CE-Series
REFERENCE MANUAL

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Da Rules

1. Read all safety and operating instructions before operating the *CE-Series* amplifier. Follow all instructions carefully and heed any warnings given.
2. Do not drop or spill any foreign object or liquid into the *CE-Series* amplifier.

3. **WARNING: Shock hazard. To reduce the risk of fire or electric shock, do not expose this unit to rain or moisture. Do not immerse your *CE-Series* amplifier in any liquid. Do not operate your amplifier near a pool, bathtub or other standing water (even on a dare).**
4. Do not bypass or defeat the grounding or polarization means used on the *CE-Series* amplifiers. Make sure all blades on the polarized power plug can be fully inserted into the extension cord, receptacle or other outlet that will be used with the unit.
5. Your *CE-Series* amp should be cleaned only with a damp cloth
6. Take care of the power cord attached to your *CE-Series* amplifier. Avoid situations where your cord might be stretched, pinched, or otherwise abused. Route it to avoid foot traffic. Pay special attention to the cord connector and attachment points.

7. Do not attempt to service this unit beyond instructions contained in this manual. Refer all servicing to the Crown Service Department.
8. Keep your *CE-Series* amplifier away from sources of heat, such as a radiator or oven. Do not cover or surround your amp with material which may retain heat, such as a blanket or curtain.

9. Obtain assistance from qualified service personnel if any of the following occurs:

- The power cord or plug has been damaged in any way.
- Foreign objects or liquid have fallen into the amplifier enclosure.
- The amplifier has been exposed to rain or has been partially or totally immersed in any liquid.
- The amplifier has been dropped or the chassis has been damaged.
- You notice a marked change in performance, or your *CE-Series* amp does not appear to operate normally.

10. CAUTION: Do not locate sensitive, high-gain equipment such as preamplifiers or tape decks directly above or below the unit. If an equipment rack is used, we recommend locating the amplifier(s) in the bottom of the rack and the preamplifier or other sensitive equipment at the top.

Keep these instructions where you can look at 'em later!

Watch for these symbols:

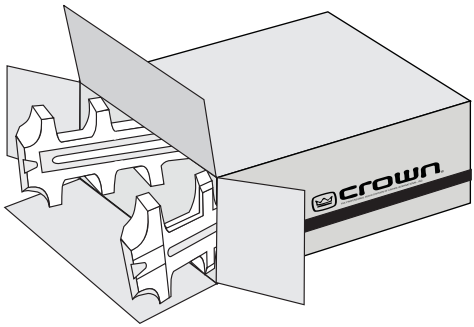
Lightning Bolt Symbol:
This symbol is used to alert the user to the presence of dangerous voltages and the possible risk of electric shock.

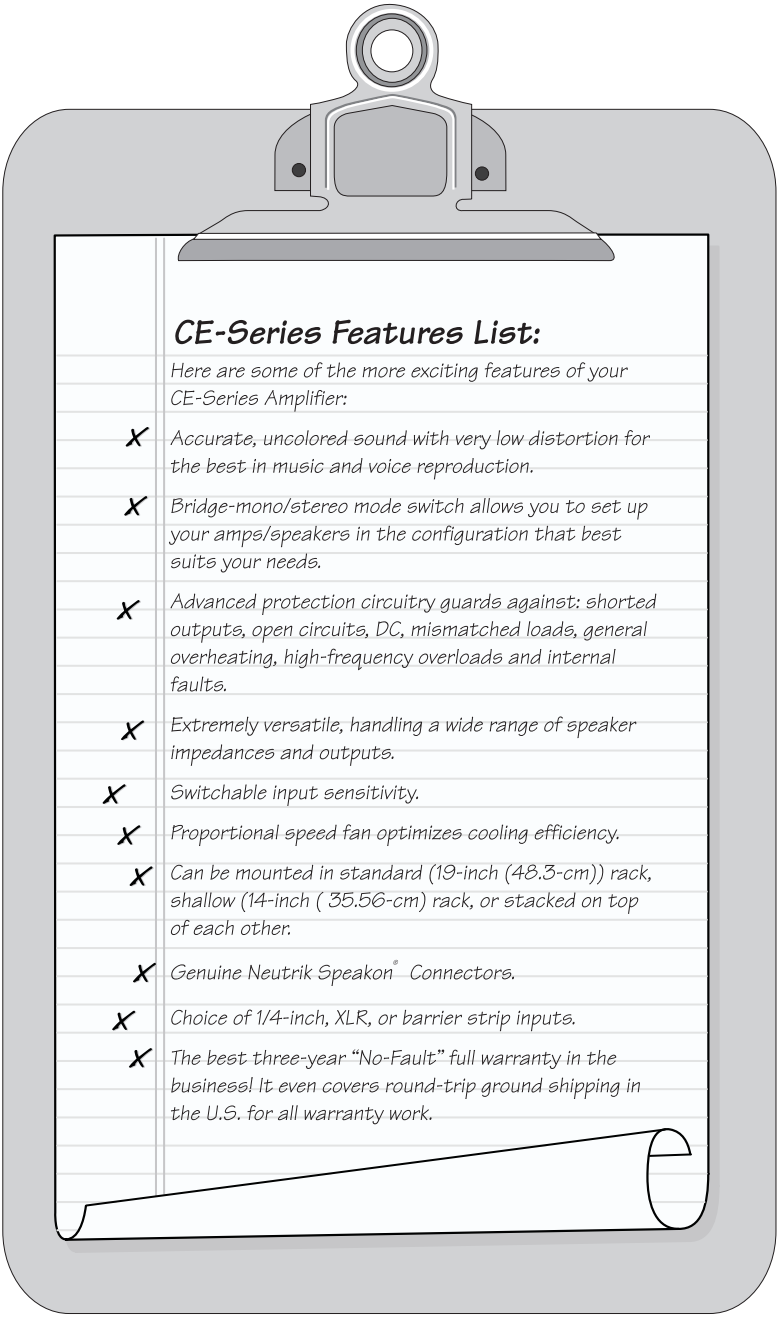
Exclamation Mark Symbol:
This symbol is used to alert the user to make special note of important operating or maintenance instructions found in the reference manual.

Unpacking Your *CE-Series Amp*

Please unpack and inspect your amplifier for any damage that may have occurred during transit. If damage is found, notify the transportation company immediately. Only you can initiate a claim for shipping damage. Crown will be happy to help as needed. Save the shipping carton as evidence of damage for the shipper's inspection.

We also recommend that you save all packing materials so you will have them if you ever need to transport the unit. **NEVER SHIP THE UNIT WITHOUT THE FACTORY PACK.**





CE-Series Features List:

Here are some of the more exciting features of your CE-Series Amplifier:

- ✗ Accurate, uncolored sound with very low distortion for the best in music and voice reproduction.
- ✗ Bridge-mono/stereo mode switch allows you to set up your amps/speakers in the configuration that best suits your needs.
- ✗ Advanced protection circuitry guards against: shorted outputs, open circuits, DC, mismatched loads, general overheating, high-frequency overloads and internal faults.
- ✗ Extremely versatile, handling a wide range of speaker impedances and outputs.
- ✗ Switchable input sensitivity.
- ✗ Proportional speed fan optimizes cooling efficiency.
- ✗ Can be mounted in standard (19-inch (48.3-cm)) rack, shallow (14-inch (35.56-cm) rack, or stacked on top of each other.
- ✗ Genuine Neutrik Speakon® Connectors.
- ✗ Choice of 1/4-inch, XLR, or barrier strip inputs.
- ✗ The best three-year "No-Fault" full warranty in the business! It even covers round-trip ground shipping in the U.S. for all warranty work.

Did You Remember To

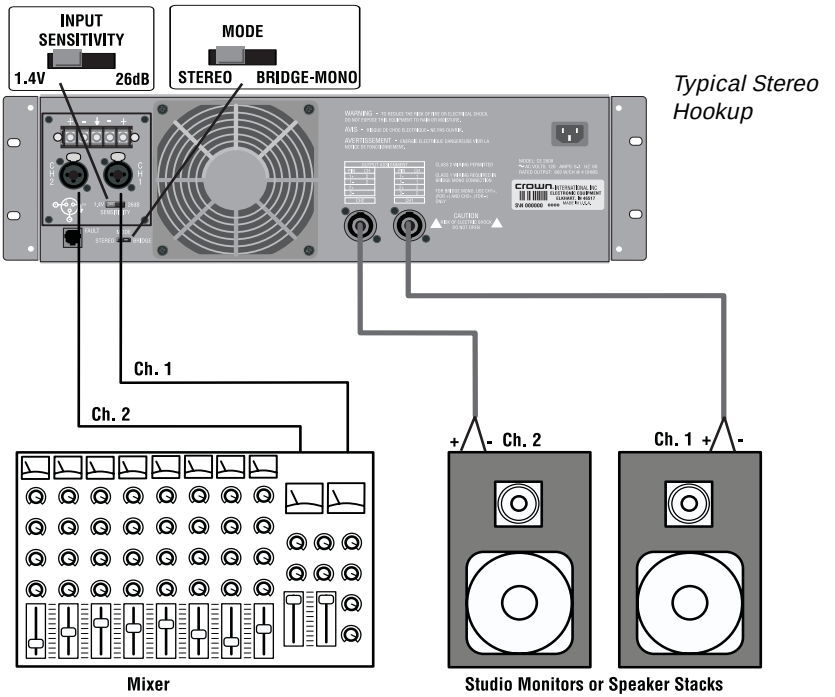
Quick Start!

You've waited a long time for this! We know you just can't wait to crank up your new Crown® *CE-Series* amplifier. And you sure don't want to flip through pages of tech-talk just to find out where the "ON" switch is. So that's why we provided you with this quick and simple page to get you up and running right away. Just take a few minutes to read through this—no more than five or ten, max—you'll be glad you did.

1. Make sure the *CE-Series* amp and all other equipment is turned OFF before you begin wiring. By the way, the amp power switch is located on the far left side of the front panel. It is OFF when depressed on the left.
2. Mount your *CE-Series* amp securely in the rack, or position it on a solid surface.
3. Connect the left and right inputs coming from your mixer, preamp, or processor. You can use either balanced 1/4-inch phone, 3-pin XLR or barrier block connectors. You can also choose to run in MONO mode. (See Figures 2.6 and 2.8.)
4. Connect the output wiring (left and right speakers). You will need two (2) Neutrik Speakon® NL4FC mating connectors.
5. Connect your *CE-Series* amp and other equipment to the appropriate power source.
6. Turn on your mixer, preamp, signal processor, or any other equipment in your system EXCEPT your *CE-Series* amplifier. (Remember: the best is worth waiting for.)
7. Make sure the Channel 1 and Channel 2 level (volume) controls on your *CE-Series* amplifier are turned all the way down (counter-clockwise), then flip the power switch ON. Note: The Fault light blinks a few times, and the "Power" light will glow a bright green to indicate power is on.
8. (Now comes the fun!) Supply input, adjust amp levels and enjoy.
9. You can check the green signal light to verify input, if necessary.

o Get Your Speakons®?

CAUTION: Excessive output levels may toast your speakers. Crown's *CE-Series* amplifiers have such low distortion, you may not realize the actual level being reached until it's too late. Please exercise caution and drive your speakers responsibly (or at least warn your neighbors!).



Typical Stereo Hookup

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Welcome

Thanks for buying this *CE-Series* amplifier. Here at Crown, we appreciate your support, and we think you'll find that you've also done yourself a favor by choosing Crown. That's because the *CE-Series* amps are REAL Crown amplifiers, designed by dedicated Crown engineers to fit your needs AND your wallet.

Yes, these Crown engineering dudes, cool guys that they are, thought that no-one should be without that great Crown sound. So what if you're not running a pro tour (yet)? You deserve the best in amplified sound. And the best, of course, is still Crown. (My dad always said, it ain't braggin' if it's true.)

The engineers at Crown got together and thumbed their noses at those high-ranking corporate types who always want big stickers and huge markups. What they came up with is the *CE-Series* of amplifiers. We think you'll really like it.

So what else is special about the *CE-Series*?

First off, your *CE-Series* amplifier features all front-panel controls for ease of use. But—so you don't have to sacrifice security for comfort—the front panel level controls can be set, then removed entirely from the panel. Whether for long-term control in a fixed installation or short-term protection against unauthorized adjustments, this feature allows you to just set-and-forget your level controls.

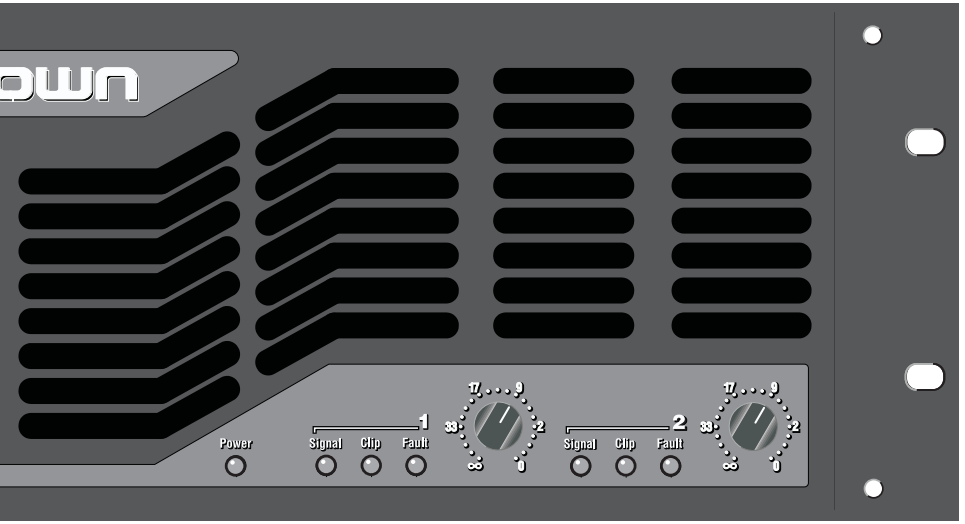


Fig. 1.1 The CE-Series Amplifier

Your *CE-Series* amp also comes with a standard SST module (System Solution Topologies) that gives you the choice of barrier strip, 1/4-inch phone, or 3-pin XLR connectors and works great in most situations. However, if you're using your CE amp for theater applications, or if you have other special input needs, you can pull the standard SST module and simply plug in one of our advanced SST modules, (such as our electronic crossover).

Don't forget the impressive output. The CE 1000 produces an awesome 1,100 watts, while the CE 2000 pumps out 1,975 watts of power.* For output connectors, the *CE-Series* features genuine Neutrik Speakon® 4-pole connectors for quick, secure and safe connections.

And, of course, there's no mistaking a *CE-Series* amp. Its rugged look will impress your friends almost as much as the Crown name.

This manual will help you correctly set up and use your new amplifier—we strongly recommend you read all instructions, warnings and cautions. Also, for your protection, please send in your warranty registration card today. And save your bill of sale—it's your **official proof of purchase.**

* 1,100 watts and 1,950 watts total in bridge-mono at 4 ohms (for the CE 1000 and CE 2000 respectively), 560 watts and 975 watts per channel at 2 ohms. See the Specifications Section for details.

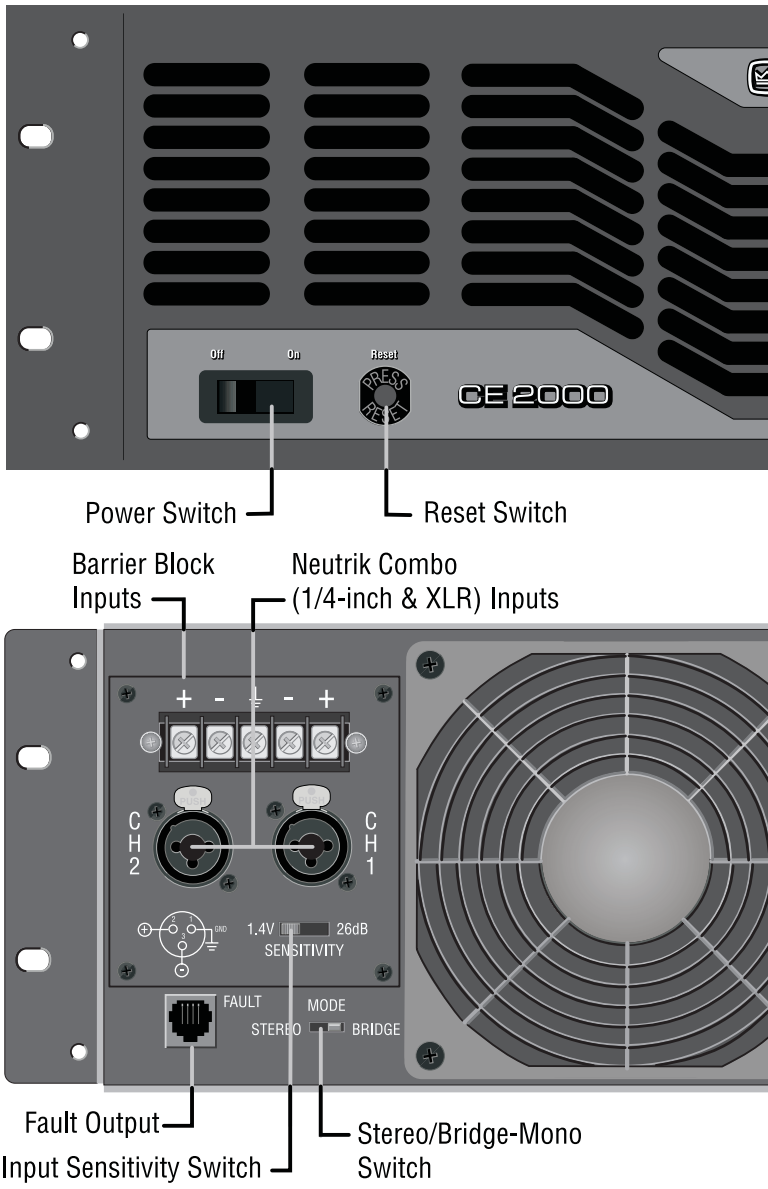
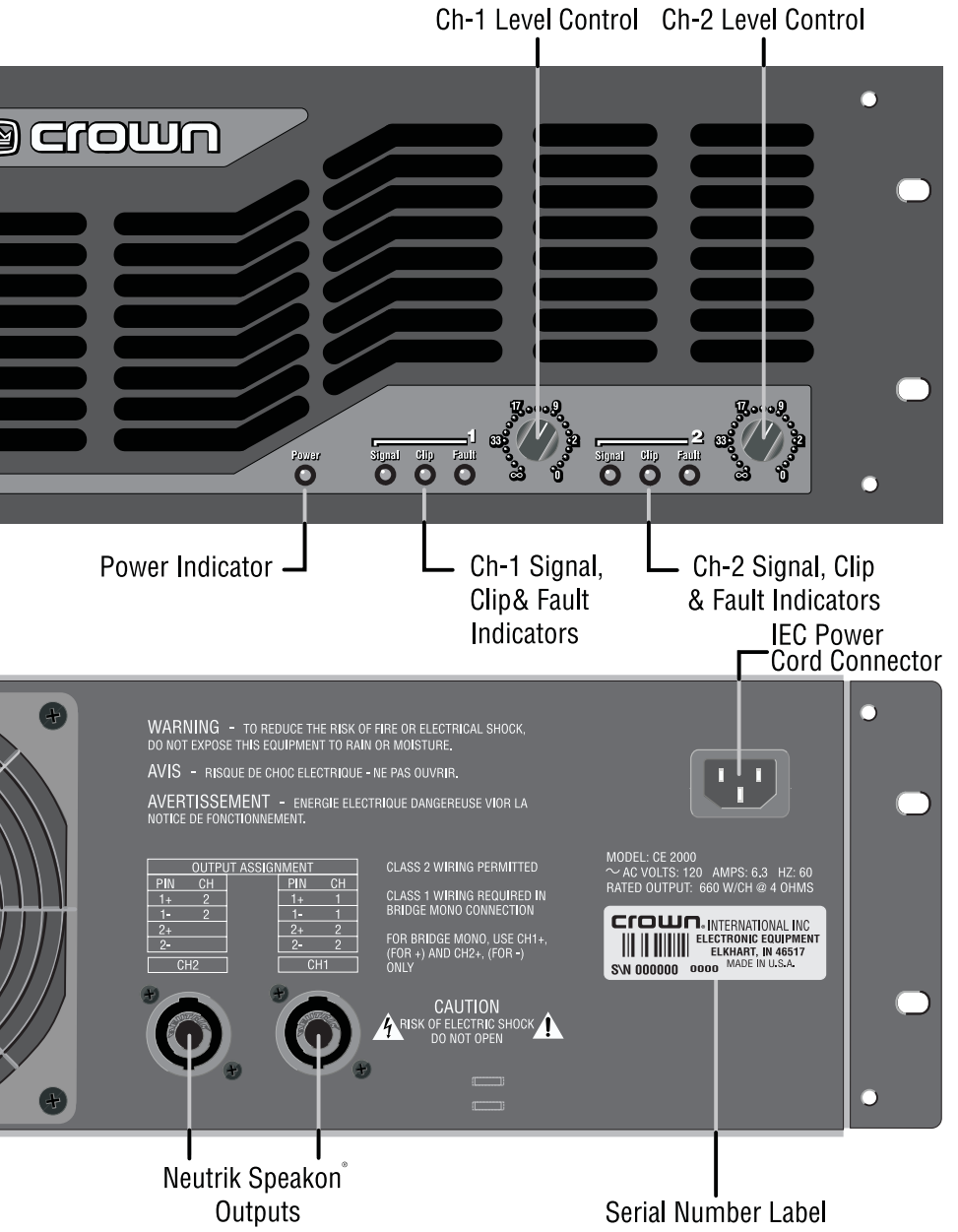


Fig. 1.2 The Big Picture: Controls, Indicators & Connectors


Ch-1 Level Control
Ch-2 Level Control
Power
Signal
Clip
Fault
Power Indicator
Ch-1 Signal, Clip& Fault Indicators
Ch-2 Signal, Clip & Fault Indicators
IEC Power Cord Connector
WARNING - TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.
AVIS - RISQUE DE CHOC ELECTRIQUE - NE PAS OUVRIR.
AVERTISSEMENT - ENERGIE ELECTRIQUE DANGEREUSE VIOR LA NOTICE DE FONCTIONNEMENT.
OUTPUT ASSIGNMENT
CLASS 2 WIRING PERMITTED
CLASS 1 WIRING REQUIRED IN BRIDGE MONO CONNECTION
FOR BRIDGE MONO, USE CH1+, (FOR +) AND CH2+, (FOR -) ONLY
CAUTION
RISK OF ELECTRIC SHOCK DO NOT OPEN
MODEL: CE 2000
AC VOLTS: 120 AMPS: 6.3 HZ: 60
RATED OUTPUT: 660 W/CH @ 4 OHMS
INTERNATIONAL INC.
ELECTRONIC EQUIPMENT
ELKHART, IN 46517
MADE IN U.S.A.
Neutrik Speakon® Outputs
Serial Number Label

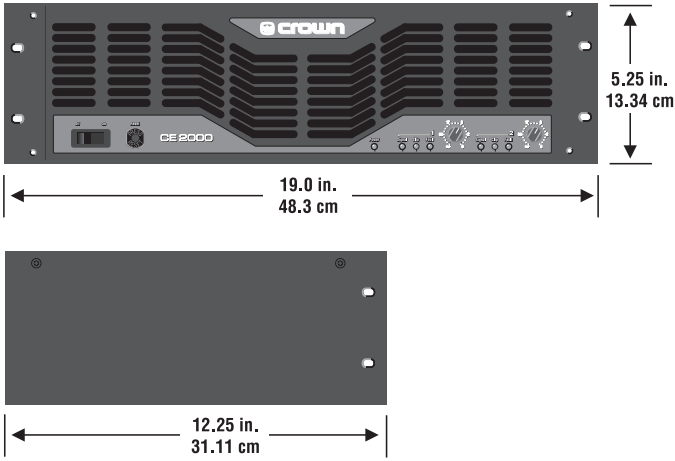
2 Detailed Install

Follow these instructions for a detailed explanation of *CE-Series* installation procedures and options. If you just want to get up and running as quickly as possible, see the Quick Start section on page 6.

2.1—Begin with the amplifier turned off and disconnected from the power receptacle. The *CE-Series* power switch is located on the left side of the front panel; it is OFF when depressed on the left. Equipment that will be connected to the inputs of the amplifier (such as mixers,equalizers or signal processors) should also be turned off.

2.2—Mount the amplifier. Your *CE-Series* amp can be mounted in a standard, 19-inch (48.3-cm) equipment rack, or it can be simply stacked with other equipment. And since your *CE-Series* amp is not as deep as many amplifiers (only 12.25 inches (31.11 cm) behind the front panel), you can also mount it in the shallow, wall-mount racks.

Fig. 2.1 Mounting Dimensions



If you choose to mount your amp in a rack, you should secure the back of the rack as well as the front. Securing the amp at both front and rear will assure that the amp stays in place, even when the rack is transported or accidentally dropped (which we know never happens).

2.3—Set the mode switch. Turn off the amplifier before moving this switch. The Mode switch should be in the "Stereo" position when you're running in Stereo Mode. Stereo Mode allows independent inputs on the left and right channels to feed separate speakers at the output. It's the configuration typically chosen (by 90% of left-handed musicians) for everyday audio applications.

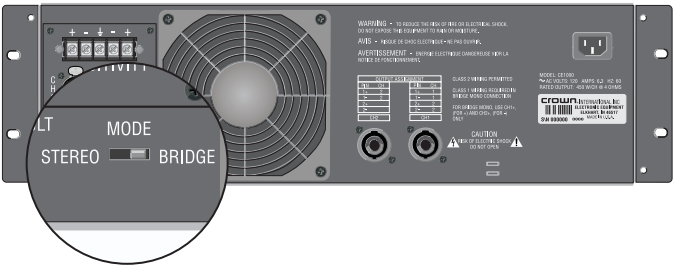


Fig. 2.2 Mode Switch

Turn the Mode switch to "Bridge-Mono" to have a single input that feeds to a single output with **twice the voltage of Stereo Mode.** Use this configuration if you want to give up stereo capabilities in order to drive your speakers ***louder.*** **(note that the wiring will also need to be changed for this configuration—see step 6 later in this section).**

2.4—Set the Input Sensitivity switch to the desired setting. Two choices are available: 1.4 V for full rated (8-ohm) output, or a fixed voltage gain of 26 dB. (The *CE-Series* ship from the factory with default settings of 1.4 V, which translates to approximately 33 dB of gain.) Refer to the information on "Input Sensitivity" in the **Operation** section (section 3) for detailed information.

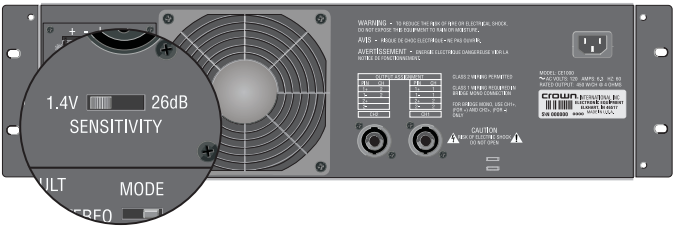
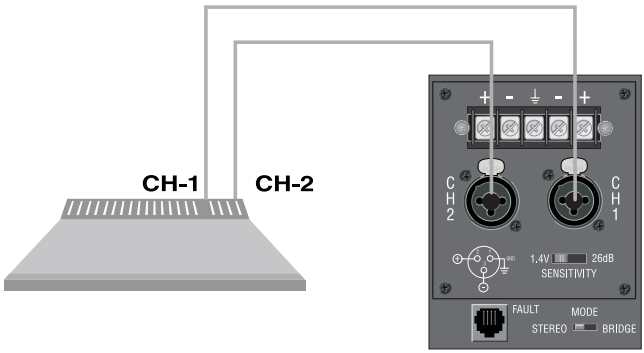


Fig. 2.3 Input Sensitivity Switch

2.5—Connect the inputs of the *CE-Series* amp to your mixer, equalizers, or signal processors ahead of the amp. Three types of balanced input connectors are provided, allowing you to choose barrier strip, 1/4-inch phone or 3-pin XLR connectors. You can also choose to use either balanced or unbalanced wiring. (See the information on "Balancing the Line" in the **Other Issues** section for an explanation of balanced vs. unbalanced wiring.)

If the Mode switch is in "Bridge-Mono" position, only the Channel 1 input connectors should be used.

Fig. 2.4 Typical Input Wiring



Input Wiring Tips

1. For all input connectivity, use shielded wire only. Cables with a foil wrap shield or a high-density braid are superior. Cables with a stranded spiral shield, although very flexible, will break down over time and cause noise problems.

2. Try to avoid using unbalanced lines with professional equipment. If you have no choice, keep the cables as short as possible. (Refer to the information on "Balancing the Line" in the **Other Issues** section.)

3. To minimize hum and crosstalk, avoid running low-level input, high-level output and AC power feeds in the same path. Try to run differing signal paths at 90° to one another. If you must use a common path for all cables, use a star-quad cable for the low-level signals.

4. When changing input connectors or wiring, turn the amplifier level controls all the way down (counter-clockwise) before connecting or disconnecting input plugs.

5. When changing output connections, a professional dude will turn the amplifier level down and the AC power off to minimize the chance of short-circuiting the output.

2.6—Connect the outputs of the *CE-Series* amp to your loudspeakers. You will need two (2) Neutrik Speakon® NL4FC connectors to interface with this amplifier.* You will also need high-quality two- or four-conductor speaker cable with the appropriate end-connectors to fit the inputs on your speakers, a pair of needle-nosed pliers and a 1.5-mm hex key to assemble the Speakon connectors.

To assemble the Neutrik Speakon NL4FC connector, complete the following steps:

2.6.1—Slide the bushing (E) and chuck (D) onto the end of the cable as shown (Figure 2.5).**

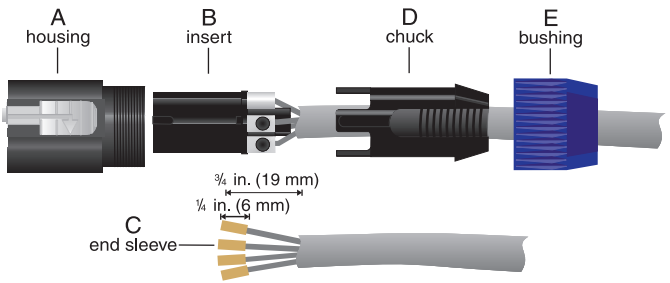


Fig. 2.5 Order of Assembly for the Neutrik Speakon NL4FC Connector

2.6.2—Strip approximately 3/4-inch (19-mm) of casing from the cable end. Strip approximately 1/4-inch (6-mm) from the end of each of the conductors down to bare wire.

2.6.3—Slide the end sleeves (C) onto the wire ends and crimp in place.

2.6.4—Insert each wire with end sleeve into the top of appro-

* You can purchase the Speakon® NL4FC connectors from your local dealer, or contact NEUTRIK AG, Im alten riet 34, Schaan FL-9494, Furstentum Liechtenstein, 011-41-75-237-2424, FAX 011-41-75-232-5393, www.neutrik.com or Neutrik USA, Inc., 195 Lehigh Ave., Lakewood, NJ 08701-4527, (908) 901-9488, Fax (908) 901-9608, www.neutrikusa.com or Crown International, Inc., 1718 West Mishawaka Road, Elkhart, IN 46517-4095, USA, 219-294-8000, FAX 219-294-8329, www.crownaudio.com.

** Your NL4FC connector kit should contain both a black and a white chuck. Use the white chuck for cable with a diameter of 0.25- to 0.5-inch (6.35- to 12.7 mm). Use the black chuck for cable with a diameter of 0.375- to 0.625-inch (9.525- to 15.875-mm).

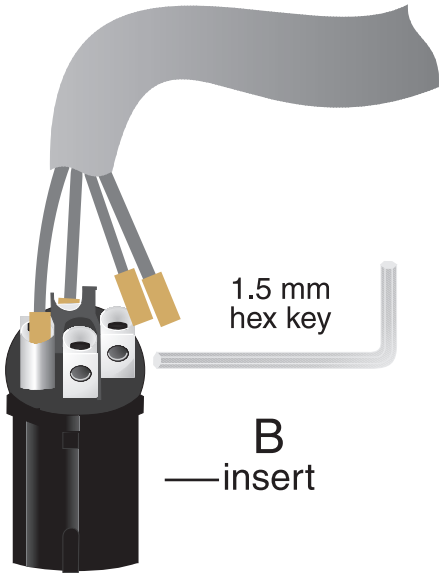


Fig. 2.6 Wiring for the Neutrik Speakon NL4FC Connector

priate slot of the connector insert (B) as shown in Figure 2.6. Use a 1.5-mm hex key inserted into each side slot to tighten the connection.

2.6.4a—If the Mode switch is in the "Stereo" position (for stereo configuration), connect the positive (+) and negative (–) leads of each wire to the appropriate Channel 1 and Channel 2 connectors as shown in Figure 2.7. Refer to Figure 2.10 for complete system setup. You may use all 4 poles of the Channel 1 output connector to feed both speakers, if you wish.

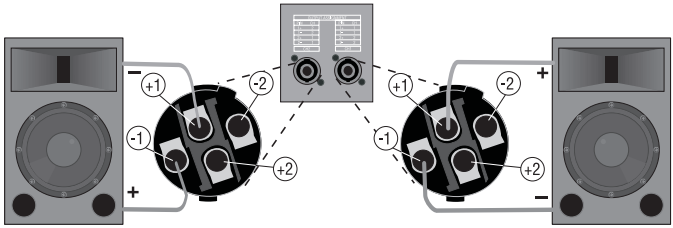


Fig. 2.7 Stereo Output Wiring

2.6.4b—If the Mode switch is in the "Bridge" position (for mono configuration), connect the load across the positive (+) terminals of the connector as shown in Figure 2.8. Refer to Figure 2.11 for complete system setup. For Bridge-Mono Mode, non-inverting output, Ch1+ is the positive (+) and Ch2+ is the negative (–).

2.6.4c—Never short or parallel the output channels of a *CE-Series* amplifier to itself or any other amplifier.

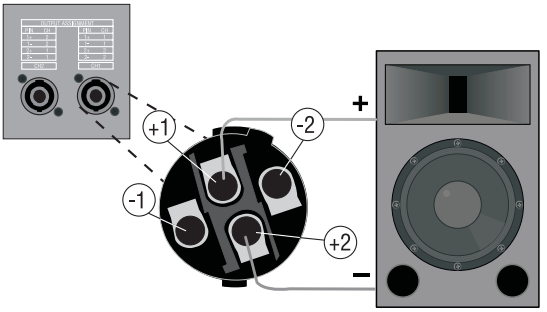


Fig. 2.8 Bridge-Mono Output Wiring

2.6.5—Slide the connector insert (B) into the connector housing (A), making sure that the large notch on the outer edge of the insert lines up with the large groove on the inside of the connector housing. The insert should slide easily through the housing and out the other side until it extends approximately 3/4-inch (19-mm) from the end of the housing (see Figure 2.9).

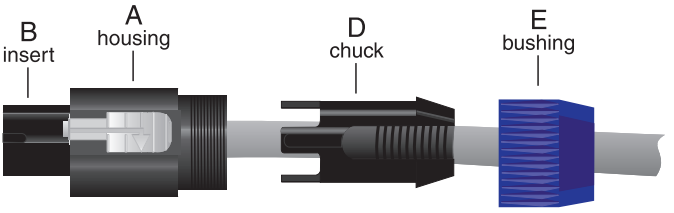
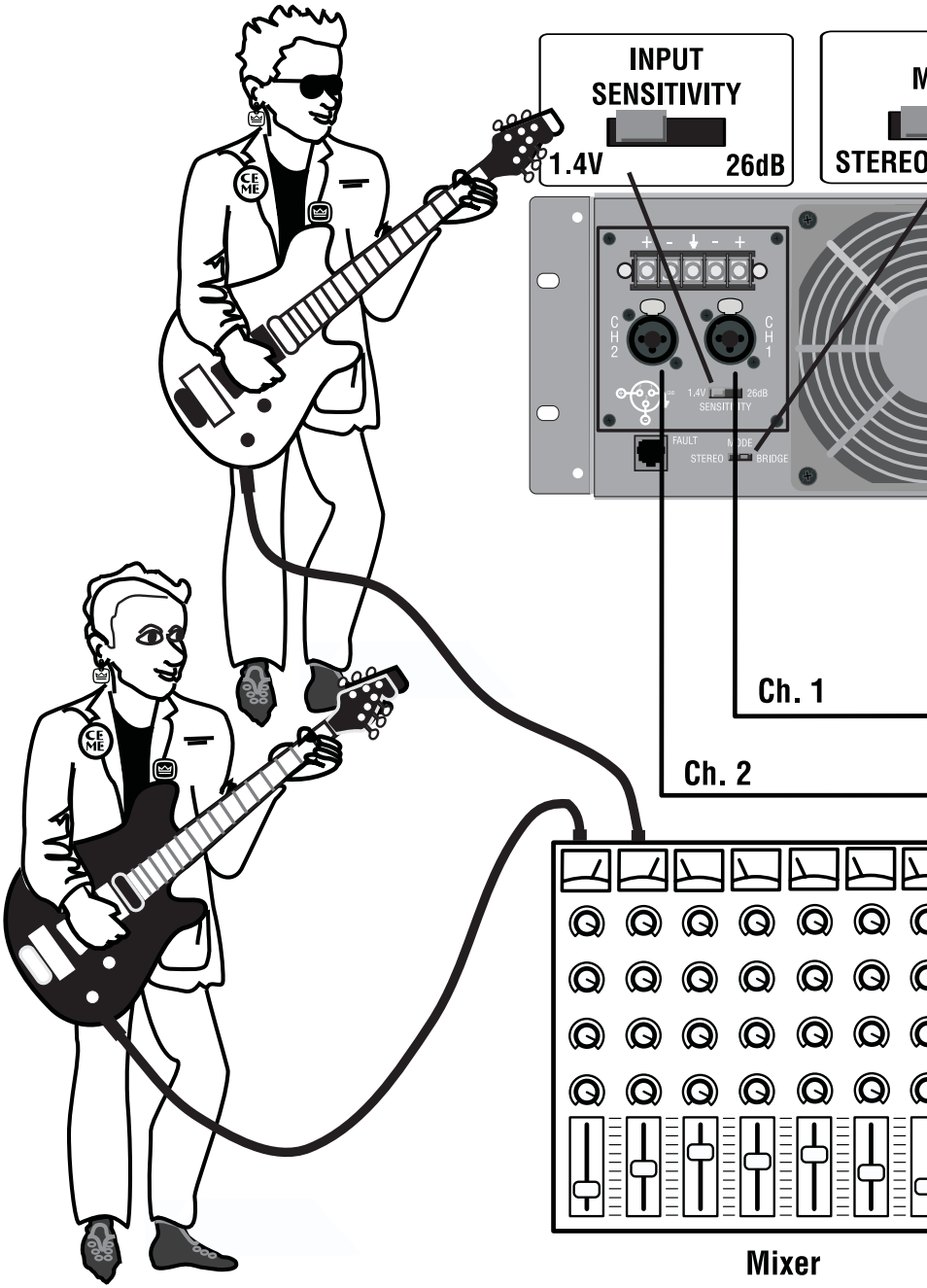


Fig. 2.9 Detailed Neutrik Speakon NL4FC Connector Assembly: Insert into Connector Housing


INPUT
SENSITIVITY
1.4V
26dB
STEREO
CH 2
CH 1
FAULT
STEREO
BRIDGE
Ch. 1
Ch. 2
Mixer

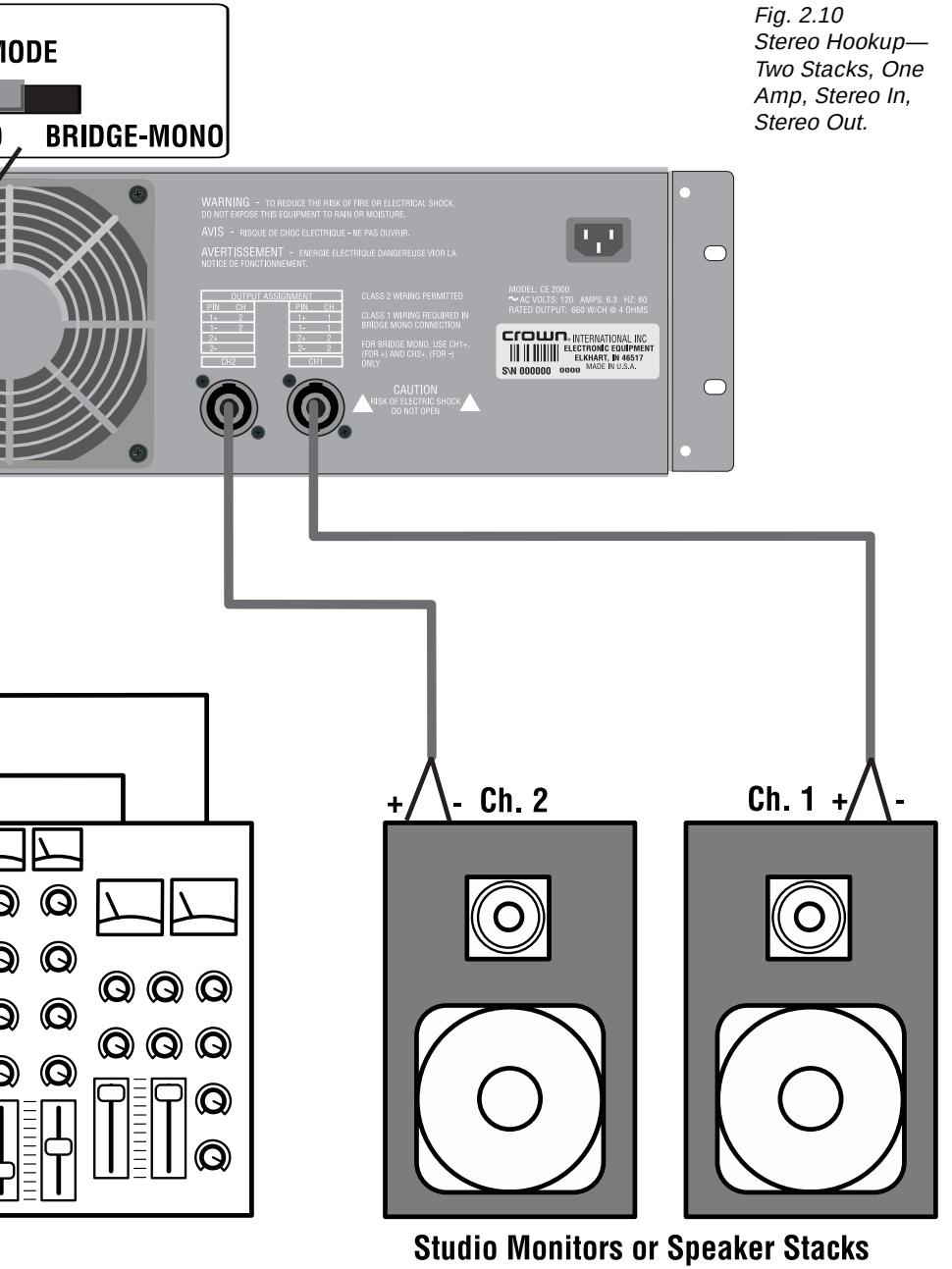
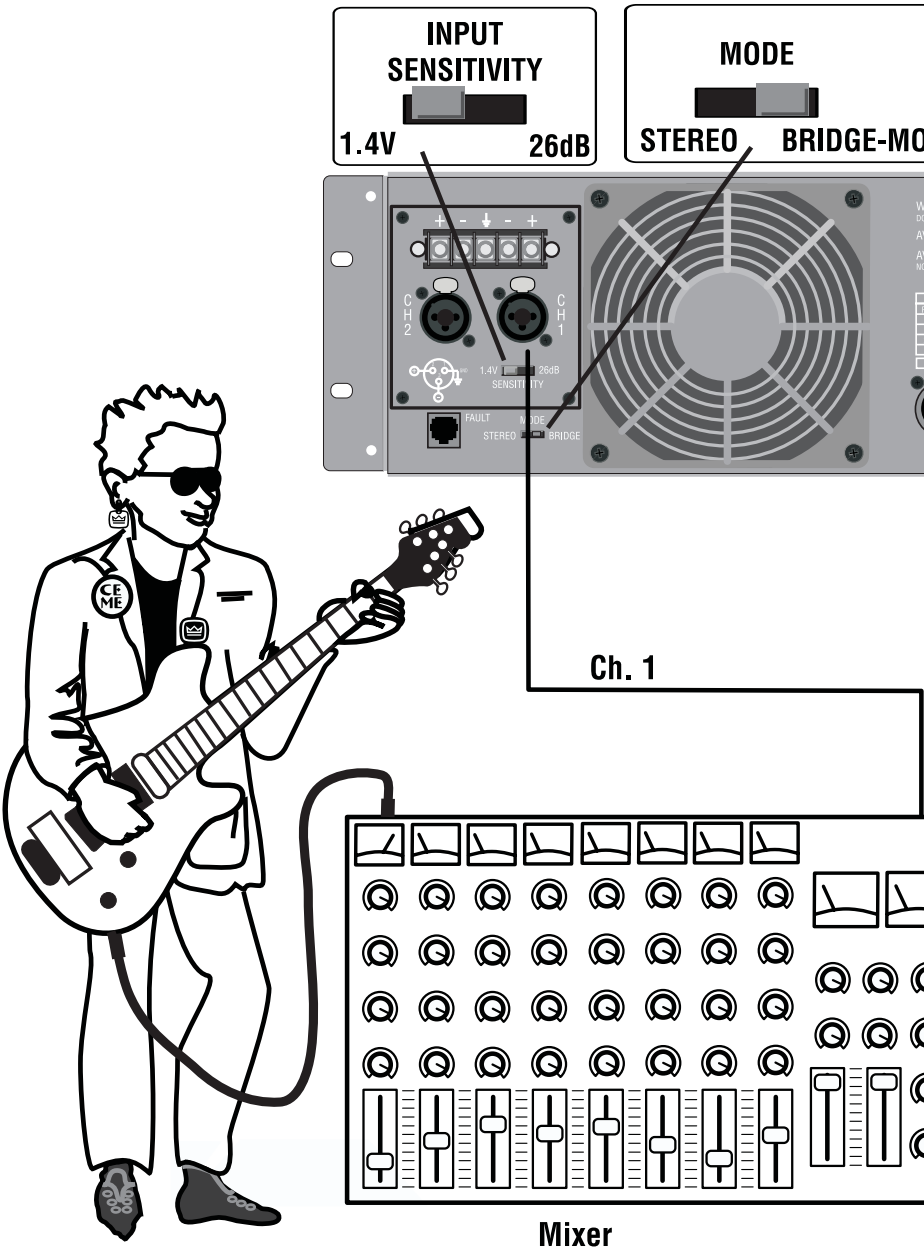


Fig. 2.10
Stereo Hookup—Two Stacks, One Amp, Stereo In, Stereo Out.


INPUT
SENSITIVITY
1.4V
26dB
MODE
STEREO
BRIDGE-MO
CH 2
CH 1
FAULT
STEREO
BRIDGE
Ch. 1
Mixer

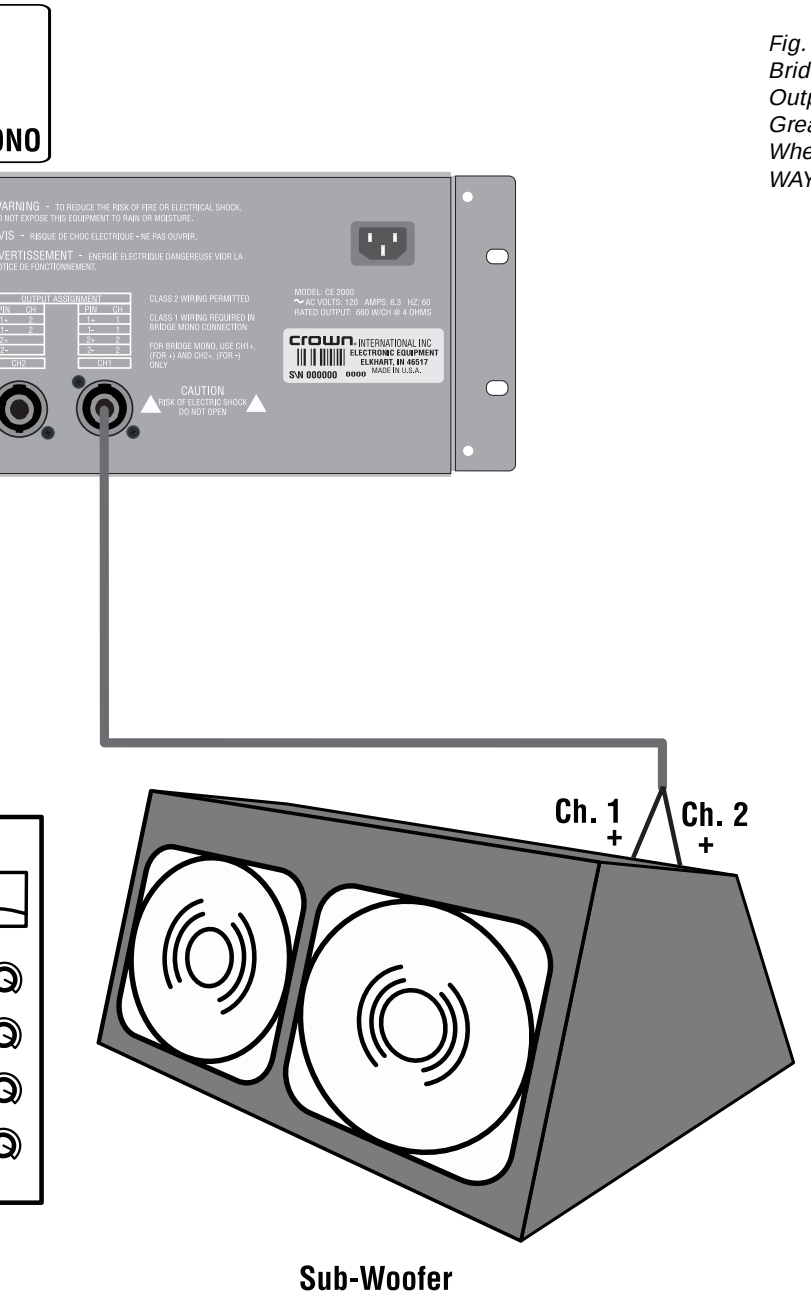


Fig. 2.11
Bridge-Mono Output Hookup—Great for Subs...or When You Want It WAY LOUD!

Output Wiring Tips

1. Although this amp has Speakon connectors to minimize wiring mistakes, we encourgage you to choose carefully when selecting speaker enclosue connectors.
2. To prevent possible short circuits, wrap or otherwise insulate exposed loudspeaker cable connectors.
3. Do not use connectors that might accidentally tie conductors together when making or breaking the connection (for example, a standard, 1/4-inch stereo phone plug).
4. Never use connectors that could be plugged into AC power sockets. Accidental AC input will be an electrifying experience for your equipment. But you will find out real quick if your speakers are any good at 60 Hz.
5. Avoid using connectors with low current-carrying capacity, such as XLRs.
6. Do not use connectors that have any tendency to short.
7. To maintain good bass response, use the lowest DC resistance cable you can afford and will terminate safely in your connectors.

2.6.6—Slide the chuck (D) along the cable and insert into the housing, making sure that the large notch on the outer edge of the chuck lines up with the large groove on the inside of the connector housing. The chuck should slide easily into the insert/housing combination until only approximately 3/8-inch (9.5-mm) of the chuck end extends from the back end of the connector as shown in Figure 2.12.

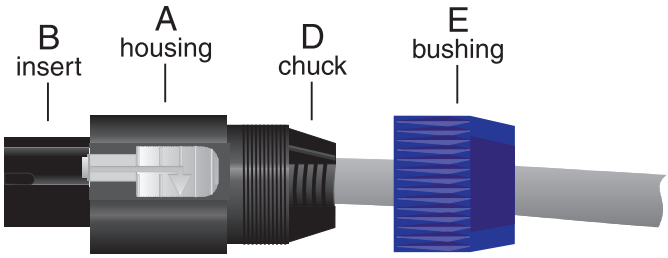


Fig. 2.12 Detailed Neutrik Speakon NL4FC Connector Assembly: Chuck into Connector Housing

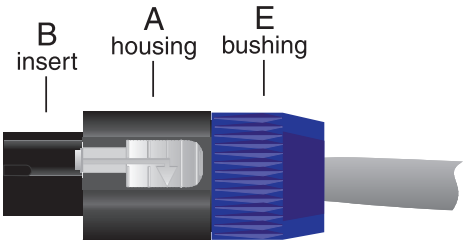


Fig. 2.13 Detailed Neutrik Speakon NL4FC Connector Assembly: Bushing onto Connector Housing Assembly

2.6.7—Slide the bushing along the cable and screw onto the end of the connector combination as shown in Figure 2.13. **Note that the bushing features a special locking construction which will prevent disassembly of the NL4FC connector once this cap is tightened into place. Before tightening, you may want to test the connector to make sure it has been assembled properly.** To test the connector, complete the remaining installation steps.

Why Speakon?

For amplifiers, the most popular termination device on professional products has been the dual banana (which incidentally was pioneered by Crown with the DC300 model). However, recent regulatory requirements in Europe have outlawed the use of the dual banana plug and forced users to terminate speaker cables with spade lugs or bare ends—an approach that is clearly not advantageous to the customer who wants to reconfigure his system or quickly change out a defective product. It is possible that similar regulatory controls will appear worldwide over the next few years.

One solution to this problem is to use the Neutrik Speakon® connector. Here at Crown, we wanted to develop a system for you that eliminated the need for specialized, time-consuming, interface cables. The major loudspeaker manufacturers have been using Speakon connectors for the input termination on their products for several years now, so you can be assured of the connector's reliability in the workplace. With Speakon connectors, you can plug straight from the amp to the speaker, and start making those great sounds right away.

The Speakon connector used on this amplifier meets all known safety regulations. Once wired correctly, the connector cannot be plugged in backwards, causing the type of inverted polarity situations that are common with banana hookups. It will provide a safe, secure and reliable method of interfacing your amplifier to the load.

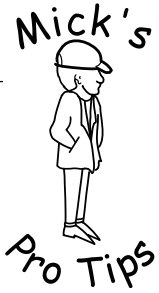
2.7—Turn on all equipment ahead of the amplifier such as the mixer or preamplifier. Adjust their signal levels to their optimum "signal to noise" settings as defined in their operating manuals.

2.8—Plug the amplifier into the power receptacle, turn on the amplifier and adjust its level controls to a desired setting. Please be sure to follow the steps outlined in the **Operation** section (page 29) if this is the first time the amplifier is being turned on.

2.9—Check to make sure adequate ventilation has been provided. Even though this amplifier has some of the most efficient heat sinks in the marketplace, it must be able to breathe. So make sure that the front vents are never blocked and that the exhaust fan (out the back) is not blocked or covered by cables.

An amplifier running at high sound pressure levels into low-impedance loads, will typically put out lots of hot air, so make sure it can go somewhere.

If you are running your equipment in dusty or dirty environments, it is advisable to pre-filter the air using industrial furnace filters. These filters can be taped or fastened to the front of the equipment rack, ensuring a clean air supply through a large surface area that will require minimum maintenance.



Cooling Tips

If you allow spaces between pieces of equipment in your rack, make sure you block the front with blank, solid (not perforated) panels. This will allow the rack to act as a chimney with hot air exhausting at the top, not re-circulating between adjacent amplfiers.

3 Operation

Operating a *CE-Series* amp is very straight-forward.

Indicators

See Figure 3.1 for positions of front-panel controls and indicators.

Fault: OFF is good. This red indicator will blink under five different conditions:

1. When the amplifier is first powered up, until the unit is ready for operation.
2. If the heatsinks reach a temperature above normal working limits.
3. If the transformer thermal protection circuit is activated.
4. If amplifier output wires develope a short-circuit.
5. Should the amplifier output stage become non-operational.

This circuit may be monitored remotely by plugging into the back-panel RJ11 jack (Fault), and using a circuit like the one described in Figure 5.2. Under some conditions, the output of the amplifier will be muted.

Clip: The red Clip indicators turn on when distortion is audible in the amplifier output.

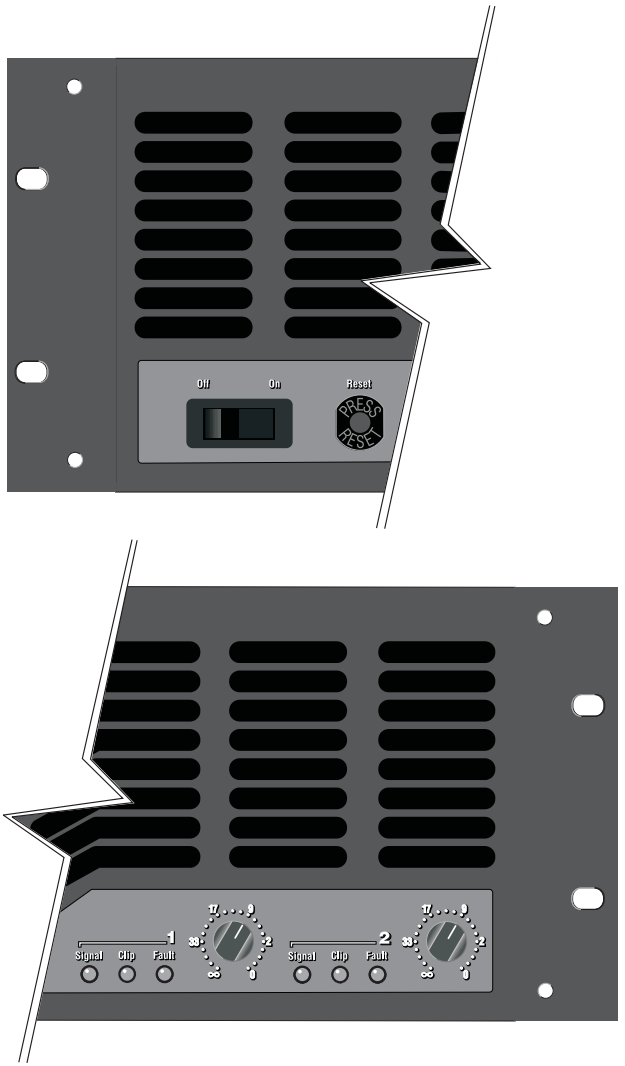
Signal: Unlike some of our other amplifiers, on the *CE-Series* amplifiers, the green signal indicator illuminates when a signal (> –40 dBm) is present at the ***INPUT*** of the amplifier. This indicator is before the level control, so it can be used to troubleshoot wiring problems within a system. No green glow, no signal is reaching the amplifier!

Power: The green Power indicator turns on when your *CE-Series* amp has been turned on and has power.

Controls

Level: You can adjust each channel's output using the level control on the front of the amplifier. To decrease the level, rotate the control counter-clockwise (to "∞"). To increase the level, rotate it clockwise (to 0). The level control knob may be pulled from the front panel and the holes plugged with the supplied caps, if you wish, to minimize tampering of control settings.

Fig. 3.1 Front Panel Indicators & Controls



Power: The power switch is located on the front panel so you can easily turn the amplifier on or off. When the switch is depressed left, the amp is off. If you ever need to make any wiring or installation changes, don't forget to also disconnect the power cord.

Please follow these steps when first turning on your amplifier:

1 Turn down the level of your audio source. For example, set your mixer's volume to "∞" (off).

2 Turn down the amplifier's level controls (counter-clockwise to "∞").

3 Turn on the power switch. The power indicator beside the switch will turn on.

4 After the Power light turns on, test the operating range of your input by turning up the level of your audio source to the highest possible operating level before distortion. You should notice the green signal indicators glowing on your amplifier.

5 **S-L-O-W-L-Y** turn up the level controls on the front of the amplifier until the maximum desired loudness or power level is achieved. Be prepared for astounding output!

6 Turn down the level of your audio source to its normal range.

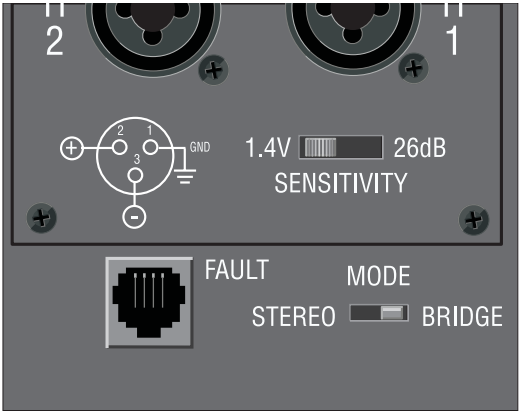


Fig. 3.2 Back Panel Controls

Input Sensitivity: A two-position Input Sensitivity switch is located on the back panel near the input connectors. Your amplifier is shipped from the factory with this switch set to the 1.4-V position. At this setting, a 1.4-volt input signal will drive the amplifier to full power into an 8-ohm load when the level controls are turned to maximum. The input sensitivity can also be set to a fixed voltage gain of 26 dB.

The input sensitivity setting is a function of amplifier gain. You will want to match this setting with the output capability of the mixer or equipment sending the drive signal to the amplifier. The 1.4-V position corresponds to a +4 dBu level. This is the level that most professional gear operates at. The 26-dB position is a fixed gain position, meaning the amplifier provides a fixed voltage gain of 20 (or 26 dB: 1 volt in, 20 volts out). This position works best with output levels of +10 dBu (2.5 volts RMS) or more. Some brands of DJ mixers, in particular, have output levels in this range. Selecting the correct sensitivity will allow your equipment to operate at its optimum level and improve the signal-to-noise of the system.

Mode: Bridge-Mono Mode combines the two amplifier output channels into a single mono channel with twice the voltage of a single stereo channel. This means the output will be much more powerful! It does this by bridging the outputs, and it requires special output wiring. **Do NOT use the negative (1–, 2–) outputs when the Bridge-Mono Mode is selected.** Connecting anything to the negative terminals may result in a visit by the Polarity Police (see Section 2 for more information). When Bridge-Mono Mode is selected, only the Channel 1 level control and the Channel 1 signal LED will work. If the Channel 2 input is wired, the Channel 2 level control should be turned to "∞" (counter/anti-clockwise) to prevent distortion.

4 Other Issues

Balancing the Line

A balanced audio circuit typically will have both positive (+) and negative (–) legs of the circuit isolated from the ground circuit. These balanced legs exhibit identical impedance characteristics with respect to ground, and may also carry the audio signal at the same level, but with opposite polarities. This results in a line that offers excellent rejection of unwanted noise.

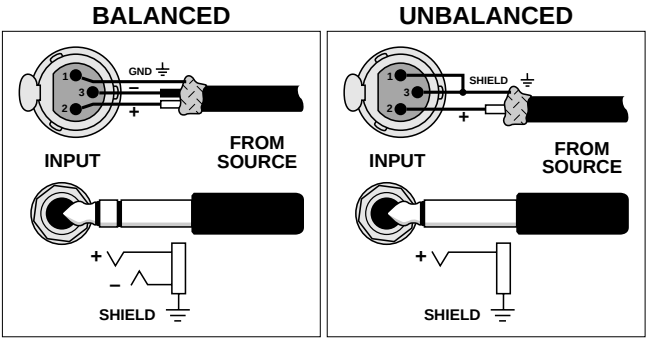


Fig. 4.1 Balanced & Unbalanced Input Wiring

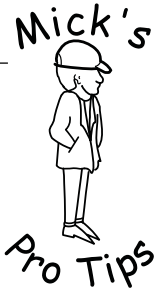
On the other hand, an unbalanced circuit usually holds one leg at ground potential, while the second leg is "hot." Unbalanced line is less expensive, but is much more susceptible to noise, and is not usually used in professional applications. For the cleanest signal, without unwanted hum and buzz, balanced line is always recommended. It is especially helpful if you have a long cable run (over 10 feet (3 m)), since noise is easily introduced into long, unbalanced lines.

1/4-inch				XLR
Tip	=	+	=	Pin 2
Ring	=	–	=	Pin 3
Sleeve	=	⏚	=	Pin 1

Fig. 4.2 Polarity Conversions

The Dastardly Duo: Dr. Hum and Mr. Buzz

If you have noticeable hum or buzz in your system, you may want to check your cable connections to see if the unwanted noise is being introduced via a ground loop. To determine the proper wiring, first check whether the output from your source is unbalanced or balanced (if you don't know, refer to the unit's back panel or instruction manual). If the source is balanced, refer to Figure 4.3; if it is unbalanced refer to Figure 4.4. Next, determine if the source's power cable is floating (ungrounded, 2-prong) or grounded (3-prong). Finally, if the source is unbalanced, check the type of wiring: twin-lead or single coax.



Hum and Buzz Tips

1. It is imperative that all of your electrical equipment share the same power ground reference.
2. Unless you are interfacing to a microphone, the shield of the cable should only be connected at one end. (See Fig. 4.2.)
3. Do not pass signal ground between electrical components in a grounded source system.
4. If you wish to avoid ground loops, it doesn't matter if you lift the input or output signal ground for your system topology, just be consistent. Personally I prefer to lift the input signal ground and it has always been successful...so far!
5. NEVER use a ground lift adapter to lift the power ground on a 3-wire AC cord; this is not its intended purpose. It is better to have it SAFE than SILENT!! Look for the true source of the noise.
6. Even when interfacing to an unbalanced load, it is preferable to use two-conductor shielded cable.
7. Get rid of the lighting company!

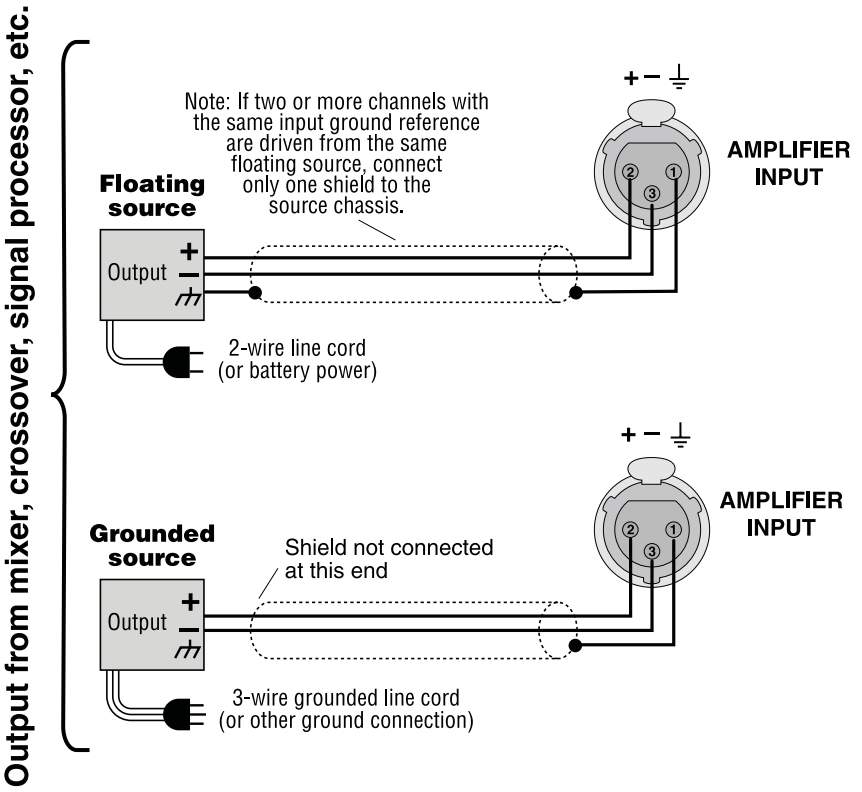


Fig. 4.3 Balanced Input Wiring

Check Figure 4.4 (following page) to see if your cable has been wired with the proper shield and ground connection. If the cabling is incorrect, you may be able to avoid the ground loop (and associated hum) by plugging all of your equipment into the same AC circuit (on the same breaker). If this is impractical, you will need to fix the cable to match the appropriate illustration. Or you may want to simply replace the offending cable with a commercially manufactured cable of the appropriate type.

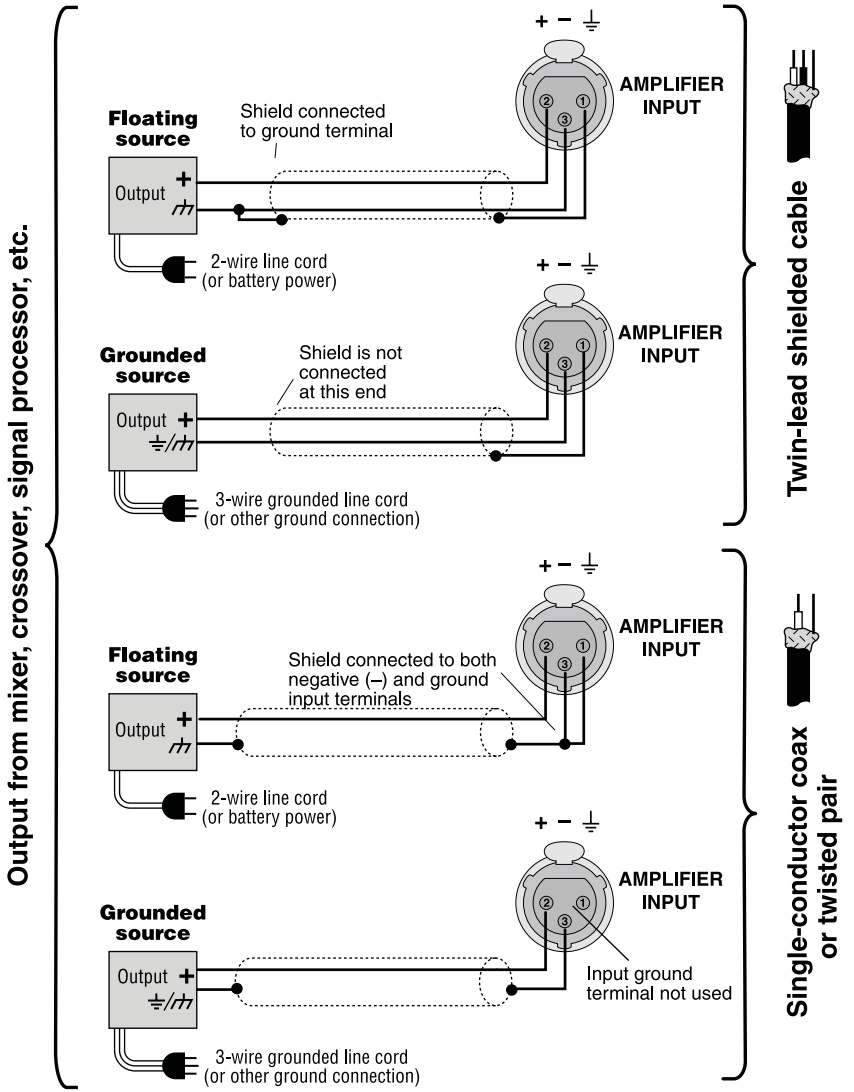


Fig. 4.4 Unbalanced Input Wiring

5 Advanced Features & Options

Crown SST Module

On the back panel of your amplifier, you will notice that the input module is removable. This module may be replaced by other SST (System Solution Topologies)—modules which will customize the equipment to better serve your needs. One such SST is an electronic crossover network designed to improve the fidelity of your system. While not all applications will require such improvements, the following should help you decide if this crossover SST is right for you.

Why Biamped?—Crown has developed a truly professional crossover that simply plugs into the input slot on the back panel of the *CE-Series* amplifiers. Extremely easy to install and set up, the crossover uses hard-wired precision components that stay at the frequencies you have selected for consistent bandwidth control.

When you use Crown's SST plug-in crossover to split the power drive to the loudspeaker components, you gain a wide range of advantages, including:

1. Increased gain because the insertion loss of passive crossover networks is eliminated.
2. Consistent power bandwidth: power bandwidth is changed in multi-way passive systems if transducers change impedance or vaporize (blow up).
3. Levels can be matched more accurately to the components.
4. Quicker troubleshooting.
5. Improved dynamic range.
6. Better protection of components due to steep 24-dB/octave filters.

Crown's advanced SST crossover plug-in module is easily exchanged with the existing module by removing the four corner screws and unplugging an edge connector. The crossover module offers the following features:

- Stereo biamp.
- 12-, 18- and 24-dB (Linkwitz-Riley) / octave filters.

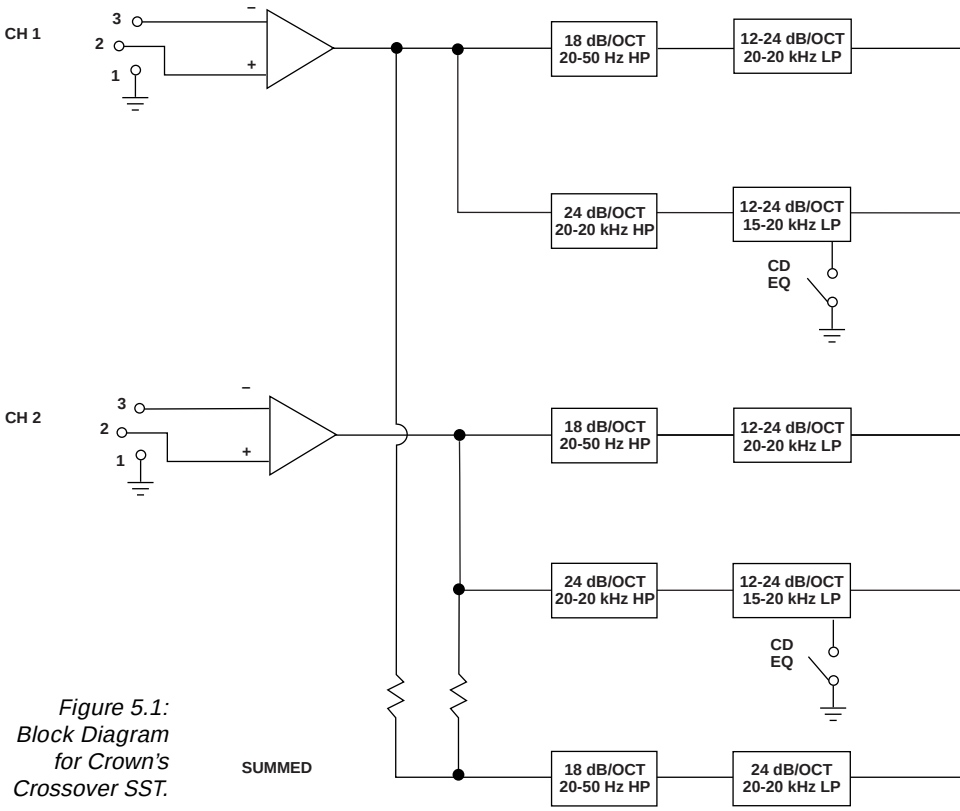
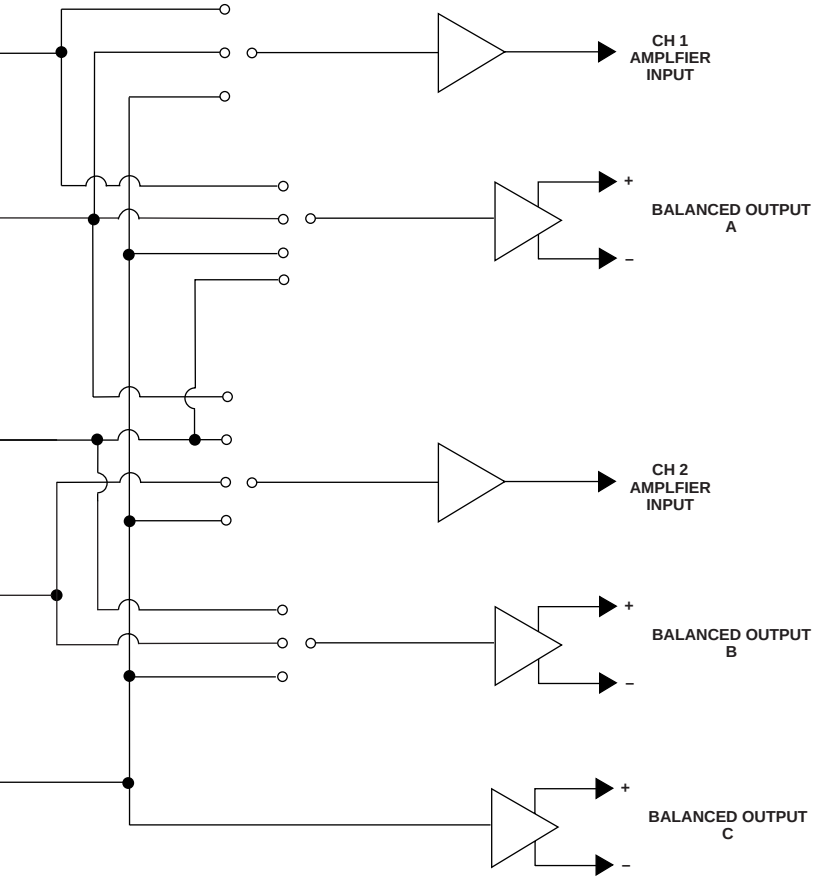


Figure 5.1: Block Diagram for Crown's Crossover SST.

- CD horn equalization.
- Mono summing of low-frequency output for driving subs.

Crown plans to release additional accessory plug-in modules offering a range of advanced features and capabilities. Watch for new releases.



Fault Monitoring

The Fault (RJ11) jack, which looks like a telephone plug, is located on the back of your CE amplifier. It gives you an easy way to remotely monitor the amplifier's fault status. To set up a circuit that will cause an LED to light whenever a fault status occurs, you can simply use the suggested circuit shown in Figure 5.2.

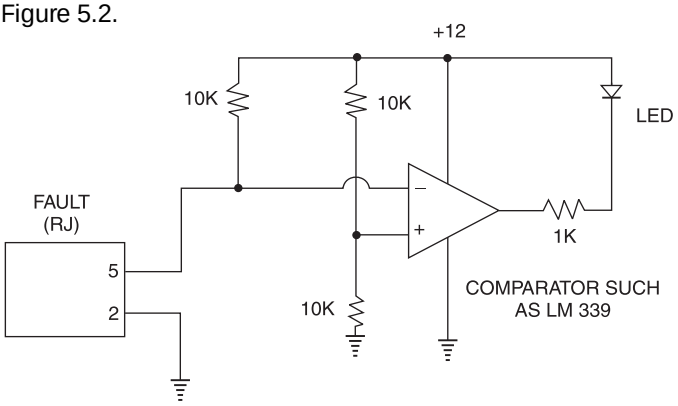


Fig. 5.2 Fault Status LED Circuitry

When using this circuit, the LED will glow whenever the amplifier is in one of four states: a channel's heatsink has reached its temperature limit, the transformer has reached its temperature limit, the amplifier has just been turned on and is in its turn-on-delay mode, or the amplifier is turned off.

If you choose to design your own circuit to interface this signal to your system, note that this RJ jack is polarity sensitive. Pin 2 must be grounded, and Pin 5 must be supplied with a positive voltage pull up (positive with respect to ground). Refer to Figure 5.3 for RJ jack pin assignments.* The maximum signal that can be exposed to the fault jack is 35 VDC and 10 mA. Best results are obtained with 10 mA LEDs.

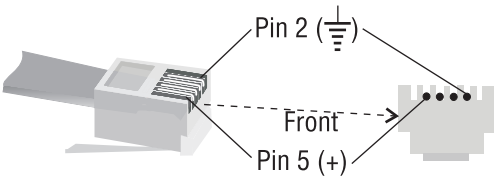


Fig. 5.3 RJ Jack Wiring and Pin Assignments

* The mating connector for the *CE-Series'* RJ11 jack contains 4 contact pins in a 6-slot case, as shown. For additional information please contact your local dealer or Crown Technical Support.

Handle Kit

Handles complement your amplifier's appearance, aid in transportation, and the placement or removal from racks. They are available from Crown's Parts Department (Part # 125489-1).

Tamper-Resistant Hole Plugs

Your *CE-Series* amplifier comes with a set of tamper-resistant hole plugs, which allow you to "protect" the level controls against unauthorized adjustment. To use, simply pull off the control knobs from the front of the amp, and slip the hole plugs into place (see Figure 5.4). The plugs should slide easily into position, without forcing. Once in place, the plugs will help to avoid most accidental or intentional tampering (some situations may require additional security measures).

To remove the hole plugs, simply pry the plug away from the amplifier case using a small, flat-blade screwdriver. To help to ensure adequate security, the plugs have been designed to be more difficult to remove than to place into position. If necessary, additional hole plugs can be purchased separately from Crown's Parts Department (Part # 103234-1).

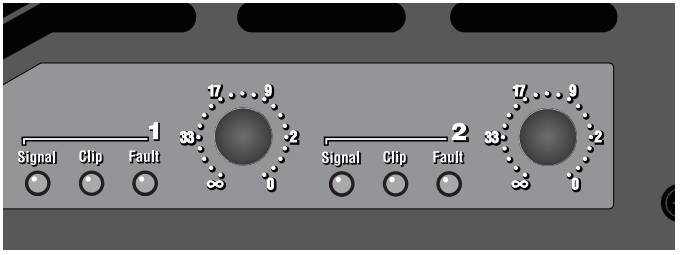


Fig. 5.4 Tamper-Resistant Hole Plugs Installed in a CE-Series Amplifier

Store your knobs in a safe location should you need to make level adjustments in the future.

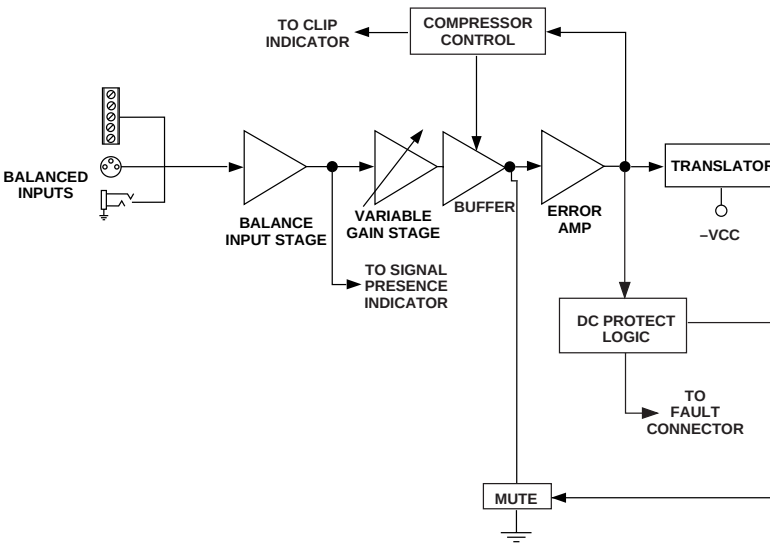
6 Principles of Operation

For the sake of simplicity, only channel one of the amplifier is described.

Signal is presented to the CE 1000 and CE 2000 through one of three connectors when using the standard input module. Each channel is outfitted with a balanced XLR / phone jack, and a barrier strip. These connectors are wired in parallel, which allows daisy chaining when needed. The signal is then converted from balanced to unbalanced in the Balanced Input Stage where it also receives RFI protection. Signal then flows into the Variable Gain Stage where the front panel level controls are allowed to affect the gain. This stage also provides the necessary scaling to change the amplifier's overall input sensitivity when the rear mounted input sensitivity switch is moved.

Following this stage, the signal is put under the control of a full-time compressor circuit comprised of a symmetrical window detector, a buffer amplifier, and the gating op amp which uses several small components to set the compressor's attack and decay characteristics. The actual compressing is accomplished by an opto-isolator which affects the gain in the signal path.

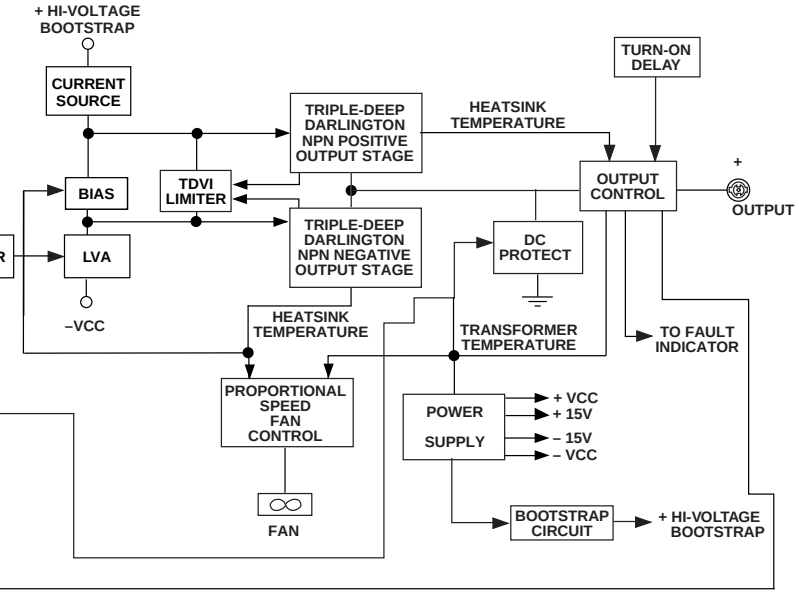
Fig. 6.1 CE Series Amplifier Block Diagram



The signal next enters the main amplifier error amp where it is mixed with a small portion of the output signal in such a way as to control the amplifier's overall output performance. ***Warning:*** Details of closed loop amplifier design are beyond the scope of this description and if discussed, would surely put most readers to sleep!

Following the error amp is the LVA stage, which is where the low-voltage referenced signal gets translated to the output high-voltage rails. The last voltage amplifier, in conjunction with a bootstrapped current source, drives both predrivers and the bias servo. The bias servo is mounted in such a way as to translate the output heatsink temperature into a controlled bias current to prevent thermal runaway and hold the amplifier's notch distortion to a minimum.

The predrivers provide enough signal to activate the drivers, which together operate in the class AB range. For the major output current requirements, the drivers feed the various numbers of paralleled output transistors which operate in a class B mode. This we call the Triple-Deep Darlington Output Stages. The output transistors are protected by the Time Dependent



Voltage & Current circuit. This circuit protects the devices from extending beyond their safe area of operation, but allows the devices to provide high bursts of peak power with music, allowing your amplifier to deliver more punch. When all is said and done, this amplifier output topology offers a good combination of low quiescent amplifier heating and great distortion performance at high powers for a reasonable complexity, reliability, and value.

All output power is delivered through 4-circuit Speakon® connectors. These connectors have been wired in such a way as to allow you the most versatility. The Channel 1 and 2 connectors are cross wired so you can cover all options, from dual cable stereo (typical), to Bridge-Mono in one connector, to running a bi-amp speaker with one amplifier and one cable per speaker cabinet!

The output relay, in conjunction with input signal mute circuit, assures the amplifier will be well-behaved during turn on and off. In the event of an amplifier output failure, a triac will fire across the offending channel and act to protect your speakers.

The turn on delay circuit functions to keep the output relay open until all the voltages are up and stable, both in the amplifier, and in all the components in the system ahead of the amplifier.

Heatsink temperature is monitored by a thermal probe attached to the heatsink. As the temperature rises, the probe sends a proportional current to the proportional speed fan circuit which starts the fan. Should the power transformer reach its maximum safe temperature, an internal thermal switch opens and the fan circuit turns on full speed to quickly cool

down the amplifier. It also disconnects the load via the output relay, removing any output current and further speeding a cool-down cycle. Extra care was taken during the design stage to set this point both to protect your investment and to to guard against nuisance tripping.

Whenever the heatsinks or the transformer reach a maximum temperature, or during the normal turn on delay window, the front panel Fault LEDs will blink to get your attention.

A modular jack is mounted on the back panel (same type as used on telephones). Pins 2 and 5 are connected to an opto-isolator which is always in a low-resistance state whenever the unit is on and happy. Should a fault be detected or should the amplifier lose AC power, the opto-isolator will change to a high resistance, allowing the user to remotely detect the status of the amplifier.

The Signal Presence Indicators tap the signal chain just before the level controls and prior to the power amplifier chain. They are ***not*** amplifier output indicators and should only be used to indicate the presence of signal to the amplifier front end.

The Clip light is driven from the output of the compressor circuitry and lights to indicate the onset of audible distortion.

The Power LED is driven from the low-voltage supply.

A positive and negative regulator form the ±15-volt power supplies. Add to that the main transformer, a full-wave bridge rectifier, and high energy electrolytics to form the main power supply. They are protected by the front-panel line circuit breaker and controlled by the front-panel power switch.

And there my friends you have it, the guts of the CE 1000/CE 2000 from Crown Audio!

7 Specifications

Note: All specifications relate to all models of CE-Series amplifiers. All measurements are at 26 dB, 8 ohms, 1 kHz at rated power unless otherwise stated.

Frequency Response: ±0.1 dB from 20 Hz to 20 kHz at 1 watt.

Phase Response: ±15° from 20 Hz to 20 kHz at 1 watt.

Signal to Noise at 8 Ohms Rated Power: >105 dB A Weighted. >100 dB from 20 Hz to 20 kHz.

Input Impedance: Nominally 20 K ohms, balanced. Nominally 10 K ohms, unbalanced.

Total Harmonic Distortion: <0.5% at 8 ohms, rated power, from 20 Hz to 20 kHz.

Intermodulation Distortion (60 Hz and 7 kHz at 4:1): <0.1% from 8 ohms rated power to –35 dB.

Damping Factor: >400 from 10 to 400 Hz.

Crosstalk: >–55 dB from 20 Hz to 20 kHz.

Common Mode Rejection (CMR): >70 dB from 20 Hz to 1 kHz.

DC Output Offset (Shorted Input): ±10 mV.

Voltage Gain,
All Models: 20:1 at maximum level position (26 dB).
CE 1000: 33.5:1 or 30.5 dB at 1.4-volt sensitivity (8 ohms).
CE 2000: 40.4:1 or 32.1 dB at 1.4-volt sensitivity (8 ohms).

Power

CE 1000

Distortion	Stereo-per-Channel			Bridged-Mono	
	8Ω	4Ω	2Ω	8Ω	4Ω
0.5%	275 W	450 W	560 W	900 W	1100 W

CE 2000

Distortion	Stereo-per-Channel			Bridged-Mono	
	8Ω	4Ω	2Ω	8Ω	4Ω
0.5%	400 W	660 W	975 W	1320 W	1950 W

Controls

Level: A detented rotary level control for each channel located on the front panel.

Power: An on/off rocker switch located on the front panel.

Input Sensitivity: A two-position switch located on the back panel near the input connectors. Can be set to 1.4 V for full output into an 8-ohm load or a fixed voltage gain of 26 dB.

Mode: Turn power off before switching. A switch located on the back panel below the input connectors which, when turned to stereo, operates the amplifier as two independent channels. When “Bridge-Mono” mode is selected, the amplifier bridges the two output channels for twice the output voltage..WATCH-OUT SPEAKERS!!

Indicators

Signal: A green LED for each channel which flashes when a very low-level signal (>–40 dBm) is present at input. May be used for troubleshooting cable runs.

Clip: A red LED for each channel which turns on when distorion becomes audible in the amplifier output.

Fault: OFF is good. This red indicator will blink under three different conditions:

1. When the amplifier is first powered up, until the unit is ready for operation.
2. If the heatsinks reach a temperature above normal working limits.
3. If the transformer thermal protection circuit is activated.
4. If amplifier output wires develop a short-circuit.
5. Should the amplifier output stage become non-operational.

This circuit may be monitored remotely by plugging into the back-panel RJ11 jack (Fault), and using a circuit like the one described in Figure 5.2. Under some conditions, the output of the amplifier will be muted.

Power: A green LED that turns on when the amplifier has been turned on and has power.

Input/Output (Spaghetti Control)

Input Connectors: One Neutrik Combo connector for each channel which features a balanced ¼-inch phone jack and a 3-pin female XLR connector, in parallel with a barrier strip termination.

Input Stage: Input is electronically balanced and employs precision 1% resistors.

Input Impedance: Nominally 20 K ohms, balanced. Nominally 10 K ohms, unbalanced.

Input Sensitivity: 1.4 volts for standard 1 kHz power, or fixed 26 dB gain.

Output Connectors: Two Neutrik Speakon® NL4MP (mates withNL4FC) output connectors.

DC Output Offset: ±10 millivolts.

Output Signal

Stereo: Unbalanced, two-channel.

Bridge-Mono: Balanced, single-channel. Channel 1 controls are active; Channel 2 should be turned down.

Wiring Configuration

OUTPUT ASSIGNMENT				
PIN	CH		PIN	CH
1+	2		1+	1
1–	2		1–	1
2+			2+	2
2–			2–	2
CH - 2			CH - 1	

Fig. 7.1 Output Pin Assignments

Protection

CE-Series amplifiers are protected against shorted, open or mismatched loads; overloaded power supplies; excessive temperature, chain destruction phenomena, input overload damage and high-frequency blowups. They also protect loudspeakers from input/output DC, large or dangerous DC offsets and turn-on/turn-off transients.

Construction

Rugged steel chassis is formed into a durable package any stagehand could love. Coated with environmentally friendly powder for long life and ease of maintenance.

Cooling: Proportional speed fan.

Dimensions: Standard 19-inch (48.3-cm) rack mount width (EIA RS-310-B), 5¼-inch (13.34-cm) height and 12¼-inch (31.11-cm) depth behind front mounting surface.

Weight: The CE 1000 weighs 32.6 pounds (14.79 kg). The CE 2000 weighs 40.3 pounds (18.28 kg). For shipping weight, add 6 lbs (2.7 kg) to each amp.

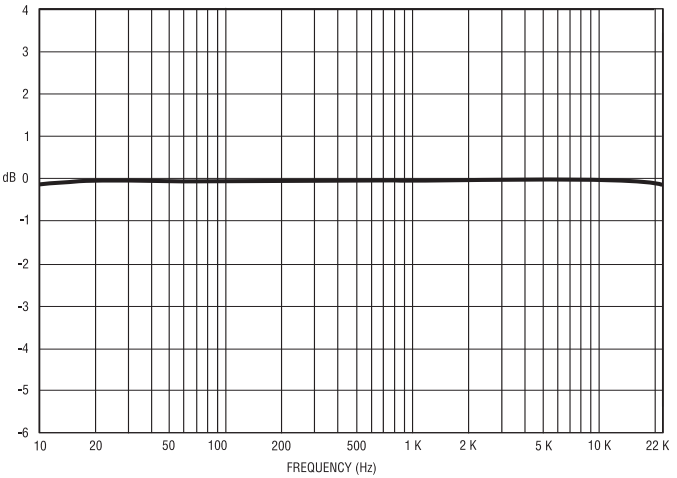


Fig. 7.2 Awesome Frequency (Amplitude) Response

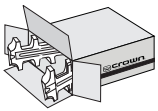
8 Service

Your amplifier should only be serviced by a fully trained technician at an authorized service center.

CAUTION: To prevent electric shock, do not remove covers. No user serviceable parts inside. Refer servicing to a qualified technician.

Worldwide Service

Service may be obtained from an authorized service center. (Contact your local Crown/Amcron representative or our office for a list of authorized service centers.) To obtain service, simply present the bill of sale as proof of purchase along with the defective unit to an authorized service center. They will handle the necessary paperwork and repair.



Always use the original factory packing to transport the unit.

Remember to transport your unit in the original factory packing!

North American Service

Service may be obtained in one of two ways: from an authorized service center or from the factory. You may choose either. It is important that you have your copy of the bill of sale as your proof of purchase.

Service at a North American Service Center

This method usually saves the most time and effort. Simply present your bill of sale along with the defective unit to an authorized service center to obtain service. They will handle the necessary paperwork and repair. Remember to transport the unit in the original factory packing. A list of authorized service centers in your area can be obtained from our Technical Support Group.

Factory Service

To obtain factory service, fill out the **service information page** found in the back of this manual and send it along with your proof of purchase and the defective unit to the Crown factory. For warranty service, we will pay for ground shipping both ways in the United States after receiving copies of the shipping receipts. Shipments should be sent “UPS ground.” (If the

unit is under warranty, you may send it C.O.D. for the cost of freight via UPS ground.) The factory will return it via UPS ground. Please contact us if other arrangements are required.

Factory Service Shipping Instructions:

1 When sending a Crown product to the factory for service, be sure to fill out the service information form found in the back of this manual and enclose it inside your unit's shipping pack. Do not send the service information form separately.

2 To ensure the safe transportation of your unit to the factory, ship it in an original factory packing container. If you don't have one, call or write Crown's Parts Department. **Do not use loose, small size packing materials.**

3 Do not ship the unit in any kind of cabinet or rack (wood or metal). Ignoring this warning may result in extensive damage to the unit and the cabinet. Accessories are not needed—do not send cables and other hardware. Do not send this instruction manual, if we forget what we said, we have duplicates!

If you have any questions, please call or write the Crown Technical Support Group.

Crown Audio Division
Technical Support / Factory Service
Plant 2 SW, 1718 W. Mishawaka Rd., Elkhart, Indiana 46517 U.S.A.

Telephone:	219-294-8200 800-342-6939 (North America, Puerto Rico, and Virgin Islands only)
Facsimile:	219-294-8301 (Technical Support) 219-294-8124 (Factory Service)
Fax Back:	219-293-9200 (North America only) 800-294-4094 (North America only) 219-294-8100 (International)
Internet:	http://www.crownaudio.com

NORTH AMERICA

THREE YEAR
FULL WARRANTY

SUMMARY OF WARRANTY

The Crown Audio Division of Crown International, Inc., 1718 West Mishawaka Road, Elkhart, Indiana 46517-4095 U.S.A. warrants to you, the ORIGINAL PURCHASER and ANY SUBSEQUENT OWNER of each NEW Crown product, for a period of three (3) years from the date of purchase by the original purchaser (the "warranty period") that the new Crown product is free of defects in materials and workmanship. We further warrant the new Crown product regardless of the reason for failure, except as excluded in this Warranty.

ITEMS EXCLUDED FROM THIS CROWN WARRANTY

This Crown Warranty is in effect only for failure of a new Crown product which occurred within the Warranty Period. It does not cover any product which has been damaged because of any intentional misuse, accident, negligence, or loss which is covered under any of your insurance contracts. This Crown Warranty also does not extend to the new Crown product if the serial number has been defaced, altered, or removed.

WHAT THE WARRANTOR WILL DO

We will remedy any defect, regardless of the reason for failure (except as excluded), by repair, replacement, or refund. We may not elect refund unless you agree, or unless we are unable to provide replacement, and repair is not practical or cannot be timely made. If a refund is elected, then you must make the defective or malfunctioning product available to us free and clear of all liens or other encumbrances. The refund will be equal to the actual purchase price, not including interest, insurance, closing costs, and other finance charges less a reasonable depreciation on the product from the date of original purchase. Warranty work can only be performed at our authorized service centers or at the factory. We will remedy the defect and ship the product from the service center or our factory within a reasonable time after receipt of the defective product at our authorized service center or our factory. All expenses in remedying the defect, including surface shipping costs in the United States, will be borne by us. (You must bear the expense of shipping the product between any foreign country and the port of entry in the United States and all taxes, duties, and other customs fees for such foreign shipments.)

HOW TO OBTAIN WARRANTY SERVICE

You must notify us of your need for warranty service not later than ninety (90) days after expiration of the warranty period. All components must be shipped in a factory pack, which, if needed, may be obtained from us free of charge. Corrective action will be taken within a reasonable time of the date of receipt of the defective product by us or our authorized service center. If the repairs made by us or our authorized service center are not satisfactory, notify us or our authorized service center immediately.

DISCLAIMER OF CONSEQUENTIAL & INCIDENTAL DAMAGES

YOU ARE NOT ENTITLED TO RECOVER FROM US ANY INCIDENTAL DAMAGES RESULTING FROM ANY DEFECT IN THE NEW CROWN PRODUCT. THIS INCLUDES ANY DAMAGE TO ANOTHER PRODUCT OR PRODUCTS RESULTING FROM SUCH A DEFECT. **SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.**

WARRANTY ALTERATIONS

No person has the authority to enlarge, amend, or modify this Crown Warranty. This Crown Warranty is not extended by the length of time which you are deprived of the use of the new Crown product. Repairs and replacement parts provided under the terms of this Crown Warranty shall carry only the unexpired portion of this Crown Warranty.

DESIGN CHANGES

We reserve the right to change the design of any product from time to time without notice and with no obligation to make corresponding changes in products previously manufactured.

LEGAL REMEDIES OF PURCHASER

THIS CROWN WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE. No action to enforce this Crown Warranty shall be commenced later than ninety (90) days after expiration of the warranty period.

THIS STATEMENT OF WARRANTY SUPERSEDES ANY OTHERS CONTAINED IN THIS MANUAL FOR CROWN PRODUCTS.

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Telephone: 219-294-8200. Facsimile: 219-294-8301

WORLDWIDE

THREE YEAR
FULL WARRANTY

SUMMARY OF WARRANTY

The Crown Audio Division of Crown International, Inc., 1718 West Mishawaka Road, Elkhart, Indiana 46517-4095 U.S.A. warrants to you, the ORIGINAL PURCHASER and ANY SUBSEQUENT OWNER of each NEW Crown[1] product, for a period of three (3) years from the date of purchase by the original purchaser (the "warranty period") that the new Crown product is free of defects in materials and workmanship, and we further warrant the new Crown product regardless of the reason for failure, except as excluded in this Crown Warranty.

[1] *Note: If your unit bears the name "Amcron," please substitute it for the name "Crown" in this warranty.*

ITEMS EXCLUDED FROM THIS CROWN WARRANTY

This Crown Warranty is in effect only for failure of a new Crown product which occurred within the Warranty Period. It does not cover any product which has been damaged because of any intentional misuse, accident, negligence, or loss which is covered under any of your insurance contracts. This Crown Warranty also does not extend to the new Crown product if the serial number has been defaced, altered, or removed.

WHAT THE WARRANTOR WILL DO

We will remedy any defect, regardless of the reason for failure (except as excluded), by repair, replacement, or refund. We may not elect refund unless you agree, or unless we are unable to provide replacement, and repair is not practical or cannot be timely made. If a refund is elected, then you must make the defective or malfunctioning product available to us free and clear of all liens or other encumbrances. The refund will be equal to the actual purchase price, not including interest, insurance, closing costs, and other finance charges less a reasonable depreciation on the product from the date of original purchase. Warranty work can only be performed at our authorized service centers. We will remedy the defect and ship the product from the service center within a reasonable time after receipt of the defective product at our authorized service center.

HOW TO OBTAIN WARRANTY SERVICE

You must notify us of your need for warranty service not later than ninety (90) days after expiration of the warranty period. All components must be shipped in a factory pack. Corrective action will be taken within a reasonable time of the date of receipt of the defective product by our authorized service center. If the repairs made by our authorized service center are not satisfactory, notify our authorized service center immediately.

DISCLAIMER OF CONSEQUENTIAL & INCIDENTAL DAMAGES

YOU ARE NOT ENTITLED TO RECOVER FROM US ANY INCIDENTAL DAMAGES RESULTING FROM ANY DEFECT IN THE NEW CROWN PRODUCT. THIS INCLUDES ANY DAMAGE TO ANOTHER PRODUCT OR PRODUCTS RESULTING FROM SUCH A DEFECT.

WARRANTY ALTERATIONS

No person has the authority to enlarge, amend, or modify this Crown Warranty. This Crown Warranty is not extended by the length of time which you are deprived of the use of the new Crown product. Repairs and replacement parts provided under the terms of this Crown Warranty shall carry only the unexpired portion of this Crown Warranty.

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We reserve the right to change the design of any product from time to time without notice and with no obligation to make corresponding changes in products previously manufactured.

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THIS STATEMENT OF WARRANTY SUPERSEDES ANY OTHERS CONTAINED IN THIS MANUAL FOR CROWN PRODUCTS.

9/90

Telephone: 219-294-8200. Facsimile: 219-294-8301

Crown Factory Service Information

Shipping Address: Crown International, Inc., Factory Service,
Plant 2 SW, 1718 W. Mishawaka Rd., Elkhart, IN U.S.A. 46517
Phone: 1-800-342-6939 or 1-219-294-8200 Fax: 1-219-294-8124

Owner's Name: _____

Shipping Address: _____

Phone Number: _____ **Fax Number:** _____

Model: _____ **Serial Number:** _____

Purchase Date: _____

NATURE OF PROBLEM

(Be sure to describe the conditions that existed when the problem occurred and what attempts were made to correct it.)

_____

_____

_____

_____

_____

Other equipment in your system: _____

_____

_____

_____

_____

If warranty has expired, payment will be:

❑ **Cash/Check** ❑ **VISA** ❑ **MasterCard** ❑ **C.O.D.**

Card Number:_____

Exp. Date: _____ **Signature:**_____

ENCLOSE THIS PORTION WITH THE UNIT.
DO NOT MAIL SEPARATELY.