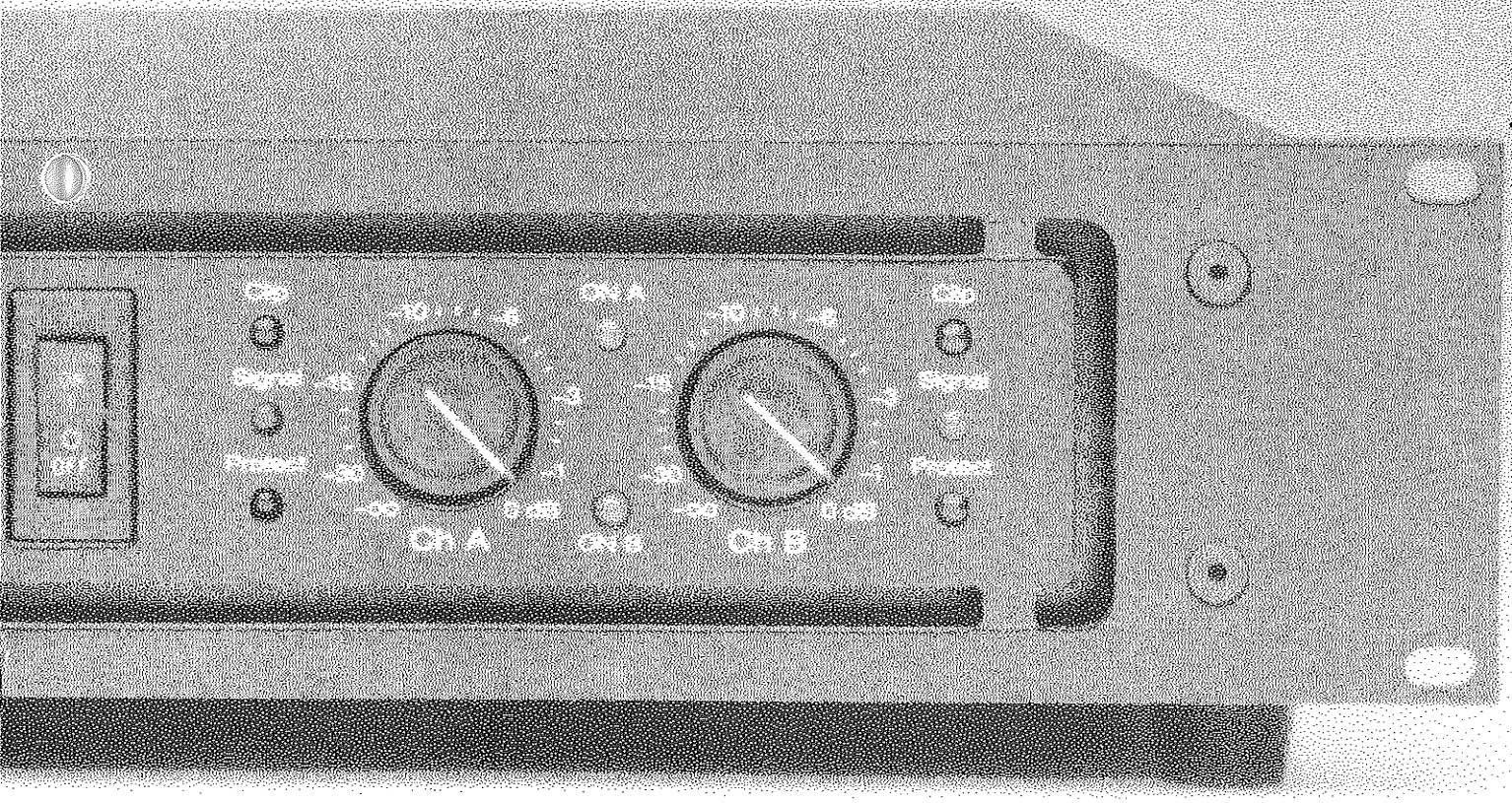
CREST AUDIO

FA SERIES

FA601
FA901
FA1201
FA2401



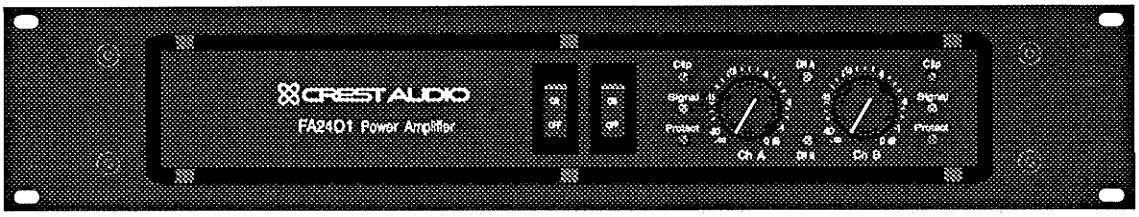
OWNER'S MANUAL

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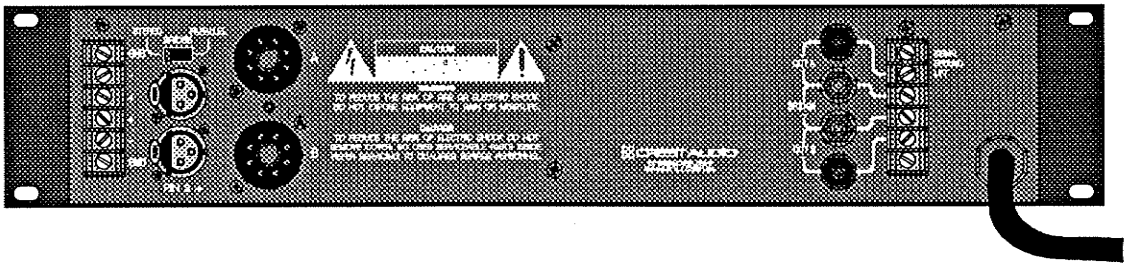
FA SERIES AMPLIFIER OWNER'S MANUAL
MODELS FA601, FA901, FA1201, FA2401

TABLE OF CONTENTS		PAGE
AMPLIFIER FRONT & BACK PHOTOS		
INTRODUCTION		1
1. IMPORTANT PRECAUTIONS		2
2. INSTALLATION AND OPERATION		3
2.1	Unpacking	3
2.2	Mounting	3
2.3	Operating Precautions	5
2.4	Connecting Inputs	6
2.5	Connecting Outputs	8
2.6	Connecting Power	8
2.7	Stereo Operation	9
2.8	Parallel Operation	9
2.9	Bridged Mono Operation	9
2.10	Bridging Precautions	10
2.11	Distributed or Constant Voltage Systems	10
2.12	Wire Gauge Chart	12
3. SWITCHES, CONTROLS, ETC.		14
3.1	AC Power Switch/Circuit Breaker	14
3.2	Input Attenuators	14
3.3	Mode Select Switch	15
3.4	Signal Ground Lift Jumper	15
4. INDICATORS		15
4.1	Clip LEDs	16
4.2	Signal LEDs	16
4.3	Protect LEDs	16
4.4	"On" LED	16
5. PROTECTION FEATURES		16
5.1	Clip Limiting	17
5.2	IGM™ Impedance Sensing	17
5.3	Thermal Protection	17
5.4	Short Circuit	18
5.5	DC Voltage Protection	18
5.6	Subsonic Frequencies	18
5.7	Turn-On/Turn-Off Protection	18
6. SPEAKER PROTECTION		18
7. MAINTENANCE		19
8. USER RESPONSIBILITY		20
9. FA SERIES SPECIFICATIONS		22

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Amplifier front view



Amplifier rear view

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FA Series Amplifier Owner's Manual
3rd Edition, August 1992 rel
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INTRODUCTION

Congratulations on your purchase of a Crest FA Series power amplifier. Your amplifier is designed for years of reliable operation under rigorous use and will perform flawlessly while maintaining the level of performance and sonic quality that made you choose Crest.

Although your amplifier is, basically, quite simple to operate and designed to be almost "bulletproof," improper use **can** be dangerous!!



FOR YOUR SAFETY, READ THE SECTIONS ON IMPORTANT PRECAUTIONS, INPUT, OUTPUT, AND POWER CONNECTIONS.



This symbol, a lightning flash with arrow head within an equilateral triangle, appears on the amplifier chassis to warn the user that uninsulated "dangerous voltages" are present within the enclosure that may pose a risk of electric shock.



This symbol, an exclamation point within an equilateral triangle, appears on the amplifier chassis to warn the user to follow important operating procedures and precautions detailed in this manual.

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1. IMPORTANT PRECAUTIONS

Please read before operating your amplifier:

1. **Keep this Owner's Manual** for future reference.

2. **Follow all instructions** printed on the unit chassis for proper operation.

3. **Do not** spill water or other liquids into or on the unit. **Do not** operate the unit while standing in liquid.

4. **Make sure** the power outlet conforms to the power requirements listed on the back of the unit.

5. **Do not** block fan intake or exhaust ports. **Do not** operate the amplifier on a surface which may impede the normal flow of air around the unit, such as a bed, sofa, rug, or similar surface.

6. **Do not** use this unit if the electrical power cord is frayed or broken.

7. **Always** operate the unit with the AC ground wire connected to the electrical system ground.

8. **Do not** drive the inputs with a voltage greater than that required to drive the amplifier to full output.

9. **Do not** run the output of any amplifier channel back into another channel's input.

10. **Do not** parallel- or series-connect an amplifier output with *any* other amplifier output.

11. **Do not** connect the output of the amplifier to any other voltage source, such as a battery, mains source, or power supply, regardless of whether the amplifier is turned on or off.

12. **Do not** use the unit near stoves, heat registers, radiators, or other heat producing devices.

13. **Do not** ground any red ("hot") terminal.

14. **Do not** remove the cover. Removing the cover will expose you to potentially dangerous voltages. There are no user serviceable parts inside. In the event of a problem, contact your nearest Crest Audio Service Center, or Crest Audio at (201) 909-8700 (Main Office) or 44-(0)273-325840 (European Office).

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2. INSTALLATION AND OPERATION

2.1 Unpacking

Carefully open the shipping carton and check for any noticeable damage. Every Crest amplifier is completely tested and inspected before leaving the factory and should arrive in perfect condition. If you find any damage, notify the shipping company immediately. Only the consignee may institute a claim with the carrier for damage incurred during shipping. Be sure to save the carton and all packing materials for the carrier's inspection.

It is a good idea to save the carton and packing material even if the amplifier has arrived in good condition. Should you ever need to ship the unit, use only the original factory packing!

2.2 Mounting

All FA Series amplifiers will mount in a standard 19" rack. Four front panel mounting holes are provided, and optional rear mounting ears (see Figure 1) are available for the FA901, FA1201, and FA2401 for additional support, especially important in non-permanent installations like mobile or touring sound systems.

Your FA amplifier uses a forced-air cooling system to maintain a low, even operating temperature. Drawn by an internal fan, air enters through the slots in the front panel and courses over and through components in the power supply and through the cooling fins of special "tunnel extrusion" heat sinks, which dissipate power transistor heat, before exhausting through the sides. The FA series amplifiers feature an "intelligent" variable-speed DC fan which is controlled by heat sink temperature sensing circuits. When you turn on the amplifier, you will hear the fan briefly "rev up," then slow to an idle; this indicates that the temperature sensing circuits are operative. The fan speed will increase only when the temperature of either heat sink requires it, which keeps fan noise to a minimum and helps cut dust accumulation inside. Under extreme thermal load, the fan will reach about 6500 rpm, forcing a very large volume of air through the heat sinks. If either heat sink gets too hot, its sensing circuit will open the output relay (see Figure 2), disconnecting the load from that particular channel. If the power transformer overheats, another sensing circuit opens its circuit to cut off power until it cools to a safe temperature.

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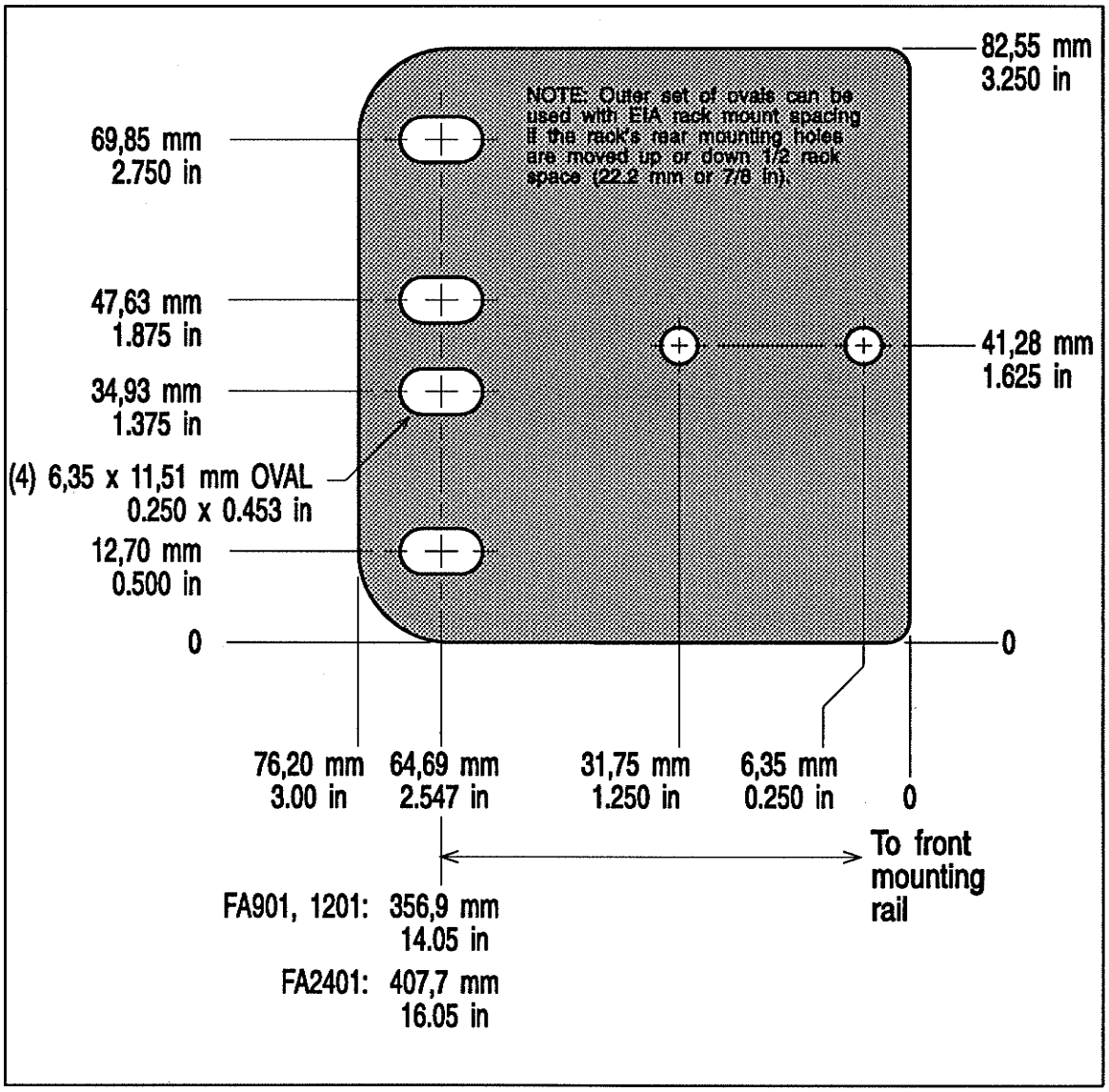


Figure 1. Rear mounting ear detail & template.

The exhaust cooling air is forced out through the side slots in the chassis, so make sure that there is enough space around the sides of the amplifier to allow the air to escape. If it is rack mounted, make sure the exhaust air can flow without resistance. If you are using racks with closed backs, there must be at least one standard rack space of opening in the front of the rack for every four amplifiers. Amplifiers may be stacked directly on top of each other (no space needed between units), starting from the bottom of the rack.

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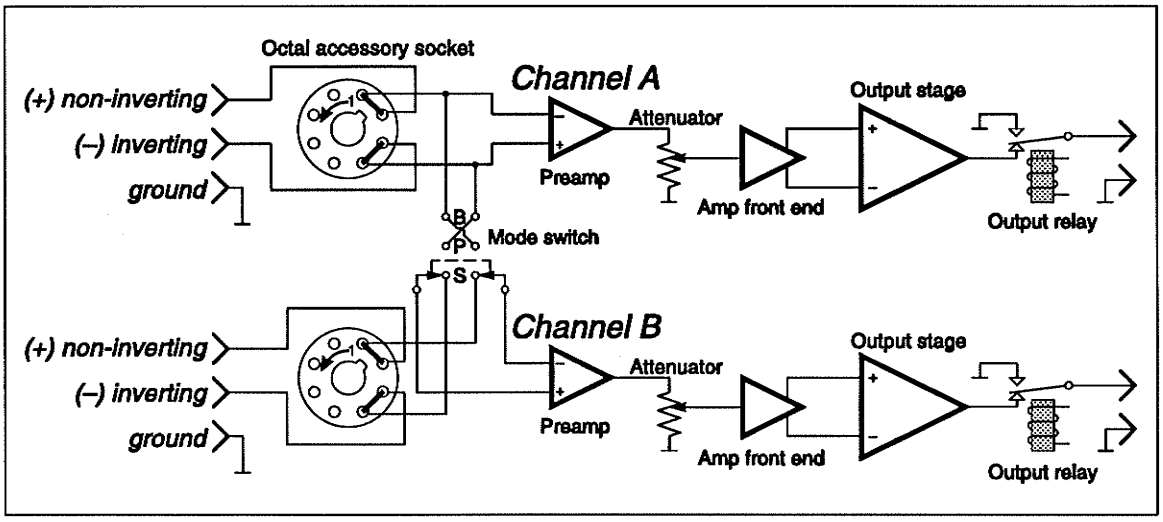


Figure 2. FA Series block diagram & signal path

2.3 Operating Precautions

Make sure the AC mains voltage is correct and is the same as that printed on the rear of the amplifier. (Unless otherwise specified when ordered, amplifiers shipped to customers in North America operate on 120 VAC 60 Hz, and those shipped to customers in Europe and Asia operate on 240 VAC 50 Hz.) Damage caused by connecting the amplifier to improper AC voltage is not covered by the three-year US warranty. Make sure the power switch is off *before* making any input or output connections.

It is always a good idea to have the gain controls turned down during power-up to prevent speaker damage if there is a high signal level at the inputs.

Whether you buy them or make them, use good-quality input and speaker cables. Most intermittent problems are caused by faulty cables. Consult the **Wire Gauge Chart [Section 2.12]** to determine proper gauges for different load impedances and cable lengths. Use good-quality connectors and wire, along with good soldering technique, to ensure troublefree reliability.

Make sure the mode switch is correctly set for the desired application. See **Sections 2.7, Stereo Operation; 2.8, Parallel Operation;** and **2.9, Bridged Mono Operation,** for more information.

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2.4 Connecting Inputs

Input connections are made via either the 3-pin XLR-type connectors or barrier strip on the rear side of the amplifier (Figure 4). The inputs are actively balanced, with polarity as shown in Figure 3.

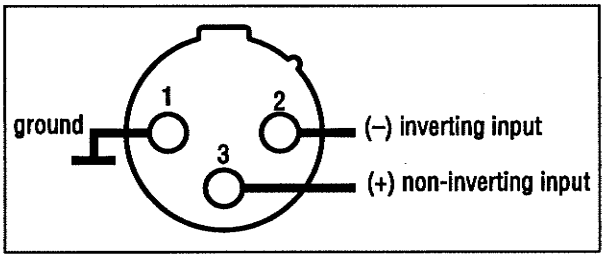


Figure 3. XLR input connector pinout

Note: For use with an unbalanced source, tie the inverting (out-of-phase) input to ground, either by connecting Pin 2 to Pin 1 inside the XLR plug or by shorting the appropriate terminals at the barrier strip. If the inverting input is left floating, a 6 dB loss in gain will result.

In the parallel and bridge modes, Channel A's and Channel B's inputs are paralleled together to facilitate "daisy-chaining," or multiple input connections. [See **Sections 2.7, Stereo Operation; 2.8, Parallel Operation;** and **2.9, Bridged Mono Operation,** for more information.]

The input impedance is high enough (20 kΩ balanced) to allow "daisy-chaining," or multiple parallel input connections. The input overload point is high enough to accept the maximum output level of virtually any signal source.

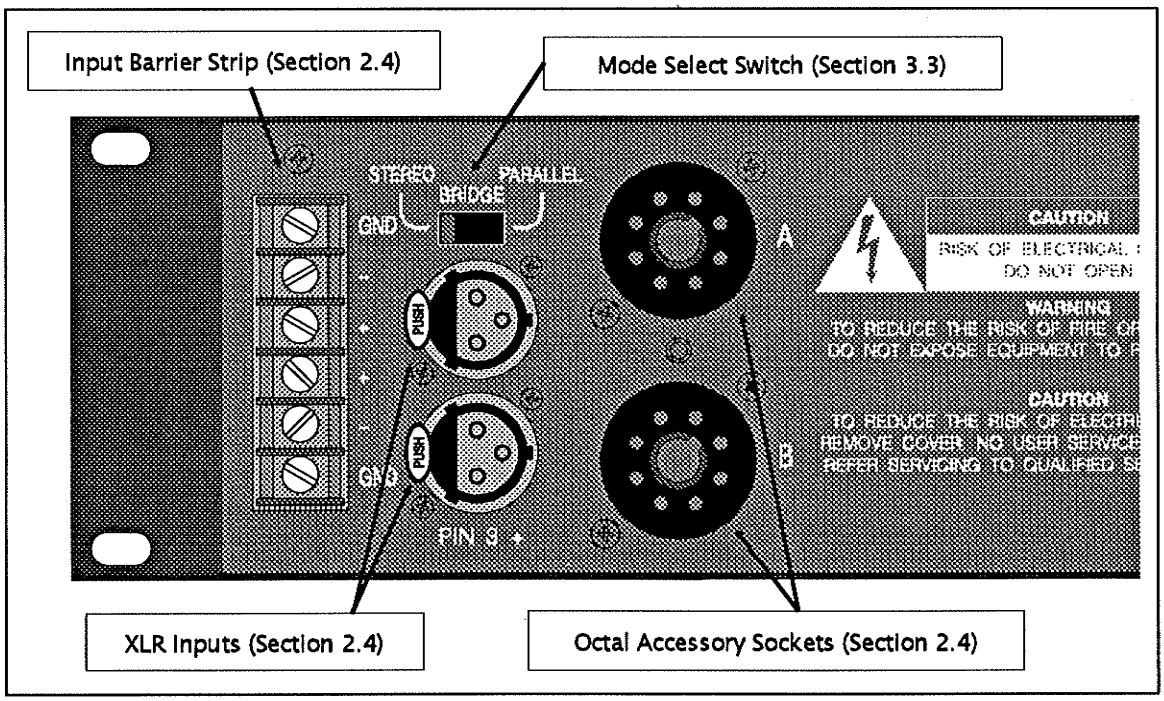


Figure 4. Rear panel, input side.

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FA Series amplifiers have two octal accessory sockets (Figure 5) on the back panel which provide convenient insertion points for accessories (such as the Crest **XO-2** 24 dB/Octave Crossover, LX-2 24 dB/Octave Crossover with Limiter, LM-1 Limiter, LM-2 Dual Limiter, PA-1 Precision Attenuator, CDEQ-2 Constant Directivity Horn Compensation Filter, TX-1 Input Isolation Transformer, or the TXD-1 Deluxe Input Isolation Transformer), etc., in the signal path between the mode switch and the preamps (see Figure 2). To use the accessory sockets, first remove the factory-installed jumpers. Table 1 lists the socket pin-outs.

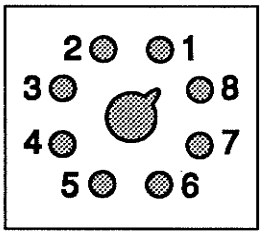


Figure 5. Octal socket pin identification

For normal operation (not using the accessory sockets), jump Pin 1 to Pin 8 and Pin 6 to Pin 7 on both sockets. To invert the input polarity, that is, to make XLR Pin 2 (+) and Pin 3 (—), remove the existing jumpers and jump Pin 1 to Pin 7 and Pin 6 to Pin 8. Use solid wire; 4 mm^2 (metric) or No. 10 (AWG) will suffice. If the wire is too small, it will not fit snugly in the socket holes and may fall out; if it is too large, it may distort the socket contacts.

Table 1. Octal accessory socket pin/channel assignments

Pin	Channel A	Channel B
1	Ch. A (—) Inverting Signal Return	Ch. B (—) Inverting Signal Return
2	Ground[1]	Same as Ch. A[1]
3	Unused	Unused
4	+24VDC @ 25 mA	—V_{CC} High Voltage (Unreg.)
5	+24VDC (Regulated)	+ 24VDC (Regulated)
6	Ch. A (+) Non-inverting Signal Return	Ch. B (+) Non-inverting Signal Return
7	Ch. A (+) Non-inverting Signal Send[2]	Ch. B (+) Non-inverting Signal Send[3]
8	Ch. A (—) Inverting Signal Send[4]	Ch. B (—) Inverting Signal Send[5]

Notes:

1. From input ground; reference ground for DC voltages at octal pins 4 & 5
2. From Ch. A (+) non-inverting input
3. From Ch. B (+) non-inverting input [Stereo]; Ch. A non-inverting input [Parallel]; Ch. A inverting input [Bridge]
4. From Ch. A (—) inverting input
5. From Ch. B (—) inverting input [Stereo]; Ch. A inverting input [Parallel]; Ch. A non-inverting input [Bridge]

Note: A chassis ground screw terminal is provided between the two octal sockets. To power accessories, the voltages from pin 4 of either octal socket may be adjusted to any desired value by using suitable DC regulators.

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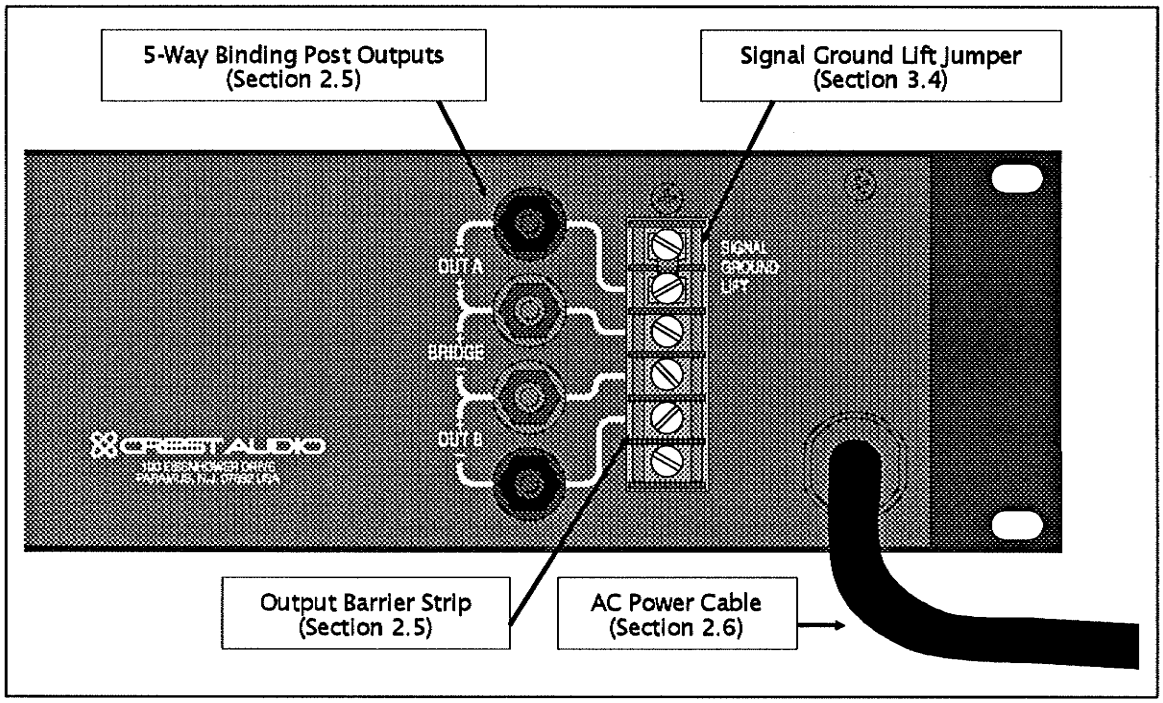


Figure 6. Rear panel, output side.

2.5 Connecting Outputs

Speakers can be connected using banana plugs, spade lugs, or bare wire to the 5-way binding posts or the output barrier strip terminals (Figure 6). Consult the **Wire Gauge Chart [Section 2.12]** to find a suitable wire gauge to minimize power and damping factor losses in the speaker cables.

The red binding posts and their corresponding barrier strip terminals are considered "hot," while the black binding posts and their corresponding terminals are at signal ground. [See Section 2.9 on **Bridged Mono Operation** for information on bridged mode and its output configuration.]

2.6 Connecting Power

While the actual current demand an amplifier places on the AC mains depends on its load, output level, and the crest factor of its program material, FA Series amplifier power requirements are rated under "typical" music conditions, with both channels driven so that peaks are just at the clipping point. The following circuit sizes, including wiring, are required for each amplifier:

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Model	Minimum 120 VAC	240 VAC		Recommended 120 VAC	240 VAC
FA601	4.0 A 2.0 A		10 A	5.0 A	
FA901	8.0 A 4.0 A		20 A	10 A	
FA1201	10.0 A	5.0 A		20 A	10 A
FA2401	12.5 A	6.25 A		20 A	10 A

2.7 Stereo Operation

For stereo (dual channel) operation, set the mode select switch to the "stereo" position. In this mode, both channels operate independently of each other, with their input attenuators controlling their respective levels. Thus, a signal at Channel A's input produces an amplified signal at Channel A's output, while a signal at Channel B's input produces an amplified signal at Channel B's output.

The recommended minimum nominal load impedance for the stereo or parallel modes is 4 ohms per channel for the FA601 and 2 ohms per channel for the FA901, FA1201, and FA2401.



Never connect a "hot" output to ground or to another "hot" output!

2.8 Parallel Operation

For parallel (dual channel—single input) operation, set the mode switch in the "parallel" position; both amplifier channels are then driven by a single input at Channel A, with no need for jumper wires. Output connections are the same as in the stereo mode—across the red and black binding posts (or their barrier strip terminals) of each channel. [See **Section 2.5** on **Connecting Outputs**.]

In the parallel mode, Channel A's input is parallel with Channel B's, so you can easily run a cable to other amplifiers. Both input attenuators remain active, allowing you to set different levels for each channel's speakers. Power and other general performance specifications are the same as in the stereo mode.



Do not connect the "hot" outputs in parallel!

2.9 Bridged Mono Operation

Both sides of the amplifier can be bridged or "strapped" together to make a very powerful single channel monaural amplifier. Use extreme caution when operating the amplifier in the bridged mode.

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To bridge the amplifier, set the rear panel mode select switch to the "bridge" position. Apply the signal to Channel A's input and connect the speakers across the "hot" outputs of Channels A and B: the red binding posts or their corresponding terminals on the barrier strip (Figure 6).

Unlike the stereo and parallel modes, in which one side of each output is ground, in the bridged mode both sides are "hot." Channel A's side is in phase with the input. For proper operation, both input attenuators must be in the same position, which keeps the load balanced between the channel outputs. As in the parallel mode, Channel A's input is connected in parallel with Channel B's.



Never connect a "hot" output to ground or to another "hot" output!

2.10 Bridging Precautions

Never ground either side of the speaker cable when the amplifier is in the bridged mode; both sides are "hot." If an output patch panel is used, all grounds must be isolated from each other *and* from the panel.

The recommended minimum nominal load impedance in the bridged mode is 8 ohms for the FA601 (equivalent to driving both channels at 4 ohms) and 4 ohms for the FA901, FA1201, and FA2401 (equivalent to driving both channels at 2 ohms). Driving bridged loads of less than the recommended minimums will activate the IGM™ circuitry [see **Section 3.2**], resulting in a loss of power, and may also cause a thermal overload.

2.11 Distributed or Constant Voltage Systems

Some sound systems require a single amplifier to drive numerous speakers in different locations with different power levels. A distributed system, as shown in Figure 7, uses tapped loudspeaker transformers to deliver a specific power level to each speaker. The actual load Z on the line is determined by the formula

$$\begin{aligned} Z &= V^2/P \\ &= (70.7)^2/P \\ &= 5000/P \end{aligned}$$

where P is the sum of the loudspeaker power taps, compensated for transformer insertion loss. For example, if the total power demanded by the speakers is 625 watts, then

$$V^2/P = 8 \text{ ohms.}$$

The compensation factor for transformer insertion loss is

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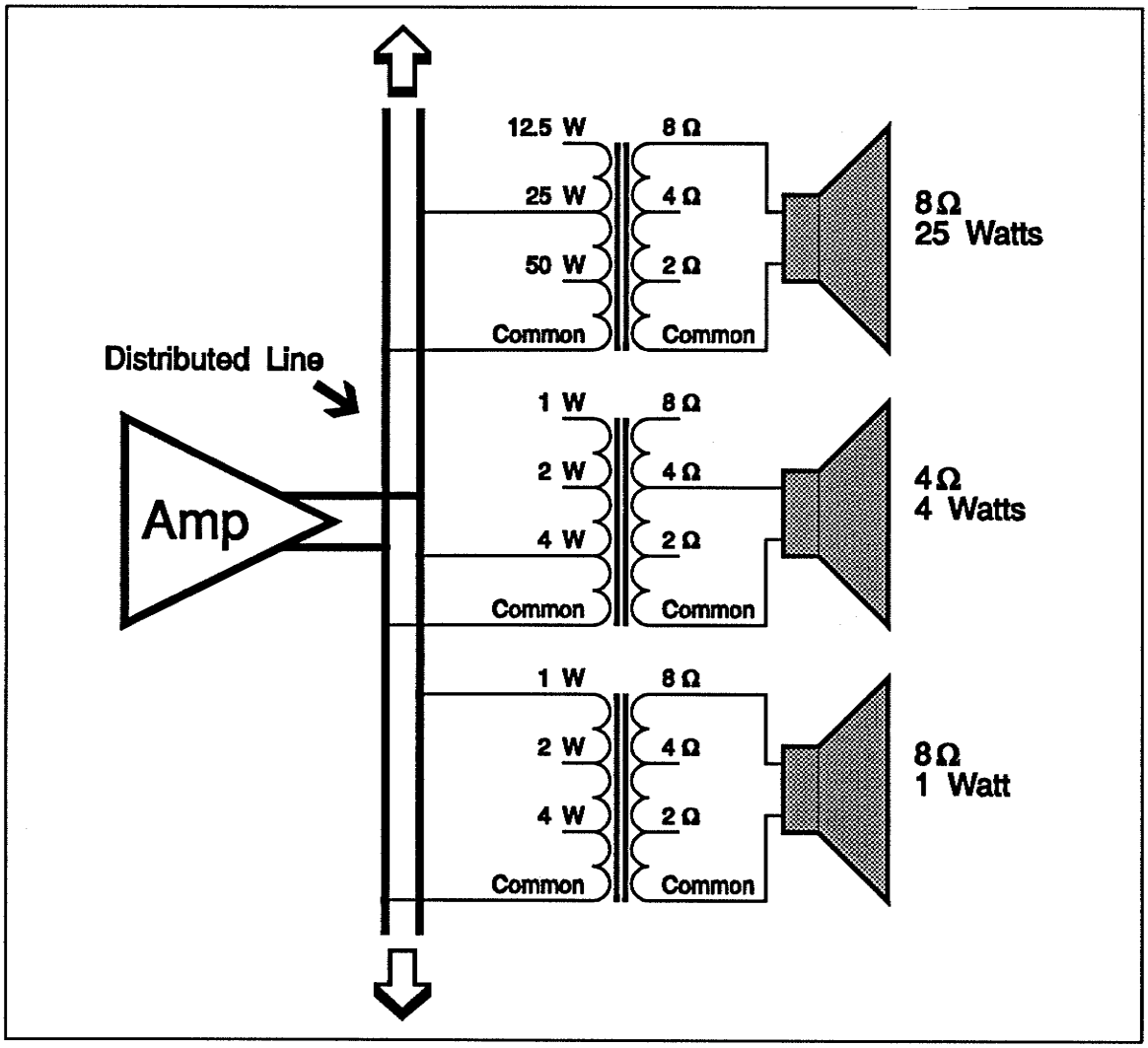


Figure 7. A distributed line

x =[power drawn from distributed line]/[power delivered to speaker]

$= 10^{[\text{insertion loss (in dB)}/10]}$

Therefore, a speaker transformer with an insertion loss of 1 dB, tapped at 4 watts, will actually demand 1.26 times 4 watts, or about 5 watts.

Some FA Series amplifiers are suitable for use with distributed or constant voltage systems.

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The FA901, in the stereo and parallel modes, is capable of delivering 35 volts RMS from each channel into a 4Ω load. Bridged, the same amplifier can put out 70 volts into an 8Ω load *or* drive a single 70.7 volt distributed line without an output autoformer or transformer—a natural match! Over 600 watts of power is available on the distributed line in this mode, and any number of tapped loudspeakers can be placed on the line as long as the total demanded power does not exceed 600 watts.

To drive a 70.7 volt line in the "bridged" mode, the FA601 requires an optional output autoformer or transformer, and all FA Series amplifiers require them to drive 70.7 volt lines in "stereo" or "parallel" modes. As mentioned before, the sum of the loudspeaker power taps should not exceed the amplifier's rating for the mode in which it is operating.

The FA1201 and the FA2401, in the bridged mode, are suitable for driving 100 volt distributed lines, which are more common in Europe.

If the impedance of a distributed line overly stresses the amplifier output stage, the IGM™ protection circuits will current-limit, reducing output power in order to protect the amplifier.

2.12 Wire Gauge Chart

Use Tables 2-a and 2-b to determine the optimum copper wire gauge for your speaker cables.

Remember that speaker cable resistance robs amplifier power in two ways: by power lost directly in the resistance (sometimes called I^2R loss), and by increasing the total load impedance, which decreases the amount of power available from the amplifier.

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Table 2-a. Copper speaker cable power loss by gauge and length (American units)

Stranded Cable Length (ft.)	Wire Gauge (AWG)	Power Loss with 8 Ω Load	Power Loss with 4 Ω Load	Power Loss with 2 Ω Load
5	18	0.81%	1.61%	3.2%
	16	0.51	1.02	2.0
	14	0.32	0.64	1.28
	12	0.20	0.40	0.80
	10	0.128	0.25	0.51
10	18	1.61%	3.2%	6.2%
	16	1.02	2.0	4.0
	14	0.64	1.28	2.5
	12	0.40	0.80	1.60
	10	0.25	0.51	1.01
40	18	6.2%	11.9%	22%
	16	4.0	7.7	14.6
	14	2.5	5.0	9.6
	12	1.60	3.2	6.2
	10	1.01	2.0	4.0
	8	0.60	1.20	2.4
80	18	11.9%	22%	37%
	16	7.7	14.6	26
	14	5.0	9.6	17.8
	12	3.2	6.2	11.8
	10	2.0	4.0	7.7
	8	1.20	2.4	4.7

Table 2-b. Copper speaker cable power loss by gauge and length (metric units)

Stranded Cable Length (m)	Wire Size (mm^2)	Power Loss with 8 Ω Load	Power Loss with 4 Ω Load	Power Loss with 2 Ω Load
2	0.3	2.9%	5.6%	10.8%
	0.5	1.74	3.4	6.7
	0.75	1.16	2.3	4.5
	1.5	0.58	1.16	2.3
	2.5	0.35	0.70	1.39
	4	0.22	0.44	0.87
5	0.5	4.3%	8.2%	15.5%
	0.75	2.9	5.6	10.8
	1.5	1.45	2.9	5.6
	2.5	0.87	1.74	3.4
	4	0.55	1.09	2.2
	6	0.37	0.73	1.45
10	0.5	8.24%	15.5%	28%
	0.75	5.6	10.8	19.9
	1.5	2.9	5.6	10.8
	2.5	1.74	3.4	6.7
	4	1.09	2.2	4.3
	6	0.73	1.45	2.9
30	0.75	15.5%	28%	45%
	1.5	8.2	15.5	28
	2.5	5.1	9.8	18.2
	4	3.2	6.3	12.0
	6	2.2	4.3	8.2
	10	1.31	2.6	5.1

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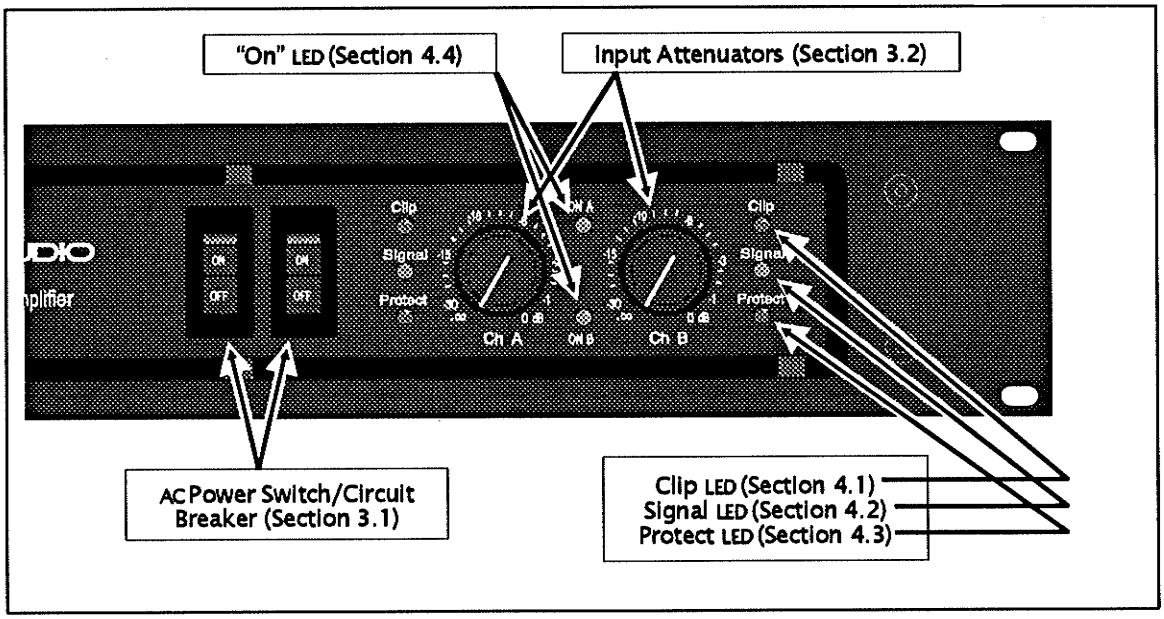


Figure 8. Front panel switches, controls, & indicators. (FA2401 shown)

3. SWITCHES, CONTROLS, ETC.

3.1 AC Power Switch/Circuit Breaker

Each FA Series amplifier has a combination AC switch/circuit breaker on the front panel (the FA2401 has two—one for each channel). If the switch shuts off during normal use, push it back to the "ON" position once. If it will not stay on, the amplifier needs servicing.



Do not try to hold the switch in the "ON" position if it won't stay there by itself!

3.2 Input Attenuators

The two input attenuator controls, located at the front panel, adjust gain for their respective amplifier channels in all modes. With an attenuator fully clockwise at 0 dB (minimum attenuation), an input signal of 0.775 volt (0 dBv) will give rated power into an 8Ω load.

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In the bridged mode, both attenuators must be in the same position so the speaker load will be equally shared between the channels. See **Sections 2.9** and **2.10** for more information and precautions on bridged-mode operation.

Wherever possible, set the attenuators fully clockwise to maintain optimum system headroom.

3.3 Mode Select Switch

The rear panel mode select switch determines whether the amplifier is in the stereo, parallel, or bridged mono mode. [See **Sections 2.7, 2.8** and **2.9** detailing the operating modes for more information.]

3.4 Signal Ground Lift Jumper

Whenever possible, the signal source equipment must share the same AC ground as the amplifier(s). In some cases, however, particularly if an amplifier is being installed in an existing system, this may result in a ground loop. If this happens, remove the ground lift jumper (supplied) on the output barrier strip, which electrically connects the signal ground to the chassis/AC ground. If the jumper is removed, the signal ground is lifted and completely isolated from the chassis/AC ground. *Don't remove the jumper if the amplifier and the signal source equipment are not on the same AC ground!*

In a properly designed system (for safety and to minimize noise), the amplifier should receive its ground from the AC line cord. The shield on a balanced input line should be grounded at one end only (usually the sending end), and it must never be relied upon to supply AC ground to the amplifier.

4. INDICATORS

All FA Series amplifiers feature seven (eight for the FA2401) front panel LED indicators: one "On" LED (two for the FA2401—one for each channel), and a Clip, a Signal, and a Protect LED for each channel. These indicators inform the user of each channel's operating status and warn of possible abnormal conditions.

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4.1 Clip LEDs

A channel's red Clip LED will light dimly at the onset of clipping and increase in brilliance as clipping becomes more severe, staying on until the clipping ceases. If the LED's are flashing quickly and intermittently, the channel is just at the clip threshold, while a steady, bright glow means the amp is "clip limiting," or reducing gain to prevent severely clipped waveforms reaching the loudspeakers. For more information on clip limiting, see **Section 5.1**.

4.2 Signal LEDs

This green LED lights when its channel produces an output signal. The LED's brightness depends on the output amplitude: very dim at 2 volts, increasing to maximum brightness at 8 volts. It is useful in determining whether a signal is reaching and passing through the amplifier.

4.3 Protect LEDs

When lit, the red Protect LED indicates that the channel's output relay is open, disconnecting the speaker(s) for any of the following reasons:

1. The unit was just powered up and is in the turn-on delay mode.
2. The amplifier senses a DC voltage at its output.
3. The channel has overheated.

4.4 "On" LED

The "On" LED lights whenever the amplifier (or on the FA2401, the amplifier channel) is turned on and under power. It indicates that the power supply is functioning properly.

5. PROTECTION FEATURES

Each FA Series amplifier incorporates several circuits to protect both itself and the loudspeakers under virtually any situation. We have attempted to make the amplifier as "foolproof" as possible by making it impervious to short and open circuits, mismatched loads, DC voltage, and overheating damage. If a channel goes into the clip limiting or IGM™ gain reduction mode, the speaker load remains connected, but clipping percentage and output power are instantly reduced.

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When a problem occurs that causes a channel to go into a protection mode, the Protect LED for that channel will glow. DC voltage on the output, excessive subsonic frequencies, or thermal overloads will cause the channel's output relay to disconnect the speaker load until the problem is corrected or the amplifier cools down.

5.1 Clip Limiting

Anytime a channel is driven into hard, continuous clipping, the clip limiter circuit will automatically reduce the channel gain to a level just slightly into clipping, guarding the speakers against the damaging high power, continuous square waves that would otherwise be produced. Situations that may activate the clip limiter include uncontrolled feedback, oscillations, or an improper equipment setting or malfunction upstream from the amplifier.

Normal program transients will not trigger the clip limiter; only steady, excessive clipping will. The Clip LED will glow brightly and continuously when limiting occurs.

5.2 IGM™ Impedance Sensing

Each FA Series amplifier features an innovative circuit that allows it to operate safely into any load. When the amplifier sees a load that overstresses the output stage, the Instantaneous Gain Modulation (IGM™) circuit adjusts the channel gain to a safe level. If the load stresses exceed the IGM™ circuit's gain-reduction capabilities, conventional *VI*-type limiting comes in also. Like the clip limiter, the IGM™ circuit is inaudible in normal use.

5.3 Thermal Protection

The internal fan will keep the amplifier operating well within its intended temperature range under all normal conditions.

If a channel's heat sink temperature reaches 75°C, such as from an obstructed air supply, etc., that channel will independently protect itself by disconnecting its load and shutting down until it has cooled to 65-70°C. During this time, the channel's Protect LED will light.

If the power transformer gets too hot (over 85°C), a thermal sensor will break its circuit, cutting all power to the power supply. Normal operation will resume automatically once the transformer cools to a safe level.

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5.4 Short Circuit

If an output is shorted, the IGM™ and thermal circuits will automatically protect the amplifier. The IGM™ circuit senses the short as an extreme load condition and attenuates the signal, protecting the channel's output transistors from extreme stress. If the short circuit remains, the channel will eventually thermally protect itself by disconnecting the load.

5.5 DC Voltage Protection

If an amplifier channel detects DC voltage at its output terminals, its output relay will immediately open to prevent loudspeaker damage.

5.6 Subsonic Frequencies

The FA amplifiers each have built-in 6 dB per octave high pass filtering, cornered at 8 Hz, to provide subsonic frequency protection for each channel. In addition, if excessive subsonic energy appears at an output the DC protection circuitry will open the channel's output relay.

5.7 Turn-On/Turn-Off Protection

At power up, the amplifier stays in the protect mode, with outputs disconnected, for about 3 seconds while the power supplies charge and stabilize. When power is removed, the speaker loads immediately disconnect so that no thumps or pops are heard. The Protect LEDs stay lit during the turn-on delay.

6. SPEAKER PROTECTION

All loudspeakers have electrical, thermal, and physical limits which must be observed to prevent damage or failure. Too much power, low frequencies applied to high frequency drivers, severely clipped waveforms, and DC voltage can all be fatal to cone and compression drivers.

All FA Series amplifiers automatically protect speakers from DC voltages and subsonic signals. [See **Chapter 5** on **Protection Features**.]

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Mid- and high-frequency drivers are highly susceptible to damage from overpowering, clipped waveforms, or frequencies below their rated passband. Be extremely careful that the low and mid bands of an electronic crossover are connected to the correct amplifiers and drivers and not accidentally connected to those for a higher frequency band.

The amplifier's clipping point is its maximum peak output power, and some of the higher power Crest FA Series amplifiers can deliver more power than many speakers can safely handle. Be sure the peak power capability of the amplifier is not excessive for your speaker system. To ensure that the speakers never receive excessive power and that the amplifier never clips, use a properly adjusted external limiter (or a compressor with a ratio of 10:1 or higher) to control power output; in systems with active electronic crossovers, use one for each frequency band.

The clip limiter will automatically limit the duration of squared-off, continuous waveforms applied to the speakers. The amplifier will, however, allow normal musical transient bursts to pass. Of course, when the amplifier does clip, it is right at its maximum output power.

Some speaker systems are packaged with "processors" that have power limiting circuits and should not require additional external limiting.

Fuses may also be used to limit power to speaker drivers, although as current-limiting—rather than voltage-limiting—devices, they are an imperfect solution, and as the "weakest links," they only limit once before needing replacement! Some poor quality fuses have a significant series resistance that could degrade the amplifier's damping of the speaker's motion and may even deteriorate the system's sound quality. If you elect to use fuses, check with the speaker manufacturer to determine the proper current rating and time lag required.

Do not drive any low-frequency speaker enclosure with frequencies lower than its own tuned frequency; the reduced acoustical damping could cause a ported speaker to "bottom out" even at moderate power. Consult the speaker system specifications to determine its frequency limits.



ABOVE ALL, USE COMMON SENSE—IT'S THE MOST IMPORTANT FACET OF ANY SPEAKER PROTECTION SCHEME!

7. MAINTENANCE

An FA Series amplifier requires no routine maintenance and should never need any internal adjustments during its lifetime.

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8. USER RESPONSIBILITY

Your FA Series amplifier is very powerful and can be potentially dangerous to loudspeakers and humans alike. It is your responsibility to read **Chapter 1** on **Important Precautions** and make sure that the amplifier is installed, wired, and operated properly as instructed in this manual.

Many loudspeakers can be easily damaged or destroyed by overpowering, especially with the high power available from a bridged amplifier. Read **Chapter 6** on **Speaker Protection** and always be aware of the speaker's continuous and peak power capabilities.



CREST AUDIO IS NOT LIABLE FOR DAMAGE TO LOUD-SPEAKERS FOR ANY REASON.

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9. FA SERIES SPECIFICATIONS

Specification	FA601	FA901
Max. RMS Voltage Swing	±40V	±49V
Max. Peak Voltage Swing	±59V	±69V
Max. Rated Power/Ch., 8Ω FTC/EIA	120/150 W	225/280 W
Max. Rated Power/Ch., 4Ω FTC/EIA	225/275 W	300/350 W
Max. Rated Power/Ch., 2Ω FTC/EIA	not recommended	400[1]/440[2] W
Max. Rated Bridged Power, 8Ω FTC/EIA	400/550 W	600/750 W
Max. Rated Bridged Power, 4Ω FTC/EIA	not recommended	800/875 W
Frequency Response	20 Hz–20 kHz; +0, -.5 dB @ 200 W	20 Hz–20 kHz; +0 -.5 dB @ 300 W
THD into 4Ω @ 1 kHz	<0.025% @ 200 W	<0.025% @ 300 W
SMPTE IMD 60 Hz & 7 Hz, 8Ω	<0.015% @ 150 W	<0.015% @ 225 W
Slew Rate	>14 V/microsecond	
Damping Factor	250:1, 1 kHz @ 8 ohms	500:1, 1 kHz @ 8 ohms
Input CMRR	greater than 90 dB	
Voltage Gain	40X (+32 dB) standard, others available on request	55X (+35 dB) standard, others available on request
Input Sensitivity	.775 V (0 dBv) for full power at 8 ohms	
Input Impedance	20 kΩ, balanced	
Hum and Noise	-103.7 dB, A weighted	
Connectors (per channel)	female XLR input, Octal send/return socket, 5-way output binding posts, input and output barrier strips	
Power Supply	540 VA power transformer; 20,000 µF filter capacitance	1.3 kVA power transformer; 29,200 µF filter capacitance
Max. Current Draw 120 VAC/240 VAC	10.0 A/5.0 A	20 A/10 A
Cooling	Variable-speed DC fan	
Switches, Controls, etc.	Front panel power switch/circuit breaker, 2 front panel attenuators, rear panel mode switch, signal ground lift jumper	
Indicators	1 "On", 2 Clip, 2 Signal, and 2 Protect LEDs	
Protection	High temperature, DC voltage, short circuit, turn-on/turn-off transient suppression, clip limiting, IGM™, subsonic filtering	
Construction	Single box chassis, 16 ga. steel with 0.187" aluminum front panel	
Dimensions	3.5" x 19" x 11.5" (8.9 x 48.3 x 29.2 cm)	3.5" x 19" x 14" (8.9 x 48.3 x 35.6 cm)
Gross Weight	33 lb (15.0 kg)	40 lb (18.1 kg)
Net Weight	28.5 lb (12.9 kg)	35.5 lb (16.1 kg)

Continuous sine wave bench power is limited by the current rating of the front panel circuit breaker.

Notes:
1. Subject to variation due to production tolerances.
2. EIA, 1 kHz, 0.05% THD, ±1 dB

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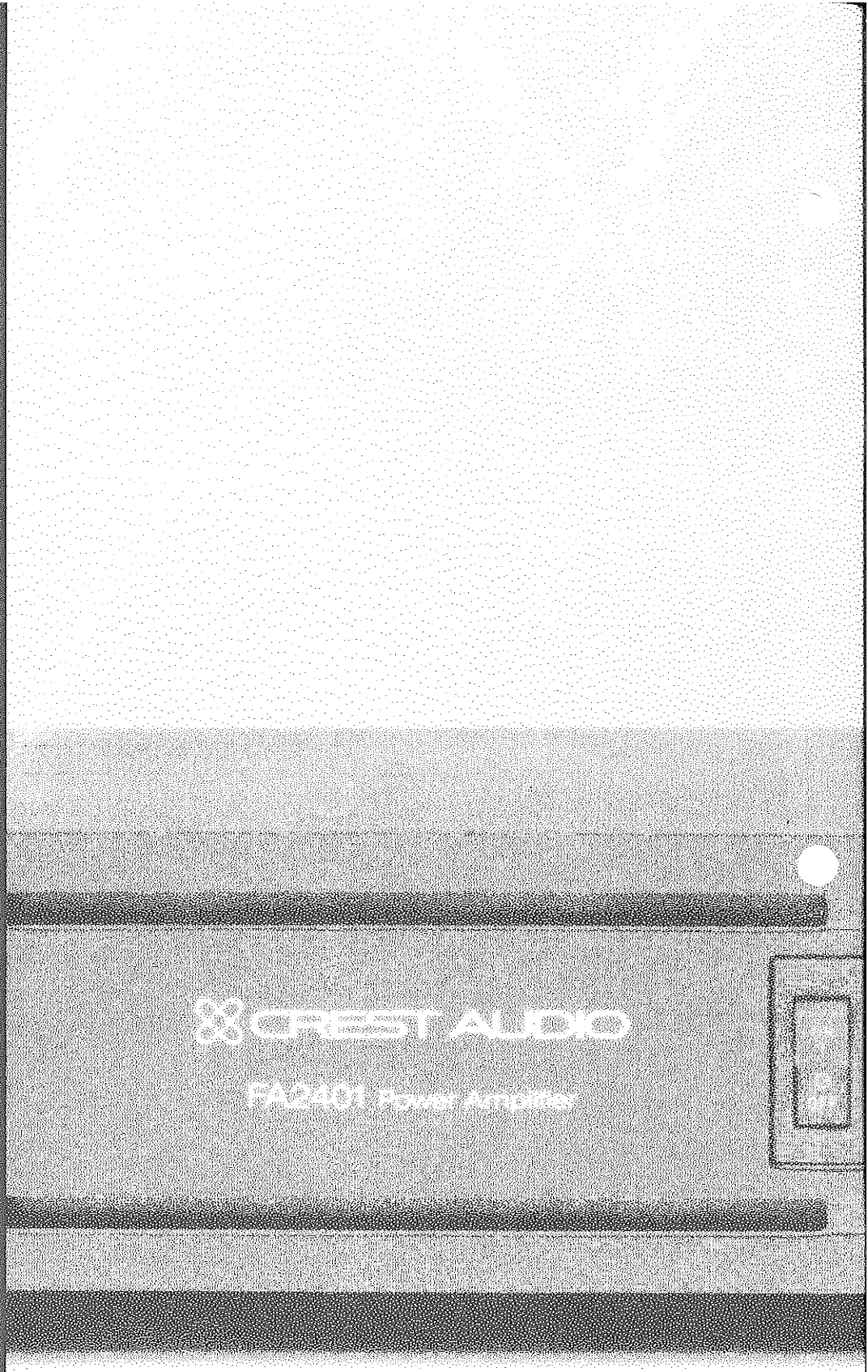
FA Series Specifications (continued)

Specification	FA1201	FA2401
Max. RMS Voltage Swing	±59V	±59V
Max. Peak Voltage Swing	±83V	±83V
Max. Rated Power/Ch., 8Ω FTC/EIA	280/300 W	330/350 W
Max. Rated Power/Ch., 4Ω FTC/EIA	450/475 W	580/600 W
Max. Rated Power/Ch., 2Ω FTC/EIA	525[1]/680[2] W	600[1]/770[2] W
Max. Rated Bridged Power, 8Ω FTC/EIA	960/1000 W	1100/1200 W
Max. Rated Bridged Power, 4Ω FTC/EIA	1050/1050 W	1200/1200 W
Frequency Response	20 Hz–20 kHz; +0, -.5 dB @ 450 W	20 Hz–20 kHz; +0, -.5 dB @ 580 W
THD into 4Ω @ 1 kHz	<0.025% @ 450 W	<0.025% @ 580 W
SMPTE IMD 60 Hz & 7 Hz, 8Ω	<0.015% @ 280 W	<0.015% @ 330 W
Slew Rate	>14 V/microsecond	>35 V/microsecond
Damping Factor	500:1, 1 kHz @ 8 ohms	
Input CMRR	greater than 90 dB	
Voltage Gain	61X (+35.7 dB) standard, others available on request	66X (+36.4 dB) standard, others available on request
Input Sensitivity	.775 V (0 dBv) for full power at 8 ohms	
Input Impedance	20 kΩ, balanced	
Hum and Noise	-103.7 dB, A weighted	
Connectors (per channel)	Female XLR input, Octal send/return socket, 5-way output binding posts, input and output barrier strips	
Power Supply	1.7 kVA power transformer; 40,800 µF filter capacitance	two 1.7 kVA power transformers; 54,400 µF filter capacitance
Max. Current Draw 120 VAC/240 VAC	20 A/10 A	20 A/10 A
Cooling	Variable-speed DC fan	
Switches, Controls, etc.	1 Front panel power switch/circuit breaker	2 Front panel power switch/circuit breakers
	2 front panel attenuators, rear panel mode switch, signal ground lift jumper	
Indicators	1 "On" LED	2 "On" LEDs
	2 Clip, 2 Signal, and 2 Protect LEDs	
Protection	High temperature, DC voltage, short circuit, turn-on/turn-off transient suppression, clip limiting, IGM™, subsonic filtering	
Construction	Single box chassis, 16 ga. steel with 0.187" aluminum front panel	Single box chassis, 14 ga. steel with 0.187" aluminum front panel
Dimensions	3.5" x 19" x 14" (8.9 x 48.3 x 35.6 cm)	3.5" x 19" x 16.5" (8.9 x 48.3 x 41.9|cm)
Gross Weight	42 lb (19.1 kg)	61 lb (27.7 kg)
Net Weight	37 lb (16.8 kg)	56.5 lb (25.6 kg)

Continuous sine wave bench power is limited by the current rating of the front panel circuit breaker.

Notes:
1. Subject to variation due to production tolerances.
2. EIA, 1 kHz, 0.05% THD, ±1 dB

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CREST AUDIO INC.
100 Eisenhower Drive
Paramus, NJ 07652 USA
Phone: 201.909.8700
FAX: 201.909.8666

CREST AUDIO EUROPE
5a Wilbury Grove Hove
East Sussex BN3 3JQ England
Phone: 44+(0).273.325840
FAX: 44+(0).273.775462

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