

WORLDTM 1.6/2.1

Dual Monaural Power Amplifiers

Owner's Manual

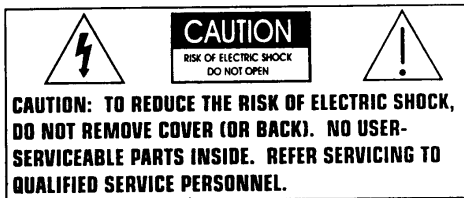


WHEN THE PERFORMANCE DEPENDS ON ITTM

Safety

Before using your Stewart Audio Inc. Power Amplifier, please read this **Owner's Manual** carefully to ensure optimum trouble –free performance.

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



The lightning bolt within arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electrical shock to person.



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.

Important Safety Instruction – Please Read Prior to Product Installation.

1. All of the safety and operating instructions should be read before the amplifier is operated. Retain these instructions for future reference. All instructions should be followed; all warnings on the amplifier and in the operating instructions should be adhered to.
2. This amplifier should not be used near water, for example, near a bathtub, in a wet basement, near a swimming pool, etc.
3. The amplifier should be situated so that its location and position does not interfere with its proper ventilation. For example, the amplifier must not be placed on a rug, bed, sofa or similar surface that impedes airflow across the chassis. Airflow through the ventilation openings should be unobstructed.
4. Do not place the amplifier near heat sources such as radiators, heat registers, stoves, or other appliances that produce heat.
5. The amplifier should be only be connected to 120 VAC, 60 Hz power supply. Do not defeat the ground or polarization of the power plug.
6. Route power cord and other cables so that they are not likely to be walked on, tripped over or stressed. Pay particular attention to condition of cords and cables at plugs, and the point where they exit the amplifier. To prevent risk of fire or injury, damaged cords and cables should be replaced immediately.
7. Clean the amplifier with a clean damp cloth. Do not use solvents or abrasive cleaners. Never pour any liquid on the amplifier.
8. When left unused for a long period of time, the power cord should be unplugged from the outlet.
9. Damaged Amplifiers requiring service. The amplifier should be serviced by a qualified service technician when:
 - a. The power cord or AC plug has been damaged.
 - b. Objects have fallen, or liquid has spilled into the unit
 - c. The amplifier has been exposed to rain or other moisture
 - d. The amplifier does not appear to operate normally or exhibits a marked change in performance.
 - e. The amplifier has been dropped or the enclosure damaged.
10. The user should not attempt to service the amplifier beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

Introduction

Congratulations! You have purchased a powerful product, which will provide you with many years of reliable service. Since 1982, Stewart, committed to innovation in design and quality workmanship, has provided its customers with a unique combination of performance and reliability. This philosophy has attracted the attention and gained the respect of industry professionals around the world.

The World™ 1.6 Dual Monaural Amplifier delivers 550 watts at 4 ohms per channel in stereo mode and over 1400 watts into a single 4 ohm load when bridged for mono operation while the World™ 2.1 Dual Monaural Amplifier delivers 650 watts at 4 ohms per channel in stereo mode and over 1800 watts in bridged mono operation. This remarkable performance comes in packages weighing only 16 pounds and 17 pounds respectively, while only occupying two rack spaces. Thermal concerns are minimized in the World 1.6 and 2.1 by innovative circuitry and extraordinary efficiency, making installations simpler than ever before.

We at Stewart Audio Inc. strive to bring you the finest in professional electronics, and we thank you for your choice, which we see as appreciation for our efforts.

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For The Record

In the spaces provided below record the model and serial number located at the rear of your power amplifier.

Model No.

Serial No.

Purchase Date

Retain this information for future reference.

Special Features

Dual Monaural Design

The World™ 1.6/2.1 are true Dual Monaural Amplifiers. Each chassis contains two independent amplifiers, each with its own power supply, sharing only the AC power cord and cooling fan. Under normal operating conditions, this design provides maximum separation and greater dynamic capabilities than two amplifiers which share a single power supply. In addition, if a fault condition shuts down one channel, the remaining channel continues to operate unaffected.

Low Impedance / High Current Design

The design of the World™ 1.6/2.1 is extremely conservative with regards to current capabilities. This ensures that the amplifier's output devices within their safe operating area even under extreme conditions. As a result, they can run low impedance loads safely, while retaining the high-impact dynamics for which it was designed.

Audio Impedance Optimization

The High-Frequency Switch Mode Power Supply and amplifier design used in the World™ 1.6/2.1 adapt to the demands placed upon them, enabling the amplifier to run with maximum efficiency regardless of load impedance. Thermal management problems normally associated with amplifiers of this capacity are therefore greatly reduced. Resources otherwise applied toward dealing with thermal problems can be put to better use in higher-quality active components for increased reliability and improved performance.

Mono-Bridgeable

The two power amplifiers contained within each of these amplifiers can be bridged together to form a single channel. In this configuration the load impedance is effectively divided between the two amplifiers, so each amplifier sees half the impedance of the load. This results in combining the power of both channels into one load.

Balanced / Unbalanced Inputs

The World™ 1.6/2.1 incorporate XLR, ¼" phone and barrier strip inputs. These inputs are wired in parallel, allowing throughput of the signal to other equipment as well as the versatility of multiple input formats.

6-Gauge 5-Way Binding Post Output

The binding post speaker outputs will accept banana plugs or wire up to 6 AWG. In addition, the binding posts are spaced to allow one standard banana plug to be used when operating in bridge mode.

High-Frequency Switch Mode Power Supply

All Stewart Audio Inc. amplifiers feature High Frequency Switch Mode Power Supplies. These supplies are a radical departure from the "old style" conventional power supply. Because of Stewart's pioneering use of this technology, some explanation is in order.

Conventional supplies operating at 60 Hz (standard line frequency) recharge only 120 times per second, requiring their storage capacitors and transformer to be quite large to supply the energy needed during the interval between cycles, when power is not available from the wall. The power supply must act as a local reservoir of power from which the amplifier circuits draw. This storage function is responsible for much of the bulk, weight and cost of traditional power amplifiers.

The Stewart High Frequency Switch Mode Power Supply fully recharges 120,000 times per second (1000 times faster than conventional analog supplies), requiring far less capacitance for filtering and storage. This high-speed recharging reduces power supply "sagging" common with other designs resulting in outstanding low frequency performance. In a Stewart amplifier, it is almost as though power is fed directly from the wall to the speaker, with the amplifier acting only as a "valve" in-between to control its flow. This power supply's remarkable efficiency at converting energy from the AC line to a usable form for loudspeaker applications allows many of the major components to be downsized, saving space, weight and cost.

Unlimited Dynamics

Most power amplifiers utilize some form of current limiting in the audio path. While a fairly reliable form of protection, this technique has some disadvantages in that it can reduce the impact of musical transients by prematurely limiting output current and therefore dynamics. Low-frequency signals may sound weak or distorted as a result. Stewart Audio Inc. World™ 1.6/2.1 120Volt amplifiers have no current limiting in the audio path, and therefore reproduce the full dynamics of the audio signal.

Absolute Protection

Stewart Audio Inc. power amplifiers employ circuits which fully protect the amplifier while avoiding any sonic compromises. First, a unique circuit monitors the current draw from the power supply. The amplifier's output is not affected in any way until the load impedance drops below $\frac{1}{2}$ ohm, indicating the presence of a short. Under these conditions the power supply will simply shut down until the short is removed, at which point the power supply will slowly ramp up to full power, protecting the load from a surge of high power. In the event of an amplifier malfunction this circuit will also protect the speakers, since the power supply is immediately disconnected from the amplifier. This operation is provided independently for each channel; therefore a fault condition in one channel will not shut down the other.

Most other amplifier designs require the presence of relatively high levels of signal in order to detect a short circuit on the output. At low levels these amplifiers will continue to drive a short, causing rapid heat buildup, thermal runaway, and finally amplifier failure. The current sensing circuitry in all Stewart World Series amplifiers are capable of detecting a shorted output even at low program levels, increasing its reliability under conditions which would cause other amplifiers to fail.

An additional danger from which all amplifiers need protection is heat. The first line of defense against excessive heat is a variable speed cooling fan. This variable speed fan will engage upon power-up and run quietly the entire time the amplifier is in use.

If for any reason the amplifier should overheat, an additional safety feature is provided in the form of a thermostat, which will shut the amplifier down, if the heatsink temperature reaches 85 C.

Full Range Power Output

Full Range (20Hz–20KHz) Rated Power Output Of the World™ 1.6/2.1 into a 4 ohms load @ .1% Distortion is 1400W and 1800 Watts respectively. For more detailed specifications see the back page of this manual for complete technical specifications.

Front and Rear Panel Features

Front Panel Features

Sophisticated simplicity is a design objective in the development of all Stewart Audio Inc. power + amplifiers. These amplifiers remain simple and intuitive to operate even while incorporating some of the most advanced technology available in the marketplace today.

Level Controls

A multiple position input level control has been provided for each channel. These controls are located on the front panel for quick access. They operate in the conventional fashion (i.e., full clockwise = maximum level.)

Independent On/Off Switch for each channel

Since both models are true Dual Monaural Amplifiers, each channel can be switched of and off independently of each other. This provides maximum flexibility in a number of situations: for example, if it is necessary to make or break connections on one channel, the other channel can continue to operate. (Note: Both switches must be in the ON position for bridged operation.) When either channel is ON, a red 'POWER ON' LED indicator is illuminated on the front panel, next to the power switch. ***(There is a 40 second delay when the amplifier is initially turned on.)***

LED Power Indicators (-20dB, -3dB, and Clip)

The front panel provides visual feedback on the power being fed into the load, by way of three colored LED's. The Green LED indicates a -20 dB power level, while the Yellow LED indicates an output level within 3 dB (half power) of the amplifiers rated output. The Red LED indicates the approach of clipping, at the limit of the amplifiers capability. The level indicators are accurate at any load impedance.

Rear Panel Features: Inputs

XLR Inputs

Each channel has a female XLR balanced input connector. It is also possible to use this input with unbalanced lines. See **Input/Output Wiring** in the section on Installation (pp. 7-8) for more details. ***(Note: The XLR input is wired in parallel with the ¼" TRS phone jack and the barrier strip inputs, so each may be used as a "through" connector to feed additional amplifiers or other associated equipment.)***

¼" TRS Phone Jack Inputs

Each channel has a female ¼" TRS phone jack input connector which may be used with either balanced or unbalanced lines. The input automatically adapts to either balanced (TRS) or unbalanced (TS) type of signal input plugs. See **Input/Output Wiring** in the section on Installation (pp. 7-8) for more details.

Barrier Strip Inputs

Each channel's barrier strip input may be used with either balanced or unbalanced lines. See **Input/Output Wiring** in the section on Installation (pp. 7-8) for more details.

Circuit Breakers

A circuit breaker, located on the rear panel, is provided for each channel. Severely overdriving the inputs may cause one or both breakers to open; to reset them simply turn off the amplifier and push the button back into its normal position. ***(Caution: Do not attempt to reset the breaker with the power switch in the ON position.)***

Rear Panel Features: Outputs

6 Gauge 5-Way Binding Post Outputs

Each Channel incorporates a pair of heavy-duty 5-way binding post output connector, which will accept up to #6 AWG (tinning recommended) bare wire, spade lugs, and single or double banana plugs. Additionally the binding posts are situated so that when the amplifier is configured for bridge mode operation, a dual banana plug may be inserted into the red binding posts. See **Input/Output Wiring** in the section on Installation (pp. 7-8) for more details.

Mono / Stereo Switch

This switch is used to configure the amplifier for 2-Channel Stereo mode (factory setting) or to "bridge" the amplifier for Mono (single channel) operation.

IMPORTANT: Never change the position of this switch while the amplifier is turned on. Doing so could damage your equipment and void your warranty.

Amplifiers operating in the bridge mode require different connections than amplifiers operating in stereo. See Bridged Operation in the section on Installation (P.8) for more details.

Installation

Mechanical Considerations

Both the World™ 1.6 and 2.1 occupy just 2 rack spaces and are only 15" deep. The World™ 1.6 weighs 16 pounds and the World™ 2.1 weighs 17 pounds, making them easier to install and transport than almost any other comparable power amplifier. Still some sensible precautions are in order.

Always use four rack screws to affix the amplifier to the rack, preferably using flat washers as well to avoid cosmetic damage to the front panel. When rack mounting your amplifier may be necessary to remove the four adhesive rubber feet from the bottom of the unit.

Air is drawn through the faceplate and exits the rear of the amplifier for cooling. Multiple amplifiers may be stacked directly on top of one another with little regard for vertical spacing as long as there is space left in the front and back of the amplifier to allow the fan cooling to operate properly. For coolest operation, one-half (Minimum) rack space between amplifiers is recommended.

In traveling rack-mounted applications, where the entire rack will be moved and quite possibly bounced around, it is always a good idea to secure the rear of the amplifier as well as the front. Your Stewart Audio Inc. dealer should be able to recommend available products or custom methods to accomplish this, if necessary.

Thermal Considerations

Although the sophisticated thermal management system makes them less susceptible than other amplifiers to overheating, it remains good practice to provide space at the front and rear of the power amplifier for the fan-driven ventilation. As an added feature, there are secondary air vents on the sides of the amplifier.

In a free-standing installation where the unit is sitting on a shelf or hard floor, you must leave the four rubber feet mounted to the bottom of the amplifier. Under no circumstances should the amplifier be placed directly on carpeting or similar "soft" surfaces i.e. a bed or couch.

In rack-mounted installations, multiple amplifiers can be stacked on top of one another without leaving space between them. For coolest operation a minimum of one-half rack space should be left under every amplifier. If mounted in a "sealed" rack, leave the top and bottom spaces open to create a "chimney" effect within the rack, which will provide cooling for the entire rack. Periodically check and clean the fan fins of dust accumulation.

AC Power Considerations

Your Stewart Audio Inc. power amplifier is designed to operate at 120 volt, 60Hz Alternating Current. Average power consumption will be between 150 and 450 watts depending on the program material and the impedance of the load. Typically, you should be able to run four World™ 1.6 on a standard 20-amp circuit or up to three World™ 2.1s. Both models are equipped with unique inrush current limiting circuitry, which minimizes power draw from the wall on power-up.

Input Wiring (refer to Hookup Diagrams 1-3)

Be certain that your cables are wired as follows.

Balanced XLR Connections are made with the following pin assignments:

- #1 = Ground
- #2 = Positive (+)
- #3 = Negative (-)



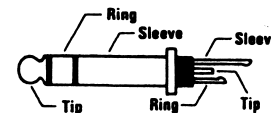
Unbalanced XLR Connections are made with the following pin assignments:

- #1 = Ground
 - #2 = Positive (+)
 - #3 = Ground
- (wire pins 1 & 3 together)



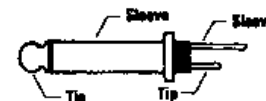
Balanced TRS ¼" Phone Connections are made with the following pin assignments:

- Tip = Positive (+)
- Ring = Negative (-)
- Sleeve = Ground



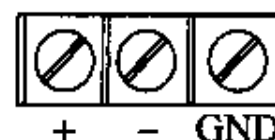
Unbalanced TS Phone Connections are made with the following pin assignments:

- Tip = Positive (+)
- Sleeve = Ground



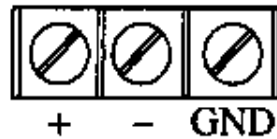
Balanced Barrier Strip Connections are made with the following pin assignments:

- Left = Positive (+)
- Center = Negative (-)
- Right = Ground



Unbalanced Barrier Strip Connections are made with the following pin assignments:

Left = Positive (+)
Center = Ground
Right = Ground
(wire Right and Center terminals together)



Wiring in Parallel (refer to Hookup Diagram 4)

Wiring XLR, ¼" and/or barrier strip inputs in parallel (as throughputs to other equipment) require special consideration when combining balanced and unbalanced lines. Connecting an unbalanced line as described above to any input will render all inputs on that channel unbalanced. If it is necessary to combine unbalanced and balanced connections on the same channel, the unbalanced connection must not ground the Negative (-) input. In the case of the ¼" phone input, this means using a TRS ("stereo") phone plug and leaving the ring terminal unconnected. When using the XLR or barrier strip inputs, pin 3 or the center terminal, respectively, must be left unconnected (not tied to ground as described above.)

Output Wiring (refer to Hookup Diagram 5)

Outputs are available via 5-way binding posts which will accept up to #6 AWG bare wire, spade lugs and single or dual banana plugs. The red binding post is to be connected to the speaker's positive terminal; black is ground.

Bridged Operation (refer to Hookup Diagram 6)

Operating your amplifier in Bridged (or Mono) mode allows the two channels to be used together to drive a single (monaural) load at much greater power level than is achievable using a single normal channel for a comparable load.

Special wiring requirements must be observed when operating the bridged mode. Failure to install input and output wiring as specified here risks damage to the amplifier and other components, and could void the warranty.

Before converting to bridged mode, be sure to set the power switch on the amplifier to the OFF position. **Never convert from one operating mode to the other while the amplifier is on.**

Set the MONO/STEREO switch to the MONO position. This switch is located on the rear panel, near the Channel 2 input section.

Connect the positive terminal of the loudspeaker (4 ohm minimum) to the positive (Red) terminal of Channel 1, and the negative terminal to the (Red) terminal of Channel 2. Make no connections to either of the "ground" (Black) "ground" terminals.

To Simplify hookup, a dual banana plug may be used across the positive (red) terminals to make speaker connections in bridged mode.

Important: follow these hookup instructions carefully. Failure to do so could damage your amplifier and void your warranty.

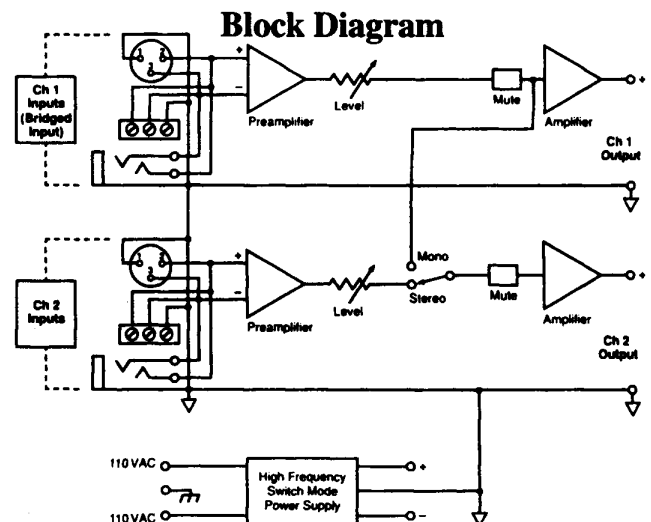
Channel #1 Positive (+) terminal = Speaker Positive (+)

Channel #2 Positive (+) Terminal = Speaker Negative (-)

Channel #1 Negative (-) terminal = No Connection

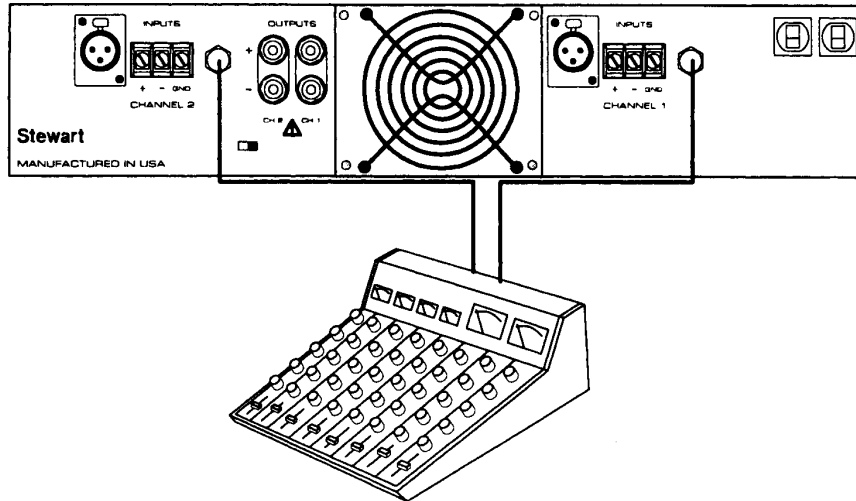
Channel #2 Negative (-) terminal = No Connection

Block Diagram



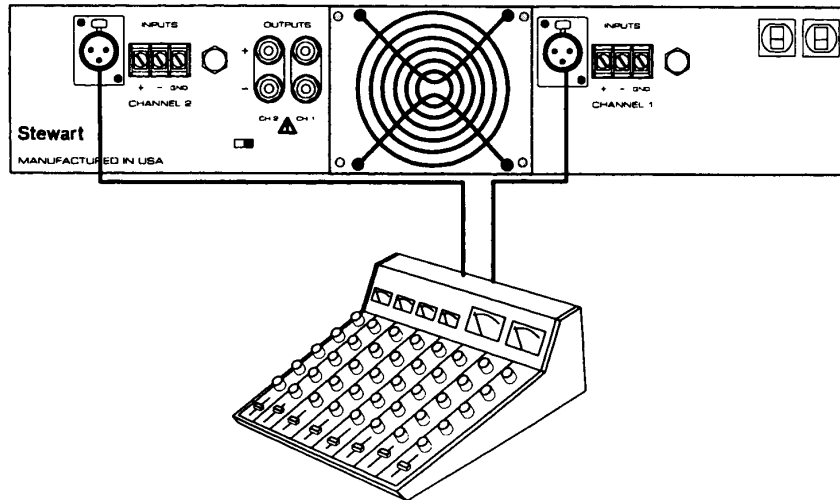
Hookup Diagram 1 Input Connections

Dual Channel (Stereo) input Connections using 1/4" Phone input connectors



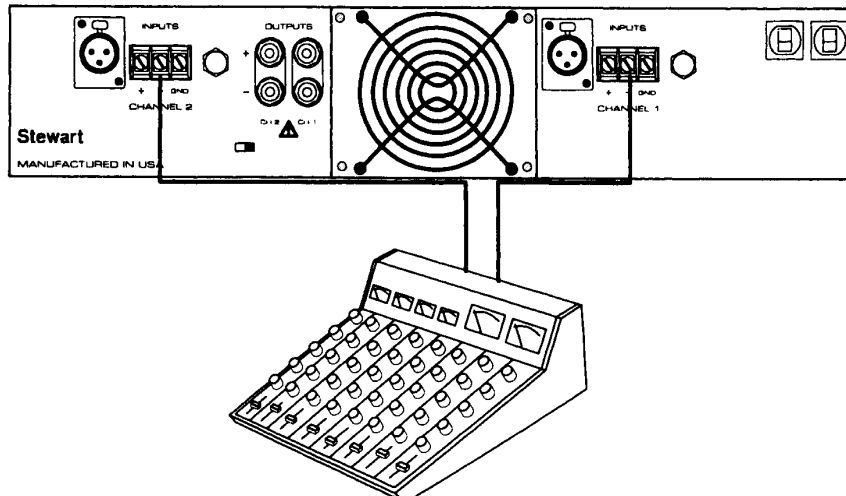
Hookup Diagram 2 Input Connections

Dual Channel (Stereo) input Connections using XLR input connectors



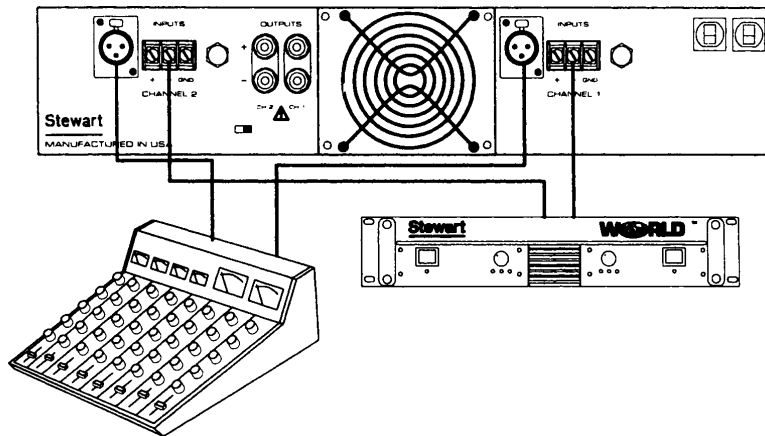
Hookup Diagram 3 Input Connections

Dual Channel (Stereo) input Connections using Barrier Strip input connectors



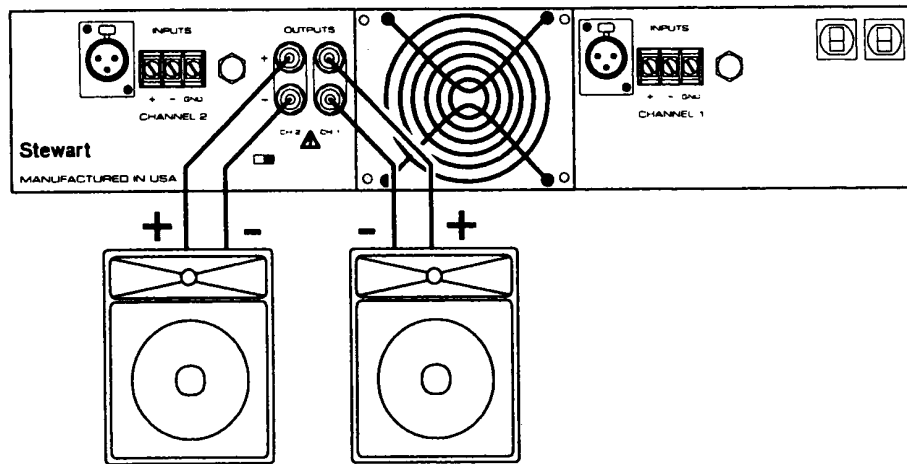
Hookup Diagram 4 Input Connections

Using Parallel input connections as “Thru-Puts” to other equipment



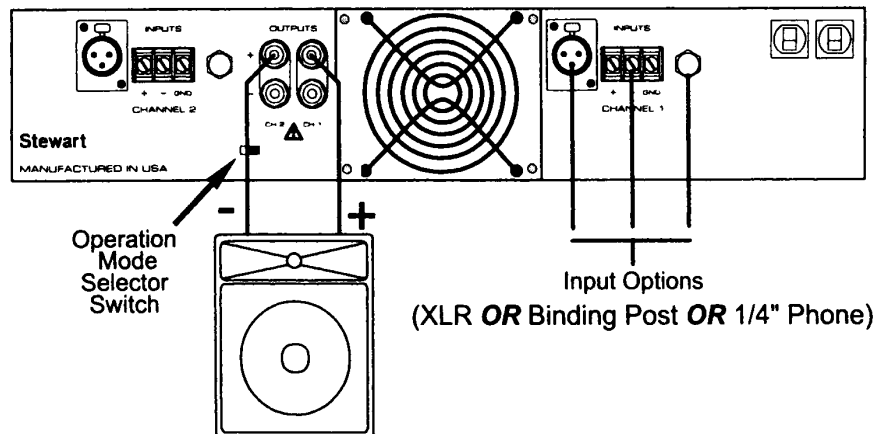
Hookup Diagram 5 Output Connections

Dual Channel (Stereo) output connections using binding post output connectors



Hookup Diagram 6 Bridged Connections

Bridged (Mono) Operation, use only Channel 1 Input. Be sure to set Operation Mode Selector Switch to “Mono” position. Channel 1 Output (+) is Speaker Positive. Channel@ Output (+) is Speaker Negative.



Troubleshooting

If you experience difficulty in operating your Stewart Audio Inc. Amplifier, chances are good that you will be able to remedy the problem yourself using standard troubleshooting techniques and the suggestions offered in the table below.

It is imperative that all connections be made cleanly, with no stray wire strands to short connector terminals. Keep in mind also that other components in the system can cause problems, which may appear to be caused by the amplifier.

Systematic troubleshooting will allow you to isolate the source of the difficulty.

If you fail to correct the problem by following the steps outlined below, do not attempt to open or repair the unit yourself. Please contact Stewart Audio Inc. at 209.588.8111 to obtain a Return Authorization number (RA#) and shipping instructions. Refer to enclosed Warranty information for Terms and Conditions of Warranty.

Symptom	Recommended Action
No output: Power indicator LED is off (Note: there is a normal ten second delay.)	Be sure power outlet is "live." Disconnect AC power and check circuit breakers on back of amplifier
No output: Power indicator/(s) cycle on/off	This indicates a short circuit condition on the output. Check output wiring; if it appears good (no stray wire strands), turn off power and disconnect speaker wires. Turn power on again. If amplifier stays on, the problem is output wiring or speakers.
Power indicator on: No output from one or both channels	Check bridge switch to make sure it is in the proper position. Check level controls, input signal, output wiring and speakers. If operating in Bridge Mode, be sure signal is plugged into Channel 1 Input
Low volume in one or both channels.	Check input level controls, input signal levels, input wiring. Be sure both speakers are the same impedance.
Amplifier heats up and/or shuts off	Review section on Thermal Considerations. Page 7.
Distorted output	Check input signal level and signal source. Check speaker(s).
Noise on output	Check signal source for noise. If you are running input cables more than 30 feet, balanced lines can reduce noise levels considerably. See section on input and output wiring on pages 7 & 8 for more information.

Technical Information

Specifications	World™ 1.6	World™ 2.1
Output Power, continuous RMS at 20-20KHz, 0.1% THD both channels driven.	700W x 2 @ 2 ohms per channel 550W x 2 @ 4 ohms per channel 300W x 2 @ 8 ohms per channel	900W x 2 @ 2 ohms per channel 650W x 2 @ 4 ohms per channel 400W x 2 @ 8 ohms per channel
Output Power, continuous RMS at 20-20KHz, 0.1% THD Bridged.	1400W x 1 @ 4 ohms Bridged 1100W x 1 @ 8 ohms Bridged 600W x 1 @ 16 ohms Bridged	1800W x 1 @ 4 ohms Bridged 1300W x 1 @ 8 ohms Bridged 800W x 1 @ 16 ohms Bridged
FTC Power Rating at <0.1% THD 20-20KHz both channels driven	300W x 2 @ 8 ohms per channel	400W x 2 @ 8 ohms per channel
Frequency Response +0dB, -0.5dB	20Hz – 20 kHz	20Hz – 20 kHz
Bandwidth +0dB, -3dB	15Hz – 45kHz	15Hz – 45kHz
Signal-to-Noise	>100dB (a-wtd., 550W @ 4 ohms	>100dB (a-wtd., 650W @ 4 ohms
Input Sensitivity	1v (0 dBV)	1v (0 dBV)
Slew Rate	>30 Volts	>30 Volts
Damping Factor	>500	>500
Input Connectors	3 pin XLR, TRS ¼" Phone, and Barrier Strip	3 pin XLR, TRS ¼" Phone, and Barrier Strip
Output Connectors	6 Gauge 5-way binding post	6 Gauge 5-way binding post
Voltage Gain	60.52x (+35.6dB)	66x (+36.4 dB)
Weight	16 lbs	17 lbs
Dimensions	3.5"H x 19"W x 15" D (Two rack spaces)	3.5"H x 19"W x 15" D (Two rack spaces)
Power Requirements Average operation (4 ohms/ch)	<4 amps, 120Vac (500watts)	<5 amps, 120Vac (600watts)

The manufacturer reserves the right to change features and specifications without prior notice.

Sales

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