VSX™

ELECTRONIC CROSSOVER

OPERATING GUIDE



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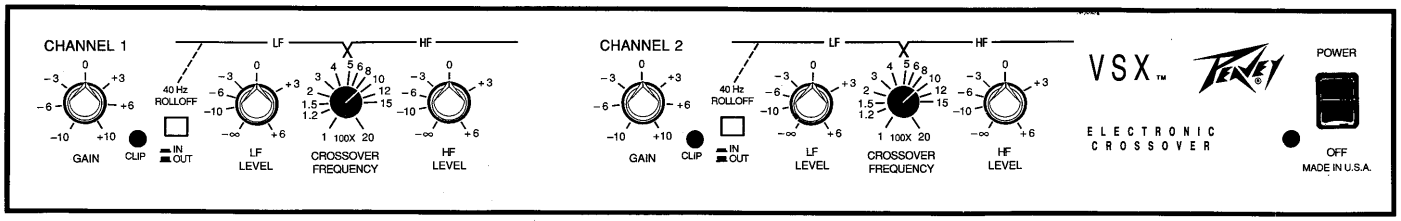

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FRONT PANEL

GAIN (1)

Used to optimize the interface gain between the VSX and the associated mixer. Control range is -10 dB to +10 dB with Unity gain at center position.

OPERATION NOTE

The 0 dB setting should be considered normal for many applications; however, adjustments in the - (negative) direction will reduce system noise. Settings in the + (positive) direction will improve headroom with mixers having output capability less than +18 dBV, at the expense of added system noise.

In applications requiring low system noise, such as studios, churches, etc., and where headroom is not critical, the noise level can be improved by operating the VSX gain levels below 0 dB. Example: A setting of -6 dB will reduce system noise by 6 dB. At the same time, system headroom will have been reduced by 6 dB. Such "compromises" should be considered normal in noise sensitive applications.

System headroom can be substantially increased with the VSX in applications where the mixer output is less than +18 dBV. To accomplish this, the optimum adjustment of gain will usually be the difference between the VSX output rating (+18 dBV) and the mixer output rating. Example: If the mixer output rating is +12 dBV, the VSX gain should be set at +6 dB (18 – 12 = +6 dB). If the mixer output rating is 18 dBV, the correct setting would be 0 dB. For mixers with output capability at +18 dBV or higher, gain settings above 0 dB will not improve headroom but will increase system noise.

CLIP LED (2)

Indicates when the signal level in the channel is too high. It illuminates when the channel signal reaches approximately +12 dBV.

40 Hz ROLLOFF (3)

Provides a 24 dB per octave rolloff at 40 Hz to reduce subsonic rumble and to protect the low speaker from operating below its cutoff frequency. Affects only the Low Frequency bandpass. When not engaged, the low end rolloff is below 10 Hz.

BANDPASS LEVEL CONTROLS (4)

Each bandpass section features a level control to compensate for the various loudspeaker efficiency ratings. All have range from off (infinity) to +6 dB and unity gain is at 12:00 position. Each is precisely calibrated to allow for accurate settings of each bandpass gain structure.

LOW-TO-HIGH CROSSOVER FREQUENCY CONTROLS (5)

The VSX's two outputs per channel are derived from a third-order, state variable filter (18 dB per octave roll-off). Each filter is independent, with the -3 dB crossover frequency selected via a screwdriver control. The screwdriver adjustment is utilized to prevent accidental changing of the critical crossover frequency values. Control range is from 100 Hz to 2 kHz and determines the -3 dB crossover point between the Low and High frequency bandpasses.

POWER LED (6)

Illuminates when AC power is being supplied to the unit.

POWER SWITCH (7)

Depress the switch to the "On" position. The red pilot light (LED) will illuminate indicating power is being supplied to the unit.

OPERATION NOTE

Always check for proper system connections before applying power. Upon initial hook-up, set all the bandpass level controls to the off position (infinity) before applying power; then slowly bring up the various levels to verify proper bandpass connections. A misconnected system could destroy loudspeakers.

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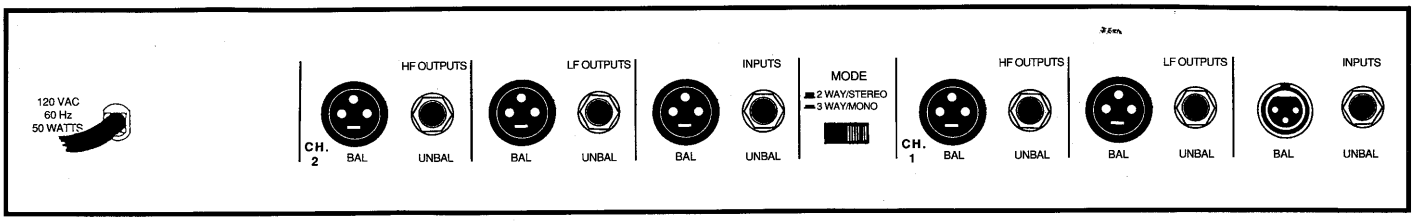

REAR PANEL

LINE CORD (120 V PRODUCTS ONLY) (8)

For your safety, we have incorporated a 3-wire line (mains) cable with proper grounding facilities. It is not advisable to remove the ground pin under any circumstances. If it is necessary to use the equipment without proper grounding facilities, suitable grounding adaptors should be used. Less noise and greatly reduced shock hazard exists when the unit is operated with the proper grounded receptacles.

BANDPASS OUTPUTS (XLR) (9)

Each XLR output is electronically balanced. (Pin 3 positive)

BANDPASS OUTPUTS (¼") (10)

Unbalanced outputs to be used when the associated power amplifiers are located near the VSX and share the same AC "mains" supply. These and all other signal grounds are isolated from chassis ground to minimize the possibility of ground loop hum.

INPUT (¼") (11)

This is a "stereo," three connector type jack (ring, tip, sleeve) allowing the input to be "balanced" when used with a three connector type (ring, tip, sleeve) plug. The "tip" is the positive input.

When a standard two conductor phone plug is inserted into this jack, the system becomes unbalanced. Such connection should be made only when the associated equipment is in close proximity to the VSX.

OPERATION NOTE

The XLR input and ¼" input are in parallel. If a two-conductor phone plug is used in the ¼" jack, both inputs become unbalanced. If a three-conductor phone plug is used to patch to associated equipment which is unbalanced, the entire channel becomes unbalanced.

INPUT (XLR) (12)

An electronically balanced input (pin 3 positive) which can handle up to +24 dBV (16 V RMS).

SET UP PROCEDURE

To achieve proper system set up and to provide good system performance and reliability, all the system component efficiency ratings and crossover frequency values must be determined and used in the following procedure.

Step 1:
The efficiency rating of the low frequency enclosure becomes the "reference efficiency" for the entire system. The level control associated with this bandpass should always be set at 0 dB. Example: A system's low frequency component has an efficiency rating of 110 dB at 1W, 1M. 110 dB is the "reference efficiency" for setup.

Step 2:
For three-way systems, the mid Level (Channel 2 Low) setting will be the difference in efficiency rating between the low and mid components. Example: The system's mid frequency component efficiency is 109 dB at 1W, 1M, 110 – 109 = +1 dB. The Mid Level setting (Channel 2 Low) should be +1 dB.

Step 3:
The high level setting will be the difference in efficiency rating between the low and high components. Example: The system's high frequency component efficiency is 115 dB at 1W, 1M, 110 - 115 = -5 dB. The High Level setting should be -5 dB.

Step 4:
The crossover frequency adjustments must be correct for the various components in the system. These values are usually the cut off frequencies of the associated components, but not necessarily. Crossover frequencies are sometimes selected to improve the "power sharing" for a given sound system application. These selections should never be below the cutoff frequency values.

Step 5:
For two-way or three-way systems, the 40 Hz filter may be activated if desired. This feature protects subwoofers from operating below cutoff and preserves headroom.

Step 6:
Adjust the gain control as described in the gain section.

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Biamped Systems: SP-2Ti, Internationals, 1245M and 1545M Monitors

Control/Output	Usage	Typical Setting
40 Hz Roll-off	Activates low roll-off	Switch in
LF Level	Sets low system level	0 dB reference
LF to HF Crossover	Sets low to high crossover	800 to 1,200 Hz
HF Level	Sets high system level	-6 to -12 dB
2 Way/3Way	Sets 2 way stereo	Switch out
LF Output	To low system power amp	
HF Output	To high system power amp	

Triamped Systems:

Control/Output	Usage	Typical Setting
40 Hz Roll-off	Activates low roll-off	Switch in
LF Level	Sets low system level	0 dB reference
LF to HF Crossover	Sets low to mid crossover	250 Hz
HF Level	Not used	
2 way/3 way	Set to 3 way mono	Switch in
40 Hz Roll-off	Not used	
LF Level	Sets mid system level	0 dB
LF to HF Crossover	Sets mid to high crossover	1,200 Hz
HF Level	Sets high system level	-6 to -12 dB
LF Output	To low system power amp	
HF Output	Not used	
LF Output	To mid system power amp	
HF Output	To high system power amp	

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SPECIFICATIONS

CONTROLS AND SWITCHES

System Gain Control:
±10 dB

40 Hz Roll-off Switch:
-3 dB @ 40 Hz, 24 dB/octave (in LF output)

LF Level Control:
- (infinity) to +6 dB

LF to HF Crossover Frequency:
100 Hz to 2 kHz, 18 dB/octave (screwdriver)

HF Level Control:
- (infinity) to +6 dB

FREQUENCY RESPONSE:

Each output is -3 dB at the selected crossover frequency value. Outputs are essentially flat within their relative passbands.

LF Output:
+0, -0.5 dB @ 10 Hz (with 40 Hz roll-off defeated)

HF Output:
+0, -0.5 dB @ 50 kHz

MAXIMUM OUTPUT LEVELS:

+18 dBV, 8 V RMS

DISTORTION

Less than 0.05% THD @ +10 dBV, 3 V RMS; 40 Hz to 20 kHz

HUM AND NOISE

(Crossover control, 1200 Hz; all level controls set at 0 dB; 40 Hz roll-off filters in; 20 Hz to 20 kHz, unweighted; 600 ohm input term.)

LF Output:
-98 dB below +10 dBV

HF Output:
-97 dB below +10 dBV

MAXIMUM INPUT LEVEL:

+24 dBV, 16 V RMS (system gain @ 0 dB or lower, other level controls set at 0 dB settings or lower)

INPUT IMPEDANCE:

20K ohms balanced, 10K ohms unbalanced

CONNECTORS

Inputs:
3 conductor ¼" phone jack, balanced/unbalanced XLR female (pin 3 positive), balanced (phone jack and XLR connector are bridged/parallel)

Outputs:
2 conductor ¼" phone jack unbalanced, XLR male (pin 3 positive), electronically balanced

(All signal grounds are common and "lifted" from chassis ground)

POWER REQUIREMENTS:

120 V AC, 50/60 Hz, 20 W (domestic model)

WEIGHT & DIMENSIONS:

8 lbs., 19" standard rack-mount, 1¾" height, 9" depth

DANGER

EXPOSURE TO EXTREMELY HIGH NOISE LEVELS MAY CAUSE A PERMANENT HEARING LOSS. INDIVIDUALS VARY CONSIDERABLY IN SUSCEPTIBILITY TO NOISE INDUCED HEARING LOSS, BUT NEARLY EVERYONE WILL LOSE SOME HEARING **IF** EXPOSED TO SUFFICIENTLY INTENSE NOISE FOR A SUFFICIENT TIME.
THE U.S. GOVERNMENT'S OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) HAS SPECIFIED THE FOLLOWING PERMISSIBLE NOISE LEVEL EXPOSURES:

DURATION PER DAY IN HOURS	SOUND LEVEL dBA, SLOW RESPONSE
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

ACCORDING TO OSHA, ANY EXPOSURE IN EXCESS OF THE ABOVE PERMISSIBLE LIMITS COULD RESULT IN SOME HEARING LOSS.
EAR PLUGS OR PROTECTORS IN THE EAR CANALS OR OVER THE EARS MUST BE WORN WHEN OPERATING THIS AMPLIFICATION SYSTEM IN ORDER TO PREVENT A PERMANENT HEARING LOSS IF EXPOSURE IS IN EXCESS OF THE LIMITS AS SET FORTH ABOVE. TO INSURE AGAINST POTENTIALLY DANGEROUS EXPOSURE TO HIGH SOUND PRESSURE LEVELS, IT IS RECOMMENDED THAT ALL PERSONS EXPOSED TO EQUIPMENT CAPABLE OF PRODUCING HIGH SOUND PRESSURE LEVELS SUCH AS THIS AMPLIFICATION SYSTEM BE PROTECTED BY HEARING PROTECTORS WHILE THIS UNIT IS IN OPERATION.

CAUTION

THIS MIXING CONSOLE/EFFECTS DEVICE/PREAMP HAS BEEN DESIGNED AND CONSTRUCTED TO PROVIDE ADEQUATE SIGNAL (VOLTAGE) FOR PLAYING MODERN MUSIC. IMPROPER USE OF THE GAIN/EQUALIZER CONTROLS AND/OR IMPROPER USE OF INTERNAL/EXTERNAL BUSSES **MAY** CREATE CLIPPING (SQUARE WAVES) AND POSSIBLY CAUSE SUBSEQUENT DAMAGE TO THE LOUDSPEAKER SYSTEMS. EXTENDED OPERATION OF THE GAIN/EQUALIZATION CONTROLS IN THEIR MAXIMUM POSITIONS IS THEREFORE **NOT** RECOMMENDED. PLEASE BE AWARE THAT **MAXIMUM POWER** CAN BE OBTAINED WITH VERY LOW SETTINGS OF THE **GAIN/EQUALIZATION** CONTROLS IF THE INPUT SIGNAL IS VERY STRONG.

IT IS COMMON PRACTICE AMONG USERS OF SOUND REINFORCEMENT EQUIPMENT TO IDENTIFY THE INDIVIDUAL CHANNELS WITH A STRIP OF TAPE PLACED ABOVE OR BELOW THE ROW OF VOLUME FADERS. MANY TYPES OR BRANDS OF TAPE HAVE A VERY STRONG ADHESIVE WHICH CAN INHIBIT THE PAINT ON THE FACEPLATE AND ACTUALLY REMOVE THE PAINT WHEN THE TAPE IS REMOVED. WE STRONGLY RECOMMEND THAT SCOTCH TAPE NOT BE USED ON PAINTED SURFACES NOR ANY OTHER TAPE THAT IS NOT ESPECIALLY DESIGNED FOR SUCH APPLICATIONS. MEDIUM OR LIGHT ADHESIVE MASKING OR MIXER LABEL TAPE IS RECOMMENDED IF TAPE IS USED. ANY TAPE LEFT ON PAINTED SURFACE FOR EXTENDED PERIODS WILL BE DIFFICULT TO REMOVE. NEVER USE CLEAR OR SCOTCH TAPE FOR THESE APPLICATIONS.

1. Read all safety and operating instructions before using this product.
2. All safety and operating instructions should be retained for future reference.
3. Obey all cautions in the operating instructions and on the back of the unit.
4. All operating instructions should be followed.
5. This product should not be used near water, i.e. a bathtub, sink, swimming pool, wet basement, etc.
6. This product should be located so that its position does not interfere with its proper ventilation. It should not be placed flat against a wall or placed in a built-in enclosure that will impede the flow of cooling air.
7. This product should not be placed near a source of heat such as a stove, radiator or another heat producing amplifier.
8. Connection to a power supply of the type marked on the unit adjacent to the power supply cord.
9. Never break off the ground pin on the power supply cord. For more information on grounding write for our free booklet "Shock Hazard and Grounding."
10. Power supply cords should always be handled carefully. Never walk or place equipment on power supply cords. Periodically check cords for cuts or signs of stress, especially at the plug and the point where the cord exits the unit.
11. The power supply cord should be unplugged when the unit is to be unused for long periods of time.
12. If this product is to be mounted in an equipment rack, rear support should be provided.
13. Metal parts can be cleaned with a damp rag. The vinyl covering used on some units can be cleaned with a damp rag, or an ammonia based household cleaner if necessary.
14. Care should be taken so that objects do not fall and liquids are not spilled into the unit through the ventilation holes or any other openings.
15. This unit should be checked by a qualified service technician if:
    A. The power supply cord or plug has been damaged.
    B. Anything has fallen or been spilled into the unit.
    C. The unit does not operate correctly.
    D. The unit has been dropped or the enclosure damaged.
16. The user should not to attempt to service this equipment. All service work should be done by a qualified service technician.

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THIS LIMITED WARRANTY VALID ONLY WHEN PURCHASED AND REGISTERED IN THE UNITED STATES OR CANADA. ALL EXPORTED PRODUCTS ARE SUBJECT TO WARRANTY AND SERVICES TO BE SPECIFIED AND PROVIDED BY THE AUTHORIZED DISTRIBUTOR FOR EACH COUNTRY.
Ces clauses de garantie ne sont vaiables qu'aux Etats-Unis et au Canada. Dans tour les autres pays, les clauses de garantie et de maintenance sont fixees par le distributeur national et assuree par lul seion la legislation envigueur.
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PEAVEY ONE-YEAR LIMITED WARRANTY/REMEDY

PEAVEY ELECTRONICS CORPORATION ("PEAVEY") warrants this product, EXCEPT for covers, footswitches, patchcords, tubes and meters, to be free from defects in material and workmanship for a period of one (1) year from date of purchase, PROVIDED, however, that this limited warranty is extended only to the original retail purchaser and is subject to the conditions, exclusions, and limitations hereinafter set forth:

PEAVEY 90-DAY LIMITED WARRANTY ON TUBES AND METERS

If this product contains tubes or meters, Peavey warrants the tubes or meters contained in the product to be free from defects in material and workmanship for a period of ninety (90) days from date of purchase; PROVIDED, however, that this limited warranty is extended only to the original retail purchaser and is also subject to the conditions, exclusions, and limitations hereinafter set forth.

CONDITIONS, EXCLUSIONS, AND LIMITATIONS OF LIMITED WARRANTIES

These limited warranties shall be void and of no effect, if:

a. The first purchase of the product is for the purpose of resale; or
b. The original retail purchase is not made from an AUTHORIZED PEAVEY DEALER; or
c. The product has been damaged by accident or unreasonable use, neglect, improper service or maintenance, or other causes not arising out of defects in material or workmanship; or
d. The serial number affixed to the product is altered, defaced, or removed.

In the event of a defect in material and/or workmanship covered by this limited warranty, Peavey will:

a. In the case of tubes or meters, replace the defective component without charge.
b. In other covered cases (i.e., cases involving anything other than covers, footswitches, patchcords, tubes or meters), repair the defect in material or workmanship or replace the product, at Peavey's option; and provided, however, that, in any case, all costs of shipping, if necessary, are paid by you, the purchaser.

THE WARRANTY REGISTRATION CARD SHOULD BE ACCURATELY COMPLETED AND MAILED TO AND RECEIVED BY PEAVEY WITHIN FOURTEEN (14) DAYS FROM THE DATE OF YOUR PURCHASE.

In order to obtain service under these warranties, you must:

a. Bring the defective item to any PEAVEY AUTHORIZED DEALER or AUTHORIZED PEAVEY SERVICE CENTER and present therewith the ORIGINAL PROOF OF PURCHASE supplied to you by the AUTHORIZED PEAVEY DEALER in connection with your purchase from him of this product.
If the DEALER or SERVICE CENTER is unable to provide the necessary warranty service you will be directed to the nearest other PEAVEY AUTHORIZED DEALER or AUTHORIZED PEAVEY SERVICE CENTER which can provide such service.

OR

b. Ship the defective item, prepaid, to:

PEAVEY ELECTRONICS CORPORATION
International Service Center
326 Hwy. 11 & 80 East
MERIDIAN, MS 39301

including therewith a complete, detailed description of the problem, together with a legible copy of the original PROOF OF PURCHASE and a complete return address. Upon Peavey's receipt of these items:
If the defect is remedial under these limited warranties and the other terms and conditions expressed herein have been complied with, Peavey will provide the necessary warranty service to repair or replace the product and will return it, FREIGHT COLLECT, to you, the purchaser.

Peavey's liability to the purchaser for damages from any cause whatsoever and regardless of the form of action, including negligence, is limited to the actual damages up to the greater of $500.00 or an amount equal to the purchase price of the product that caused the damage or that is the subject of or is directly related to the cause of action. Such purchase price will be that in effect for the specific product when the cause of action arose. This limitation of liability will not apply to claims for personal injury or damage to real property or tangible personal property allegedly caused by Peavey's negligence. Peavey does not assume liability for personal injury or property damage arising out of or caused by a non-Peavey alteration or attachment, nor does Peavey assume any responsbility for damage to interconnected non-Peavey equipment that may result from the normal functioning and maintenance of the Peavey equipment.

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In the event of any modification or disclaimer of expressed or implied warranties, or any limitation of remedies, contained herein conflicts with applicable law, then such modification, disclaimer or limitation, as the case may be, shall be deemed to be modified to the extent necessary to comply with such law.

Your remedies for breach of these warranties are limited to those remedies provided herein and Peavey Electronics Corporation gives this limited warranty only with respect to equipment purchased in the United States of America.

INSTRUCTIONS — WARRANTY REGISTRATION CARD

1. Mail the completed WARRANTY REGISTRATION CARD to:

PEAVEY ELECTRONICS CORPORATION
POST OFFICE BOX 2898
MERIDIAN, MISSISSIPPI 39302-2898

   a. Keep the PROOF OF PURCHASE. In the event warranty service is required during the warranty period, you will need this document. There will be no identification card issued by Peavey Electronics Corporation.
2. IMPORTANCE OF WARRANTY REGISTRATION CARDS AND NOTIFICATION OF CHANGES OF ADDRESSES:
   a. Completion and mailing of WARRANTY REGISTRATION CARDS — Should notification become necessary for any condition that may require correction, the REGISTRATION CARD will help ensure that you are contacted and properly notified.
   b. Notice of address changes – If you move from the address shown on the WARRANTY REGISTRATION CARD, you should notify Peavey of the change of address so as to facilitate your receipt of any bulletins or other forms of notification which may become necessary in connection with any condition that may require dissemination of information or correction.
3. You may contact Peavey directly by telephoning (601) 483-5365.

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