully counter-clockwise), and switch the amplifiers' input level selector to the 0.5 - 5.0 Volt position.
4. Turn the BLT4's input level controls to the minimum position (fully counter-clockwise).
5. Set the switches on top of the BALANCED X.0 labeled "INPUT LEVEL" to the "5V" position. Set all frequency controls on the BALANCED X.0 to their respective 12 o'clock positions.
6. Turn the system on, and verify all of the components are "ON". Set source unit volume to approximately 3/4 of full volume.
7. While playing extremely dynamic source material or a test tone, slowly increase the BLT's input level until the red LED labeled "REFERENCE" on the top of the BLT begins to blink. This calibrates the input sensitivity of the BLT to the level of your head unit. (NOTE: To set the BLT level, Soundstream recommends using the Autosound 2000 Compact Disc #102 Track 27, 1 kHz 0 dB "all bits high" tone. If this CD is not available, a similar tone from a test CD can be used, or an extremely dynamic CD with a high crest factor. Remember; the "loudest" CD you have may not be the most "dynamic"!)
8. Next, with the source material still playing, adjust the input levels of your amplifiers so that the amplifiers input LED's begin to blink as well. Since in step 7 you've set up the BLT to transmit a 5 volt signal, and in step 3 you set the amplifier up to clip upon receiving a 5 volt input signal, the BLT4 LED and the output clipping LED's on the amplifier should blink at about the same level.
9. Turn the system down, and reconnect the speakers. If the volume out of your amplifier is not loud enough, turn up the gain adjustments on the front of the amplifier receiving the BLT input.
10. If the amplifier volume is too loud, and the amplifier gain controls are already turned to the minimum position, turn down the level of the transmitted signal by adjusting the level controls on the top of the BLT.

Level Setting the BALANCED X.0 without the Direct 5V Input

If a wider range of gain is needed, or the BALANCED X.0 is being used with a balanced line audio source other than the Soundstream BLT™ or BLT4™, it may be necessary to use the input gain controls of the BALANCED X.0. Begin by following steps 1 through 8 in the level setting instructions above, but with the switches on top of the BALANCED X.0 labeled "INPUT LEVEL" in the "VARI" position. Continue with the following instructions:

1. Set all of the input level controls on the BALANCED X.0 to the minimum position (i.e., full counter-clockwise).
2. Set the input levels on the BALANCED X.0 by adjusting the front and rear inputs until the red LED's labeled "INPUT OVERLOAD" begin to blink. This matches the BALANCED X.0 to the audio source.
3. Next, turn up the input sensitivity controls of the amplifiers until the input overload LED's on the amplifiers begin to blink. Be careful not to turn up the amplifier input controls past the 12 o'clock position. If more gain is needed, turn up the input level controls of the BALANCED X.0. This will set the system to have the correct gain, yet retaining the best S/N (signal-to-noise) ratio.
4. Complete steps 9 and 10 on page 9

NOTE: It may be necessary to adjust the system after a listening test. These settings are dependent upon personal preference. If possible, adjust the gain control settings on the amplifiers first, the BALANCED X.0 second, and the source third.

CROSSOVER ADJUSTMENTS

The BALANCED X.0 is a very flexible crossover, allowing all of the high pass and low pass frequencies to be set independently from each other.

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 less musical information in this region, the final response is very smooth and natural sounding. The high pass filter is variable from 60 to 300 Hz at 12 dB/octave, while the low pass filter is variable from 50 to 200 Hz at 24 dB/octave (60 to 240 Hz at 12 dB/octave).

2-WAY MODE

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

3-WAY MODE (Midbass / Satellite)

For initial crossover set-up, try setting the low pass filter to approximately 60 Hz, and the high pass filter for the midbass output at 100 Hz. Set the 3-way bandpass crossover point at about 400 Hz (12 o'clock). Change the crossover points to accommodate a good mixture of frequency response, power handling, and personal preference.

3-WAY MODE (Midrange / Tweeter)

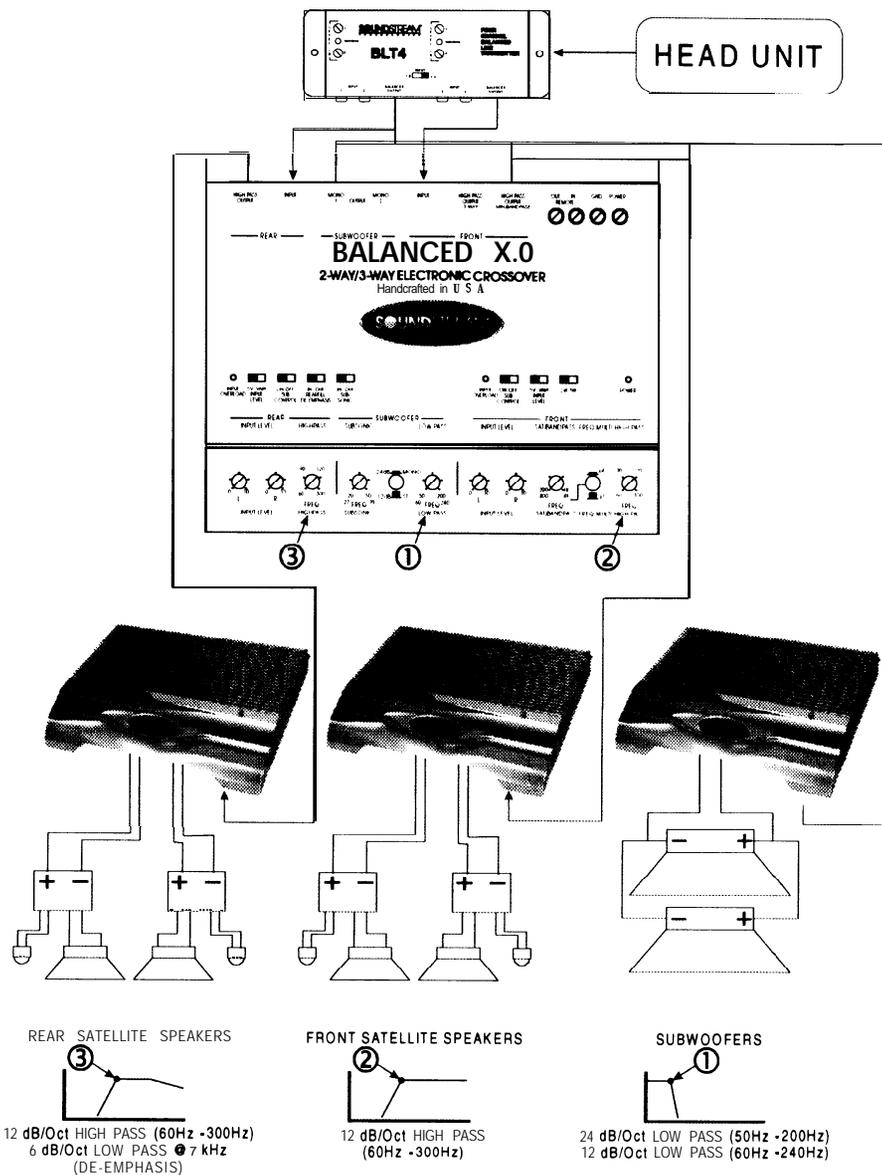
For initial crossover set-up, try setting the low pass filter to approximately 60 Hz, and the high pass filter for the midrange output at 100 Hz. Set the 3-way band pass crossover point at about 2,500 Hz (12 o'clock). Change the crossover points to accommodate a good mixture of frequency response, power handling, and personal preference. (Consult the speaker's owner's manual for more information about their frequency response and power handling. Use this information to help assist you to set the crossover points without damaging the speakers.)



Even though you are using the BALANCED X.0 in 3-way mode, it may be a good idea to also use the passive crossover supplied with your speakers. Even though they are being crossed electronically, this will give added power handling and insurance that the drivers will not be damaged.

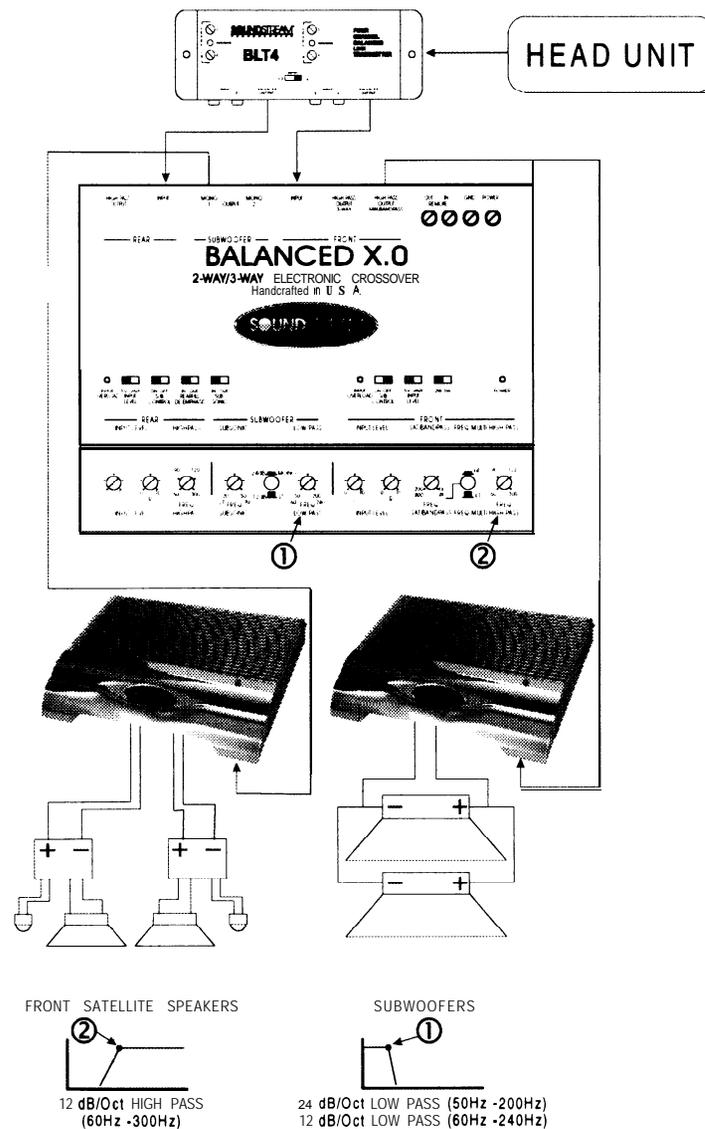
SAMPLE SYSTEM #1

Front / Rear fade with constant bass
Rear Fill with De-Emphasis ON
2-Way Front System



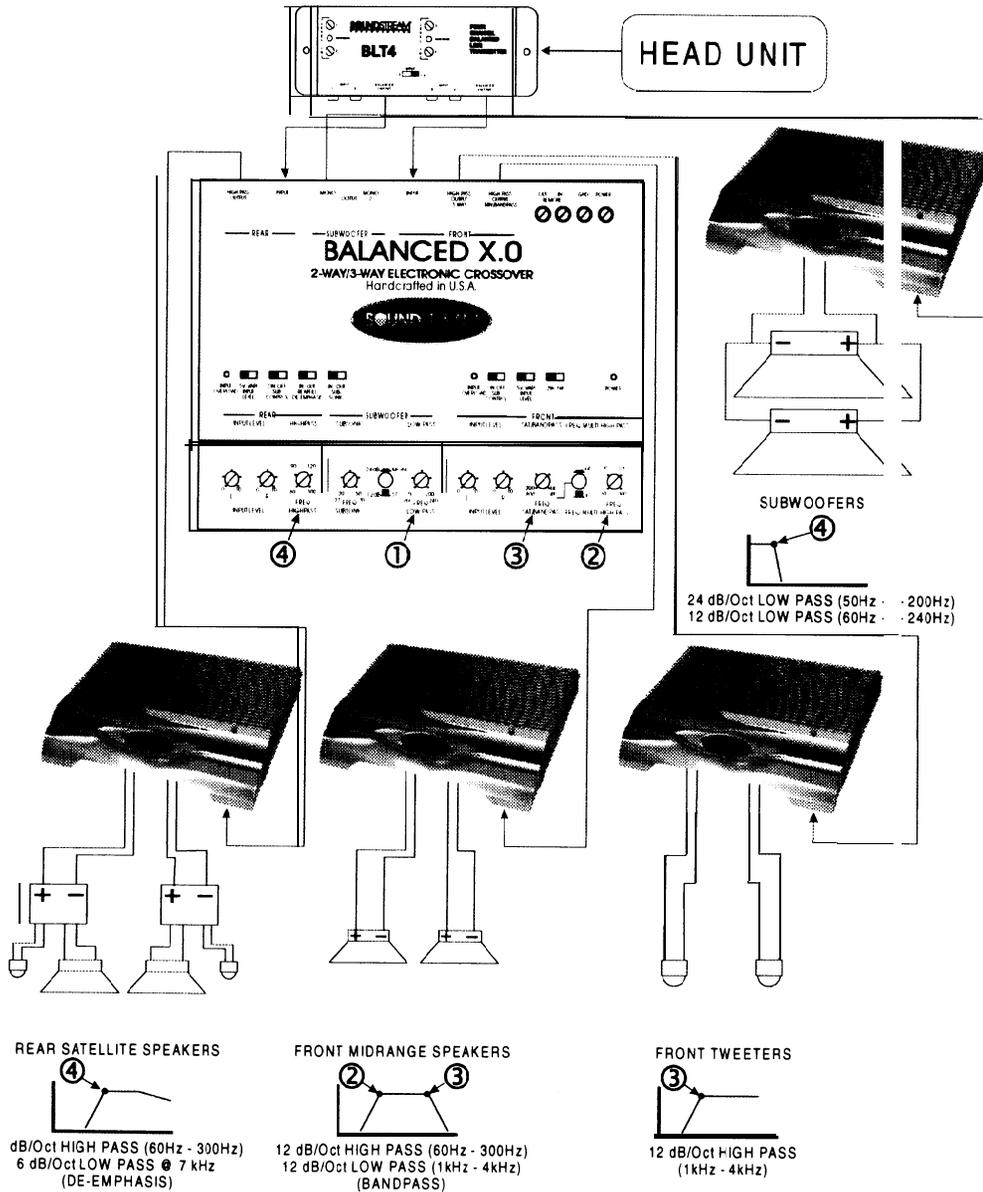
SAMPLE SYSTEM #2

Front / Rear fader acts as Subwoofer Level Control
No Rear Fill
2-Way Front System



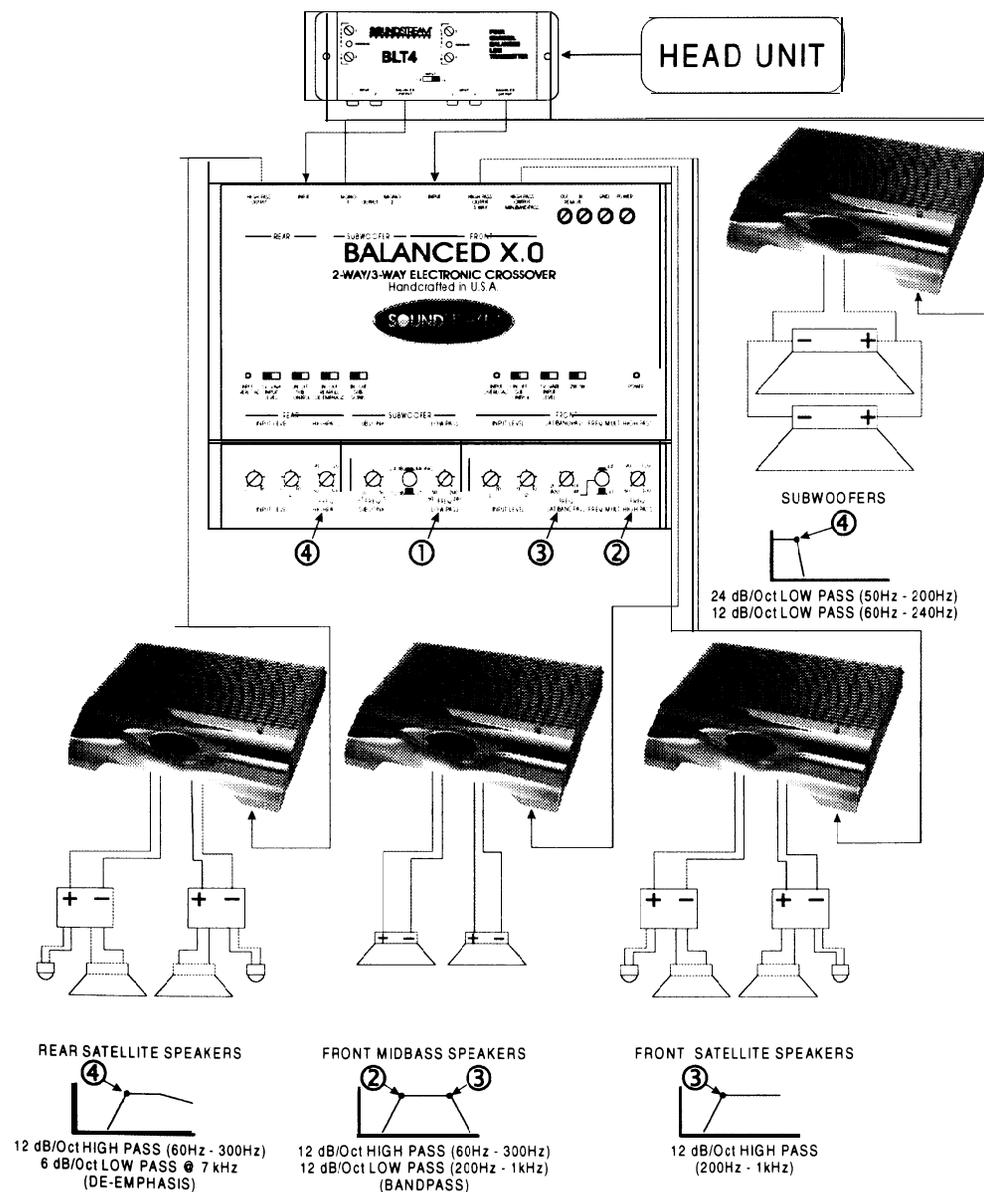
SAMPLE SYSTEM #3

Front / Rear fade with constant bass
 Rear Fill with De-Emphasis ON
 3-Way Front System (Midrange / Tweeter)
 "Freq Multi" button is IN



SAMPLE SYSTEM #4

Front / Rear fade with constant bass
 Rear Fill with De-Emphasis ON
 3-Way Front System (Midbass / Satellite)
 "Freq Multi" button is OUT



<i>PROBLEM</i>	<i>CAUSE</i>
No sound and power LED is not lit	<ul style="list-style-type: none"> • No power or ground at crossover • No remote turn-on signal • Blown fuse near battery • Phantom Power not present or available. Check the Mini-Din connections.
No subwoofer output, or the subwoofer output goes away when fading to the front or the rear.	<ul style="list-style-type: none"> • One or both of the "SUB CONTROL" switches are OFF. • Check "Remote Bass" switch on RUBICON amplifier
Excessive engine noise using BLT™ or BLT4™	<ul style="list-style-type: none"> • Make sure the input settings on the X.0 are set to 5V, not variable.

SERVICE

Your Soundstream BALANCED X.0 crossover is protected by a limited warranty. Please read the enclosed warranty card.

SPECIFICATIONS

Crossover *Slopes*

Low Pass	12 dB per octave
High Pass	12 dB per octave
Subwoofer	12 dB per octave (Stereo) 24 dB per octave (Mono)

Crossover *Frequencies*

Subwoofer Low Pass (Mono)	Variable 50 Hz - 200 Hz
Subwoofer Low Pass (Stereo)	Variable 66 Hz - 240 Hz
Subwoofer Subsonic (Mono)	Variable 20 Hz - 50 Hz
Subwoofer Subsonic (Stereo)	Variable 27 Hz - 70 Hz
High Pass (2-Way)	Variable 60 Hz - 300 Hz
Mid-Range (3-Way; Midbass/Satellite)	Variable 200 Hz - 1 kHz
Mid-Range (3-Way; Midrange/Tweeter)	Variable 800 Hz - 4 kHz
High Pass (3-Way; Midbass/Satellite)	Variable 200 Hz - 1 kHz
High Pass (3-Way; Midrange/Tweeter)	Variable 800 Hz - 4 kHz

(Note: The 3-way band pass frequency and high pass frequency are symmetrically set by one control.)

THD <0.05%, 20Hz - 20kHz

Signal-to-Noise >100 dB

Input Impedance 10kΩ

Output Impedance 1 00R

Crossover Output 5v, Variable

Dimensions 8 7/8" W x 13/8" H x 5" D2
25mm W x 350mm x 127mm