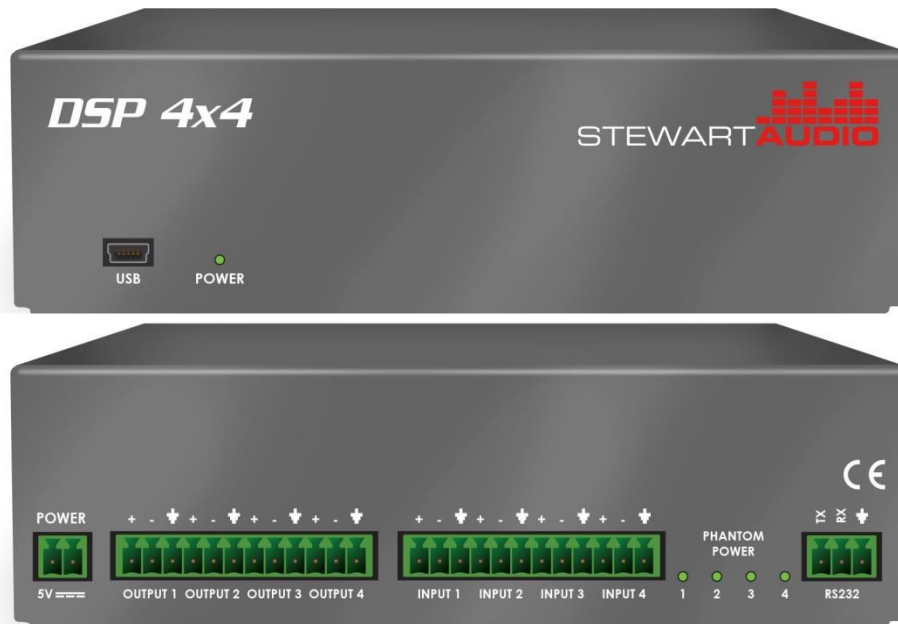# DSP 4x4 Operation Manual

1 Important safety instructions

1. Please read carefully prior to product installation or operation.
2. Read these instructions.
3. Keep these instructions.
4. Heed all warnings.
5. Follow all instructions.
6. Do not use this apparatus near water.
7. Clean only with dry cloth.
8. Do not block any ventilation openings. Install in accordance with manufacturer's instructions.
9. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
10. The unit should only be connected to 120-240VAC, 50-60 Hz power supply. Use only the power adapter that is sold with the unit.
11. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point they exit from the apparatus.
12. Only use attachments/accessories specified by the manufacturer.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate properly, or has been dropped.

2   Approvals

This equipment has been tested and found to be compliant with the limits for Class A Digital device pursuant to part 15 of the FCC rules, and in compliance with the EN55022 and EN55024 EMC standards.

3   Warnings

3.1   Explanation of Warning Symbols

3.1.1   Lightning Bolt

The lightning bolt within arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of un-insulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electrical shock to person.
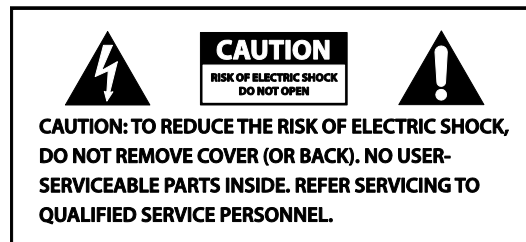
3.1.2   Exclamation Point

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instruction in the literature accompanying the appliance.

3.2   Warnings

WARNING: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE. DANGEROUS HIGH VOLTAGES ARE PRESENT INSIDE THE ENCLOSURE. DO NOT OPEN THE CABINET. REFER SERVICING TO QUALIFIED PERSONNEL ONLY.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

3.3   User Responsibility

3.3.1   Radio Interference

This product has been tested and complies with the EMC directive, and with FCC part 15 Class A. If this product is not used in accordance with these operating instructions, it may cause interference with to other equipment, such as radio and television receivers.

3.3.2   Maintenance

Clean regularly with a soft cloth to remove dust and debris. Also check that vent holes and slots are not covered and that there is adequate ventilation for convection cooling.

4 Table of Contents

5   Welcome

Congratulations on the purchase of your new Stewart Audio DSP 4x4 audio digital signal processor. This product has been designed and built to provide you with years of high-quality audio performance and trouble-free operation. If after reading this operation manual you have questions concerning product installation and operation, please contact your Authorized Stewart dealer, or you may contact us directly using the contact information provided on the back of this guide.

5.1   Features

The DSP 4x4 offers 4 channels of digital signal processing through a fixed architecture. It is configurable through a USB port using Stewart Audio's DSP Control Center software.   An RS-232 connection is provided for remote control of the muting, preselect, and output volume functions. The enclosure occupies a 1/3 x 1RU rack space. Single and dual rack mount kits are available from Stewart Audio.

This product is proudly manufactured in the United States.

5.2   Unpacking and Visual Inspection

Every Stewart Audio product is carefully tested and inspected before leaving the factory and should arrive in perfect condition. If any damage is discovered, please notify the shipping carrier immediately. Save the packing materials for the carrier's inspection and for any future shipping.
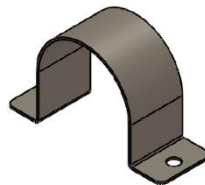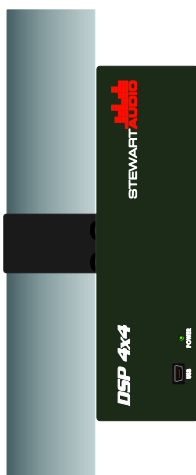
5.3   Installation and Setup

5.3.1   Mounting

There are a number of different mounting options for the DSP 4x4 to meet a variety of installation requirements.

5.3.1.1   Pole Mounting

The DSP 4x4 has mounting holes on the top of the unit which can be used with the AV-Pole bracket available from Stewart Audio.


Part Number: AV-Pole

5.3.1.2 Universal Mounting

The DSP 4x4 also has a universal bracket available which allows the unit to be mounted against a wall or under a table. Two screws are included in the kit which will affix the bracket to the top of the unit. Once this is done, two holes are available for mounting the unit where desired.

Part Number: AV-Bracket

CAUTION: Use only the screws provided in mounting the brackets to the unit. Do not over tighten.
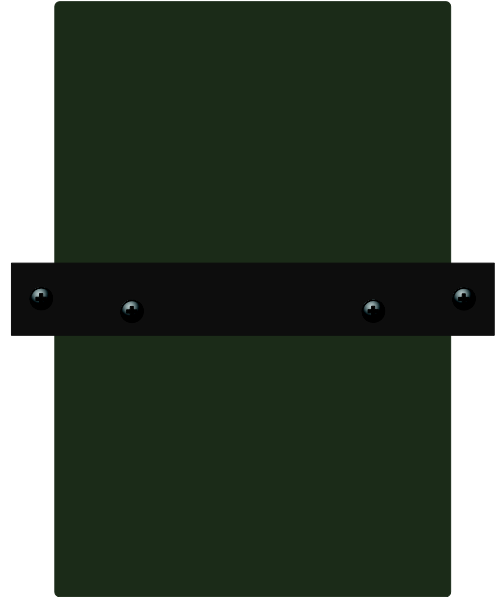
5.3.1.3 Rack Mounting

Two rack mount kits are available for the DSP4x4; a single rack mount (RMK-CMP-S) and a dual rack mount (RMK-CMP-D). These can be ordered from your Stewart Audio dealer, or directly from Stewart Audio. The following diagrams show how these are attached to the DSP. Use care not to over-tighten the screws.
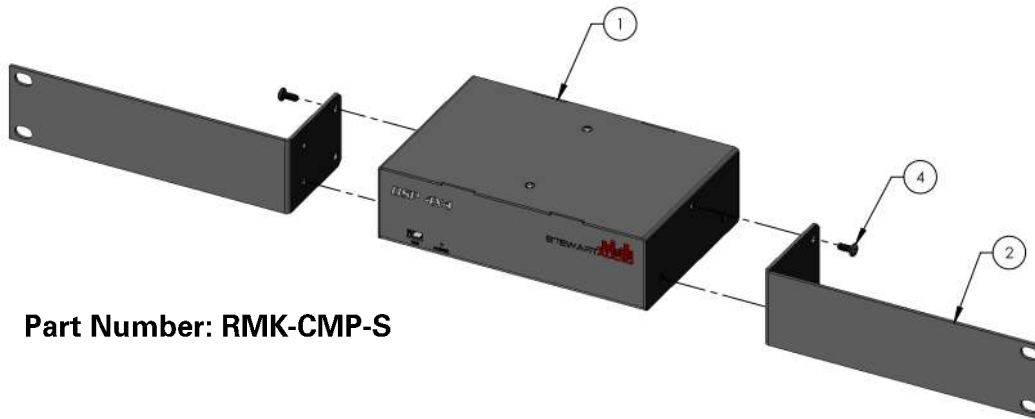
Part Number: RMK-CMP-S

Part Number: RMK-CMP-D

5.3.2   Product Dimensions

5.3.3   Input Connections

Your DSP4x4 is provided with a 3-pin Euro-style connector for each input. This connector will accept both balanced or unbalanced connectio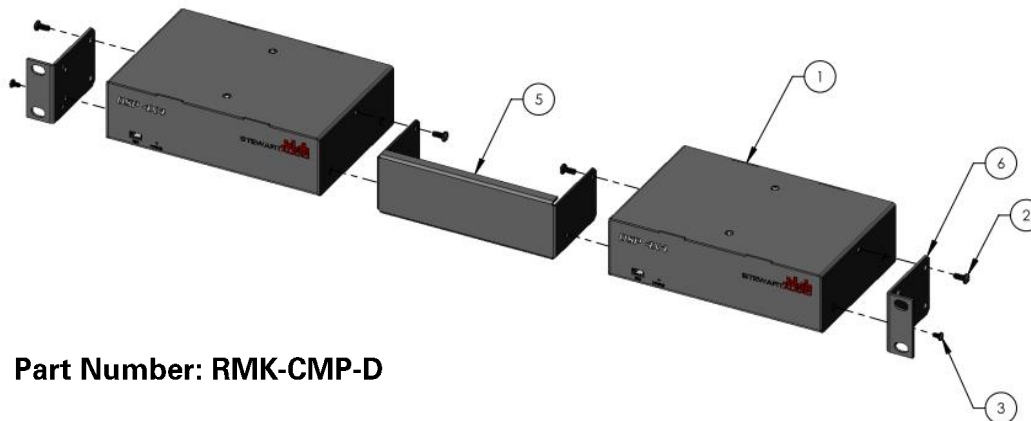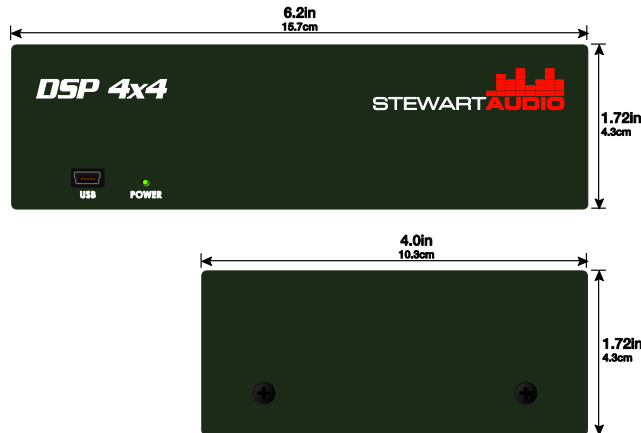ns, however some modifications must be made for an unbalanced connection. See the next two sections for instructions on connecting the DSP 4x4 to its input source.

5.3.3.1   Balanced Connections

When using a balanced input source and connector, you must ensure that the hot, cold, and ground pins of the connector are matched up to the +, -, and ground pins of the DSP 4x4's Phoenix connector respectively. Diagrams have been provided for standard XLR and TRS connectors. Please refer to the manual of your input source in case it does not follow the standard pin-out.

Caution: Incorrect wiring may result in damage to equipment.

5.3.3.2   Unbalanced Connections

When using an unbalanced input source and connector, a jumper must be added between the negative (-) terminals and the ground terminals. Once this has been done, the unbalanced source can be connected to the positive (+) and ground terminals. Please refer to the manual of your input source in case it does not follow the standard pin-out. For your convenience, pre-wired connectors are available for purchase, see the next page for details.

Note: A jumper is required for connecting an unbalanced input.

DSP 4x4 Operations Manual Rev E
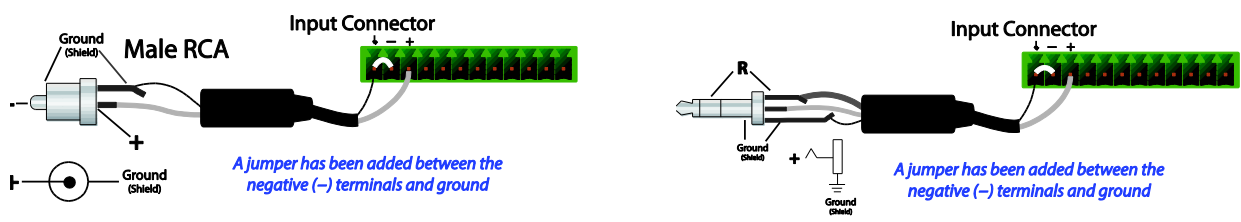
Pre-wired unbalanced connectors are available for purchase from Stewart Audio. The summing adapters will properly sum a stereo source for use with the mono input on the rear of the DSP 4x4 without causing sound cancellation. Part numbers are found below the diagrams.

ADPT-RCA	**ADPT-SUMRCA**	**ADPT-SUM35**
Mono	Stereo	Stereo
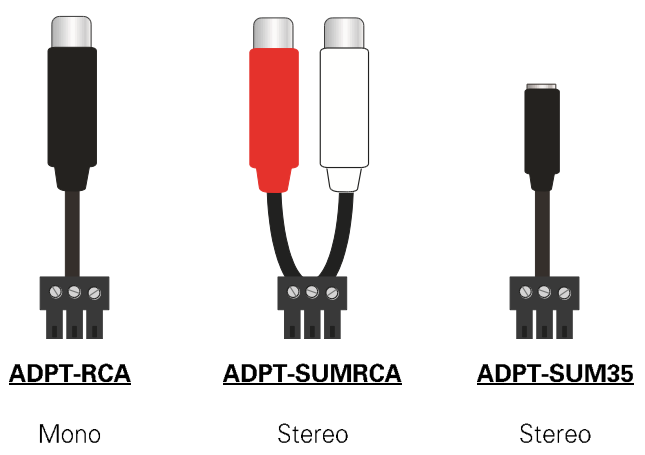
5.3.3.3 Phantom Power

The DSP 4x4 is designed with software-selectable 24VDC phantom power on all 4 channels capable of supplying 25mA per channel. This power level is sufficient to operate most condenser microphones in a typical DSP 4x4 application.

Phantom power can be switched on/off via the Input Block of the Stewart Audio Control Center Software or using RS–232 commands documented in Section 5.3.5.

When phantom power is being supplied on a channel, the appropriate LED indicator on the rear of the DSP 4x4 will illuminate.

⚠️ **Caution: Microphones or other input devices which do not require phantom power can be permanently damaged by the application of phantom power. Stewart Audio will not be held responsible for damage to these devices.**

⚠️ **Caution: Phantom power should not be used with the summing adapters in Section 5.3.3.2. The power will be dissipated in the adapter and will not reach the microphone or other input device.**

5.3.4 Output Connections

Your DSP 4x4 is provided with a 3-pin Euro-style connector for each output. This connector offers a balanced output to interface with the input of another device.

Connection method for balanced are identical to the method for inputs as referenced in Section 5.3.3, for unbalanced outputs there should NOT be a connection from negative to ground.

5.3.5 RS-232 Connection

Your DSP 4x4 can be controlled using the RS–232 connection on the rear of the device. For the available RS–232 commands, see below.
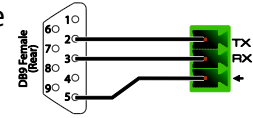
All communications should be performed at 9600 baud, 8 bits, 1 stop bit, no parity, and no flow control. .All commands operate on the **output gain block** of the signal processing chain.

NOTE - TX and RX labelings are relative to the Stewart Audio Device

Command Name and Description	Hex Command
TRIM Changes trim by **AMOUNT**[1] on **CHAN**[2]	0x12 AMOUNT[1] CHAN[2] 0x03
VOLUME_DISCRETE Sets **CHAN**[2] volume to **VOL**[3]	0x12 0x06 CHAN[2] VOL[3] 0x03
VOLUME_STATUS Return **CHAN**[2] volume in the format: **0x06 VOL[3] 0x0A**	0x12 0x07 CHAN[2] 0x03
FORCE_MUTE_ON Turn mute off for **CHAN**[2]	0x12 0x08 CHAN[2] 0x03
FORCE_MUTE_OFF Turn mute on for **CHAN**[2]	0x12 0x09 CHAN[2] 0x03
MUTE_TOGGLE Toggle mute on **CHAN**[2]	0x12 0x10 CHAN[2] 0x03
MUTE_STATUS Return **CHAN**[2] mute status in the format: **0x06 MUTE5[3] 0x0A**	0x12 0x11 CHAN[2] 0x03
CHANGE_PRESET Change to **PRESET**	0x12 0x12 PRESET[3] 0x03
FIRMWARE_VERSION Returns the current version in the format: **0x02 0xXX 0xYY 0x03** (**XX** = Version, **YY** = Revision)	0x12 0x13 0x13 0x03

[1] AMOUNT is

    0x01 = up 10%, 0x02 = up 5%; 0x04 = down 10%; 0x05 = down 5%

[2] CHAN is

    0x00 = all channels; 0x01 = channel 1: 0x02 = channel 2; etc.

[3] VOLUME is in the range of 0 – 100 expressed in hexadecimal (0x00 – 0x64).

[4] Preset is zero-based in the range 0x00 – 0x09.

[5] Mute is in the format 0x00 = unmuted; 0x01 = muted

6 Controls and Indicators
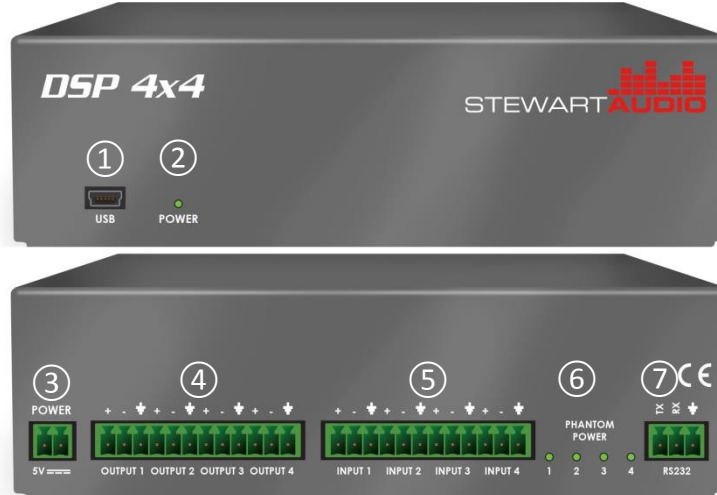
1. USB 2.0 Connector: used for DSP programming
2. Power Indicator LED: illuminates when power is applied
3. Power Connector (3.5mm): connect power adapter supplied with unit only
4. Output Connectors (3.5mm): connect to input of next device in the signal chain
5. Input Connectors (3.5mm): connect to source(s)
6. Phantom Power Indicator LEDs: illuminate when phantom power is applied to the corresponding channel (in DSP Control Center program)
7. RS-232 Connector (3.5mm): connect to RS-232 controller (optional)

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7 Technical Specifications

Frequency response	20-20kHz ±0.2dB
THD + Noise	▪ <0.007%
Signal to Noise Ratio	▪ >120dB @ 0dB gain
Unweighted Crosstalk	▪ <-95dB
Input Sensitivity	▪ -24dB to 0dB
Input Impedance	
Balanced	▪ 20 kΩ
Unbalanced	▪ 10 kΩ
Phantom power applied	▪ 2.4 kΩ
Phantom power	▪ 24VDC @ 25mA (software controlled)
D/A conversion	▪ 24-bit, 48kHz
Current draw (max)	▪ 400mA @ 5VDC
Input connections	▪ 3.5mm Euro block
Output connections	▪ 3.5mm Euro block
LED indicators	▪ Power, phantom power (1/channel)
Controls	▪ USB (programming)
	▪ RS-232 (operation)
Serial control port	▪ Bi-directional RS-232
Baud rate & protocol	▪ 9600 baud, 8 bits, no parity, no flow control
USB control port	▪ Front panel, female mini USB-B
USB standard	▪ USB 2.0 low speed
Program control	▪ Stewart Audio DSP Control Center
Power supply input	▪ External in-line 5VDC Universals input AC/DC (included)
Construction --	▪ Aluminum Chassis
Mounting --	▪ Universal bracket; pole mountable; 19" Rack Mount
Cooling --	▪ Convection (no fan)
Dimensions (excluding rack mounts) --------------------	▪ 1.7" x 6.2" x 4.0"
	▪ 4.3cm x 15.7cm x 10.3cm
Weight	▪ 0.6 lbs (0.3kg)
Regulatory	▪ CE and FCC compliant
Environmental	▪ RoHS
Warranty--	▪ 3 years

8 Troubleshooting

Problem: No power LED indicator

Procedure: Ensure that only the provided 5VDC 2A power supply has been used and that it is connected to a live power outlet supplying 100-240VAC.

Problem: No RS–232 communication

Procedure: Ensure that the connections are done as specified in **Section 5.3.5.** Check that the communication is at 9600 baud. Shorten the cable lengths to see if it affects the communication

Problem: No output on individual channel

Procedure: Refer to the **DSP Control Center Software** manual (http://www.stewartaudio.com/DSPCC) for instructions on using live mode to meter the signal in the DSP signal path. If a condenser microphone is in use, ensure phantom power is being supplied. Check input connections (**see Section 5.3.3)**. Check that the volume on the audio source is at a sufficient level.

9 Warranty Information

9.1 Warranty Summary

All Stewart Audio products and accessories, unless excluded in this summary, are covered by a 3-year limited warranty on parts and labor from the data of purchase. In order to be eligible for warranty repairs, the products and accessories must have been purchased through an authorized Stewart Audio dealer and submitted by the original purchaser. This warranty is only valid in the country in which the product was purchased.

9.2 Eligibility Requirements

Stewart Audio warrants against all malfunctions which come as a result of component or manufacturer defect. The product is also covered from all failures which arise during the warranty period (3 years from date of purchase) that are not a result of misuse. The following actions will void your warranty:

- The power cord or AC plug has been damaged through misuse.
- The product has been exposed to moisture or extreme temperatures.
- The product has been dropped, items have been dropped on the product, or the enclosure has been damaged.
- The product has been opened by the operator.
- The product was improperly packaged when sending to the factory for repair, resulting in damage.
- Any of the precautions or instructions found in this manual were not followed.

Damages resulting to the product which are not covered under this warranty can be factory-repaired at cost to the customer. Use the contact information below to initiate the repair process.

9.3 Non-warranty Repairs

An estimate for all non-warranty repairs will be provided to the customer once the unit has been shipped to the factory. The customer is responsible to approve this estimate within 7 days. If the repairs are not approved within 14 days, Stewart Audio reserves the right to consider the unit scrap and may discard it. Payment for non-warranty repairs must be submitted to Stewart Audio before the product will be returned to the customer.

10 Return Procedure

All returns to the factory for service must be accompanied by a Return Authorization (RA) number. One can be obtained by contacting Stewart Audio at (209) 588-8111 or via e-mail at support@stewartaudio.com.

NOTE: Any defective products received without an RA number will be returned to sender at their expense.

If Stewart Audio is unable to contact the sender in 14 days, the merchandise will be considered scrap and may be disposed of.

10.1 Shipment Instructions

- If Stewart Audio requests that you ship the defective product back to their service center, please refer to the guide below. To ensure prompt warranty service, be sure to follow all instructions.
- Return Authorization (RA) is required for product being sent to the factory for service.
- See packing instructions in **Section 10.2.**
- Ship the defective product using a method which provides for order tracking or order confirmation. The service center is located at the following address:

  Stewart Audio
  14335 Cuesta Court Suite C
  Sonora, CA 95370

- Use a bold black marker and write the RA number on three sides of the box.

Record the RMA number for future reference. The RA number can be used to check the repair status.

10.2 Packaging Instructions

Should Stewart Audio request that you ship your product to their service center, these instructions must be followed in order to ensure safe delivery. If they are not followed, Stewart Audio assumes

no responsibility for damaged goods and/or accessories that are sent with your unit.

1. Please write the RA number on three sides of the box. Include the Stewart Audio RA number inside the box and a brief description of the problem.
2. You will be advised during the RA process what accessories should be included with the product (power supplies, connectors, cords, etc.). This is dependent on the failure assessment.
3. When shipping your product, it is important that it has adequate protection. We recommend you use the original packing material when returning the product for repair. If you do not have the original box, see number 4.
4. If you provide your own shipping pack, use materials adequate to prevent damage during transit. Make certain that the product is NOT free to move within the package, as this is the most common cause of damage.
5. Securely seal the package with an adequate carton sealing tape.
6. Do not use light boxes or "peanuts".

NOTE: Damage caused by poor packaging will not be covered under warranty.