

# CMXa Series



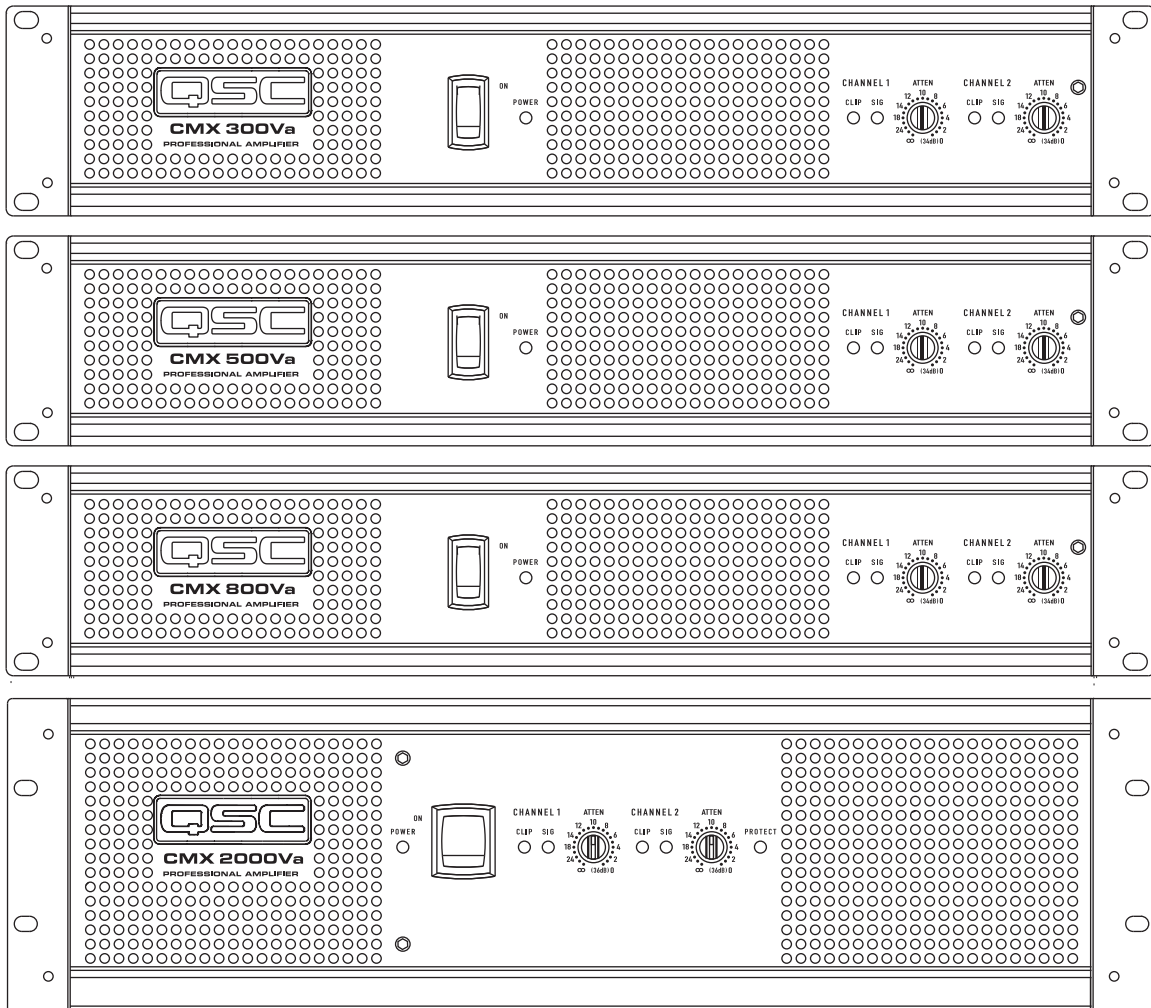
## User Manual

CMX 300Va

CMX 500Va

CMX 800Va

CMX 2000Va



TD-000409-00-A



## EXPLANATION OF SYMBOLS

The term "**WARNING!**" indicates instructions regarding personal safety. If the instructions are not followed the result may be bodily injury or death.

The term "**CAUTION!**" indicates instructions regarding possible damage to physical equipment. If these instructions are not followed, it may result in damage to the equipment that may not be covered under the warranty.

The term "**IMPORTANT!**" indicates instructions or information that are vital to the successful completion of the procedure.

The term "**NOTE**" is used to indicate additional useful information.



The intent of the lightning flash with arrowhead symbol in a triangle is to alert the user to the presence of un-insulated "dangerous" voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to humans.



The intent of the exclamation point within an equilateral triangle is to alert the user to the presence of important safety, and operating and maintenance instructions in this manual.



### IMPORTANT SAFETY INSTRUCTIONS



**WARNING!:** TO PREVENT FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

- Read these instructions
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with a dry cloth.
- Do not block any ventilation opening. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- The appliance coupler, or the AC Mains plug, is the AC mains disconnect device and shall remain readily operable after installation. On units equipped with powerCon® connectors, the AC Mains disconnect device is the AC Mains plug only; do not use the appliance coupler.
- Adhere to all applicable, local codes.
- Consult a licensed, professional engineer when any doubt or questions arise regarding a physical equipment installation.

## RoHS Statement

The CMX 300Va, CMX 500Va, CMX 800Va and CMX 2000Va amplifiers are in compliance with European Directive 2002/95/EC – Restriction of Hazardous Substances (RoHS).

The CMX 300Va, CMX 500Va, CMX 800Va and CMX 2000Va amplifiers are in compliance with “China RoHS” directives. The following chart is provided for product use in China and its territories:

|                               |   | CMXa      |           |                 |               |                 |
|-------------------------------|---|-----------|-----------|-----------------|---------------|-----------------|
| 部件名称<br>(Part Name)           | 有毒有害物质或元素<br>(Toxic or hazardous Substances and Elements) |           |           |                 |               |                 |
|                               | 铅<br>(Pb)   | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(Cr(vi)) | 多溴联苯<br>(PBB) | 多溴二苯醚<br>(PBDE) |
| 电路板组件<br>(PCB Assemblies)     | X   | O         | X         | O               | O             | O               |
| 机壳装配件<br>(Chassis Assemblies) | X   | O         | X         | O               | O             | O               |

O: 表明这些有毒或有害物质在部件使用的同类材料中的含量是在 SJ/T11363\_2006极限的要求之下。  
 O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X: 表明这些有毒或有害物质在部件使用的同类材料中至少有一种而含量是在SJ/T11363\_2006极限的要求之上。  
 X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.

## FCC Statement



**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

# Warranty (USA only; other countries, see your dealer or distributor)

## QSC Audio Products 3 Year Limited Warranty

QSC Audio Products, LLC ("QSC") guarantees its products to be free from defective material and/or workmanship and will replace defective parts and repair malfunctioning products under this warranty when the defect occurs under normal installation and use, provided the unit is returned to our factory, one of our authorized service stations or an authorized QSC International Distributor via pre-paid transportation with a copy of proof of purchase (i.e., sales receipt). This warranty provides that the examination of the return product must indicate, in our judgment, a manufacturing defect. This warranty does not extend to any product which has been subjected to misuse, neglect, accident, improper installation, or where the date code has been removed or defaced. QSC shall not be liable for incidental and/or consequential damages. This warranty gives you specific legal rights. This limited warranty is freely transferable during the term of the warranty period. The warranty on QSC products is NOT VALID if the products have been purchased from an unauthorized dealer/online e-tailer, or if the original factory serial number has been removed, defaced, or replaced in any way. Damage to, or loss of any software or data residing on the product is not covered. When providing repair or replacement service, QSC will use reasonable efforts to reinstall the product's original software configuration and subsequent update releases, but will not provide any recovery or transfer of software or data contained on the serviced unit not originally included in the product.

Customers may have additional rights, which vary from state to state or from country to country. In the event that a provision of this limited warranty is void, prohibited or superseded by local laws, the remaining provisions shall remain in effect.

**The QSC limited warranty is valid for a period of three (3) years from date of purchase in the United States and many (but not all) other countries.**

For QSC warranty information in countries other than the United States, contact your authorized QSC international distributor. A list of QSC International distributors is available at [www.qsc.com](http://www.qsc.com).

To register your QSC product online, go to [www.qsc.com](http://www.qsc.com) and select "Product Registration". Other questions regarding this warranty can be answered by calling, e-mailing or contacting your authorized QSC distributor.

**Phone:** 1-800-854-4079 within US and Canada, +1-714-754-6175 international, **Email:** [warranty@qsc.com](mailto:warranty@qsc.com), **Website:** [www.qsc.com](http://www.qsc.com).

# Introduction

These rugged, fan-cooled, 2-channel, 2RU/3RU amplifiers provide high-value performance and power in a strong, compact chassis. The series comprises four models: the CMX 300Va, CMX 500Va, CMX 800Va and CMX 2000Va.

|   | CMX 300Va | CMX 500Va | CMX 800Va | CMX 2000Va |
|---|-----------|-----------|-----------|------------|
| Stereo Mode (both channels driven)        |           |           |           |            |
| 8Ω / FTC 20 Hz - 20 kHz / 0.1% THD        | 185 W     | 260 W     | 450 W     | 1050 W     |
| 8Ω / EIA 1 KHZ / 0.1% THD                 | 200 W     | 300 W     | 500 W     | 1100 W     |
| 4Ω / FTC 20 Hz - 20 KHZ / 0.1% THD        | 280W      | 400 W     | 650 W     | 1600 W     |
| 4Ω / EIA 1 KHZ / 0.5% THD                 | 300 W     | 500 W     | 800 W     |            |
| 4Ω / EIA 1 KHZ / 1% THD                   |           |           |           | 2000 W     |
| 2Ω / EIA 1 KHZ / 1% THD                   | 430 W     | 700 W     | 1200 W    | 2500 W     |
| 70 V - Direct drive / EIA 1 kHz / 1% THD  | -         | -         | 400 W     | 2500 W     |
| 100 V - Direct drive / EIA 1 kHz / 1% THD |           |           |           | 1000 W     |
| Bridge Mono Mode                          |           |           |           |            |
| 8Ω / FTC 20 Hz - 20 kHz / 0.1%THD         | 530 W     | 800 W     | 1300 W    | 3200 W     |
| 8Ω / EIA 1 kHz / 0.1%THD                  | 600 W     | 900 W     | 1500 W    | 3600 W     |
| 4Ω / EIA 1 kHz / 1%THD                    | 830 W     | 1400 W    | 2400 W    | 5000 W     |
| 70 V - Direct drive / EIA 1 kHz / 1% THD  | 600 W     | 1200 W    | 2000 W    |            |
| 100 V - Direct drive / EIA 1 kHz / 1% THD | -         | 600 W     | 2300 W    | 3600 W     |
| 140 V - Direct drive / EIA 1 kHz / 1% THD |           |           |           | 5000 W     |

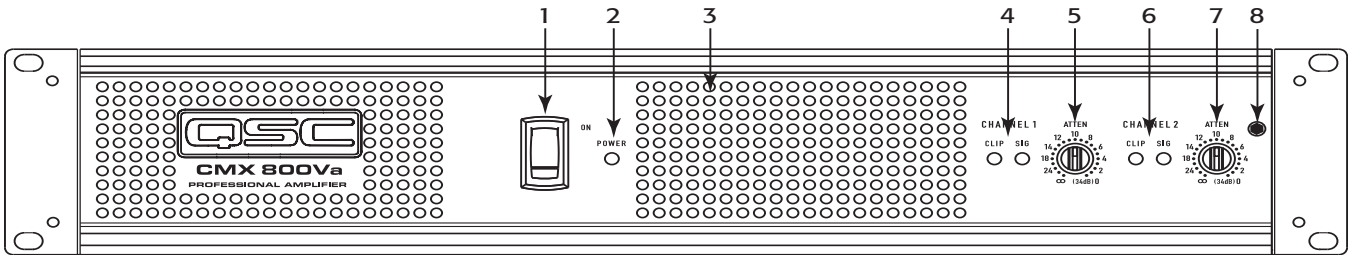
– Table 1 –

## Features

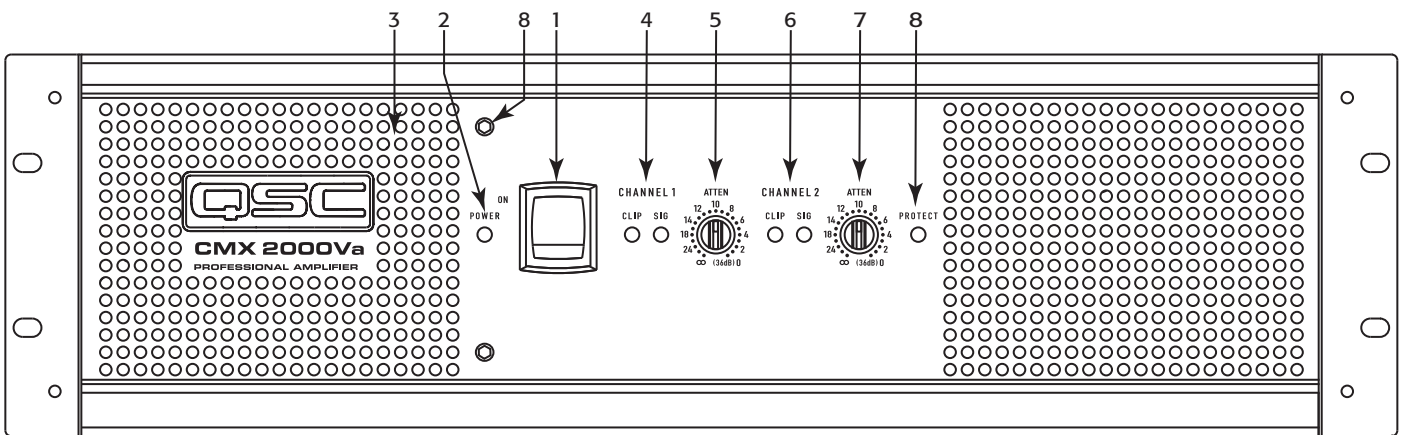
- Independent, user-defeatable clip limiters
- Fully selectable low-frequency filtering; choice of 30 or 50 Hz roll-off
- Stereo (dual-channel), parallel-input, or Bridge Mono operating modes
- Balanced inputs – XLR, ¼" (6.3 mm) TRS, and barrier strip
- Pluggable terminal block and NL4 outputs
- 21 detent gain knobs
- Front panel LED indicators for signal and clip and power
- Attenuation control security plate

## Front Panel

1. Power switch
2. Power indicator LED
3. Cooling vents
4. Clip and Signal indicator LEDs, (Channel 1)
5. Attenuation controls (Channel 1)
6. Clip and Signal indicator LEDs, (Channel 2)
7. Attenuation control (Channel 2)
8. Lockout plate retention screw



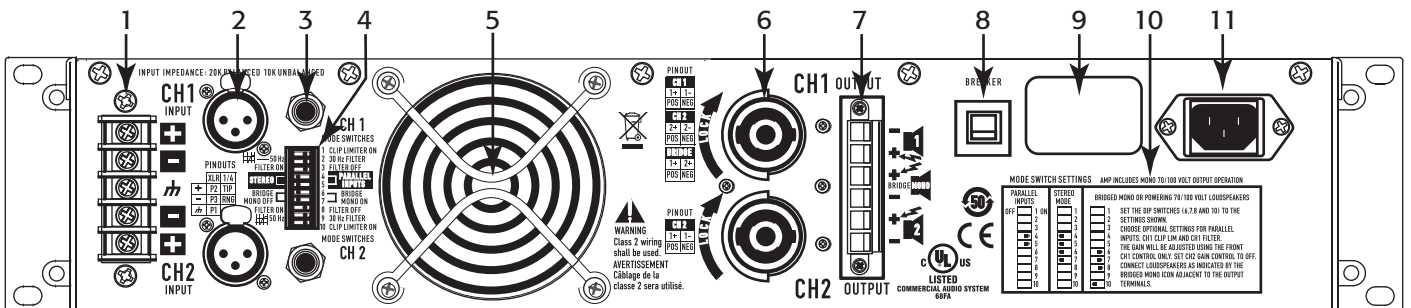
– Figure 1 –



– Figure 2 –

## Back Panel

1. Barrier strip input
2. XLR inputs, Channels 1 and 2
3. TRS inputs, Channels 1 & 2
4. Configuration dip switches
5. Fan
6. NL4 output, Channel 1 and 2
7. Terminal block connector outputs, Channels 1 and 2
8. Circuit Breaker
9. Serial number label
10. Configuration switch chart
11. IEC power inlet (power cord connector)

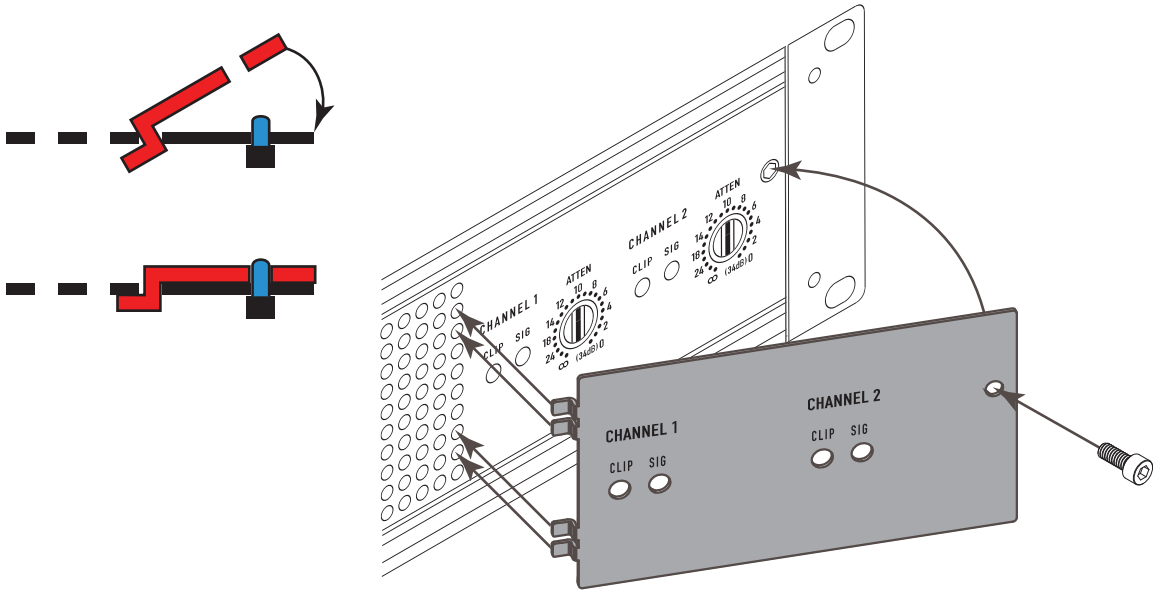


– Figure 3 –

# Features and Setup

## Attenuation Control Security Plate

The Attenuation control security plate (– Figure 4) provides protection against accidentally adjusting the Attenuation controls on the amplifier face. Attach the plate, after making final adjustments to the Attenuation controls, by sliding the tabs into the installation slots. Secure in place with the attachment screw.



– Figure 4 –

## Setting the Mode Switches

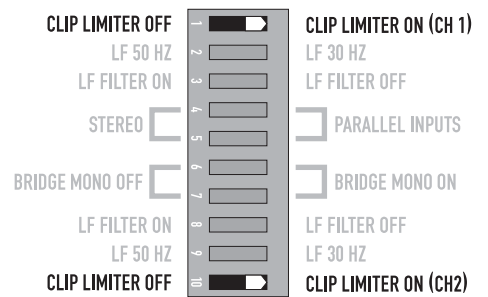
The CMXa has mode switches for STEREO, PARALLEL INPUTS, or BRIDGE MONO modes. Each channel has independent clip limiting and low frequency filtering.

## Clip Limiter

### What it is

When the audio signal drives the amplifier's output circuit beyond its power capability, it clips, flattening the peaks of the waveform. The clip limiter detects this and reduces the gain to minimize the amount of overdrive. To preserve as much of the program dynamics as possible, limiting reduces the average program level until peaks barely clip.

Each channel has its own clip limiter, and you can switch it on or off independently, as shown in – Figure 5.



– Figure 5 –

### When to use it (or not)

When driving full-range speakers, clip limiting reduces high-frequency distortion caused by bass overloads. It also protects higher frequency drivers from excess overdrive and harsh clipping harmonics.

When driving subwoofers, some users let the amplifier clip without limiting because it gives extra “punch” to kick drums and similar sounds.



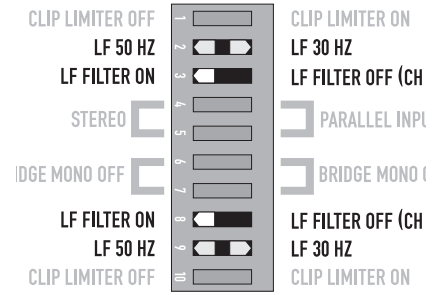
**CAUTION:** In bi-amp systems, excessive limiting will affect the frequency balance.

# Input Low-Frequency Filter

## What it is

The low-frequency (LF) filter rolls off signals below either 30 Hz or 50 Hz (– Figure 8 and – Figure 9). This improves bass performance by limiting sub-audio cone motion, making more power available for the speakers' rated frequency range.

The filter settings for each channel are controlled individually through the DIP switch settings shown in – Figure 6. When the filter is turned off (– Figure 7), a 5 Hz roll off protects against DC or deep sub-audio inputs.

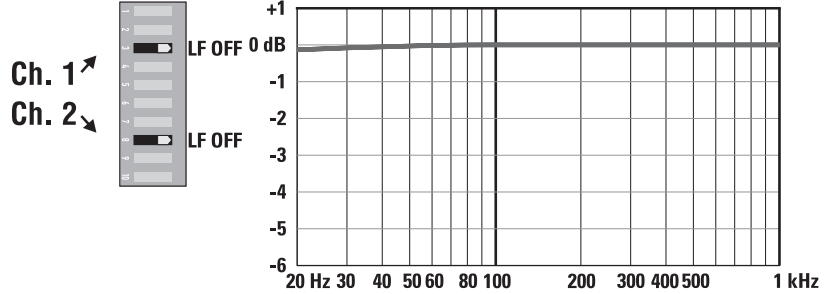


– Figure 6 –

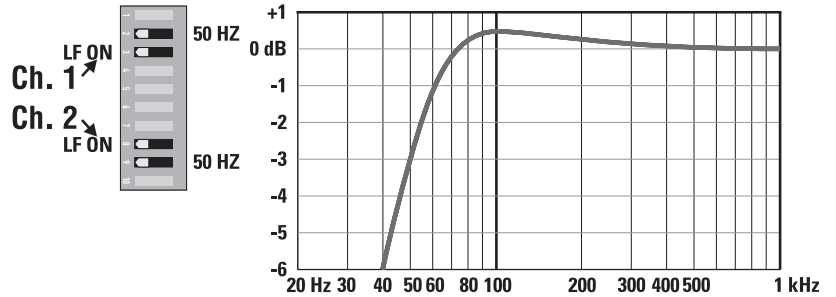
## When to use it (or not)

As a rule, your speakers will sound better with proper filtering. Unless you already have filtering in a preceding device, match the setting to the low frequency rating of your speakers. Vented (bass reflex, ported, etc.) speakers are especially sensitive to cone over-excision at frequencies below their rated limit.

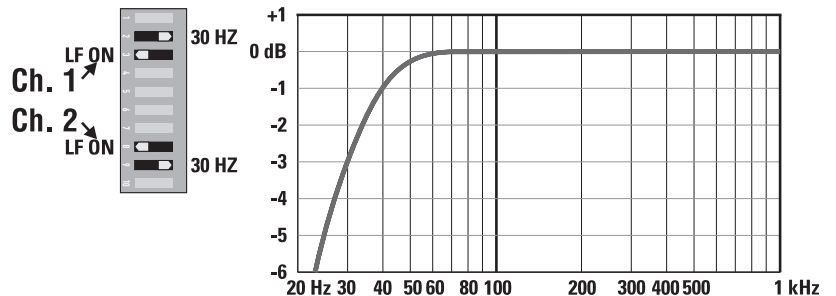
The 50 Hz filter works well with most compact full-range speakers, and has a slight boost at 100 Hz for greater fullness. The 30 Hz filter is intended for subwoofers and large full-range cabinets. The “off” position should be used only for applications such as studio playback monitoring, where you need to know if there are unwanted sub-audio signals present in your mix.



– Figure 7 –



– Figure 8 –



– Figure 9 –



## Parallel Input Mode

### What it is

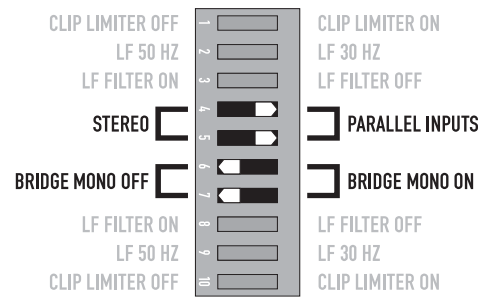
The Parallel Input switches let you operate the amplifier in Parallel mode, delivering the same signal to both channels without using a Y cable. Each channel drives its own speaker load, with independent gain, filtering, and clip limiting.

Set switch positions 4 and 5 to "PARALLEL INPUTS" to couple the inputs together (– Figure 10). Turn the switches to "STEREO" for stereo, bi-amping, or other 2-channel modes.

With the inputs in parallel, you can use the other set of input connectors to carry the signal to other amps (– Figure 11). This is often called a “daisy-chain.”

### When to use it

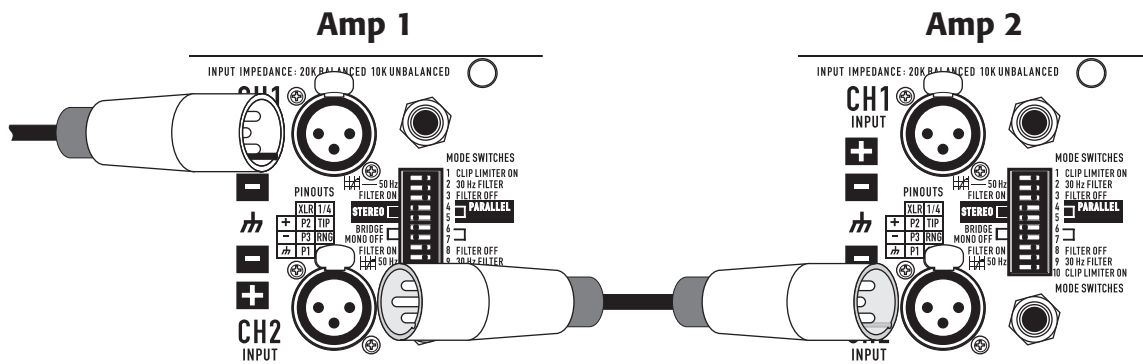
Use the Parallel mode when driving two speakers with one input signal (Parallel mode) while keeping separate control of both channels' gain, filtering, and limiting. Use Parallel mode and Bridge Mono mode to patch the signal to additional amplifiers through the extra input jacks.



– Figure 10 –



**NOTE:** If you're using a balanced signal, use only balanced patch cables; even one unbalanced cable will unbalance the entire signal chain, possibly causing hum.



– Figure 11 –



**NOTE:** Turn off the “Parallel Inputs” switches when feeding the amp two separate signals.

## Bridge Mono Mode

### What it is

Bridge Mono mode combines the power of both amp channels into one speaker, resulting in twice the voltage swing, four times the peak power, and approximately three times the sustained power of a single channel. This mode uses Channel 1's input, attenuation control, input filter, and clip limiter; Channel 2's dip switch settings should be in the OFF position, the attenuation control should be at maximum attenuation (– Figure 12 and – Figure 13).

### When to use it (or not)

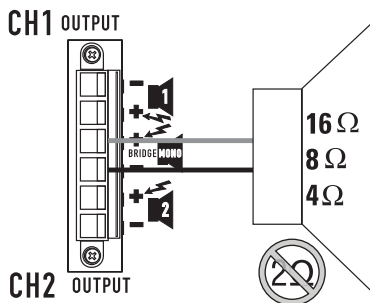
Use Bridge Mono mode to deliver the power of both channels to a single 8 or 4Ω load. Set switch positions 6 and 7 to BRIDGE MONO ON (– Figure 12). Use Channel 1's inputs, and connect the loudspeaker as shown in – Figure 14 or – Figure 15).

### Bridge Mono Precautions

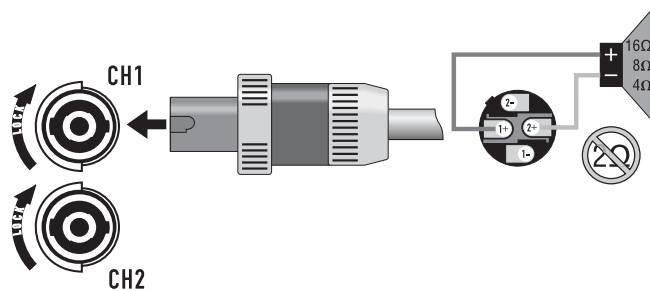
This mode puts a high demand on the amplifier and speaker, Excessive clipping may cause protective muting or speaker damage. Be sure the speaker has a sufficient power rating.



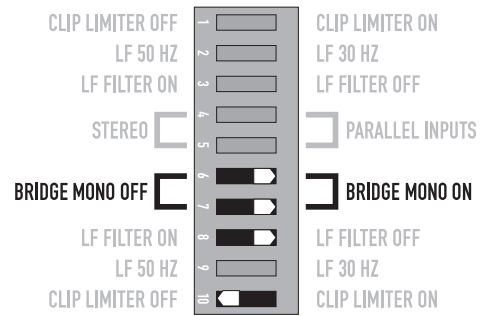
**WARNING!** Output voltages greater than 100 volts RMS are available between the bridged terminals of the CMXa. CLASS 3 wiring methods (NEC 1999), as specified in accordance with national and local codes, must be used to connect the speaker.



– Figure 14 –

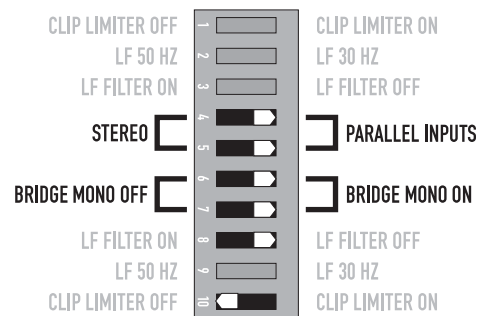


– Figure 15 –



Channel 2 settings, switches 8, and 10 are set to off.

– Figure 12 –



To patch the signal to additional amplifiers, use the parallel input switches described under Parallel Input Mode.

– Figure 13 –

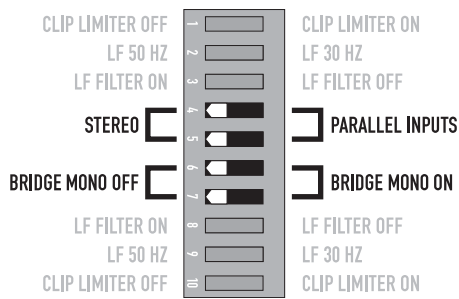
# The Difference Between Modes

## Stereo Mode

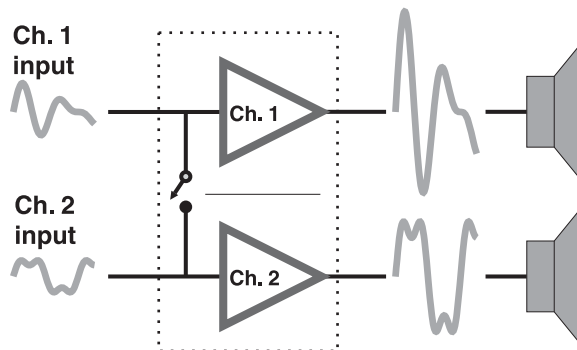
Stereo mode is the typical way of using the amplifier. Each channel is fully independent. Separate signals connect at the inputs, the attenuation knobs control their respective channels, and separate speakers connect to each output. The dip switches are set as shown in – Figure 16, a schematic illustration in – Figure 17.

Examples:

- Two-channel (stereo) playback.
- Two independent mono signals, such as main and monitor mixes.
- Bi-amped operation, with the low frequencies in Channel 1 and the highs in Channel 2.



– Figure 16 –



– Figure 17 –

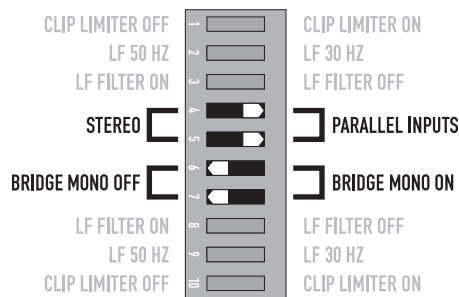
## Parallel Input Mode

This mode is similar to the Stereo mode, except that the inputs for Channel 1 and Channel 2 are internally connected together. A signal into Channel 1 jack drives both channels directly (– Figure 18). Use Channel 1 Input, do not connect different sources to both channels. Each channel's attenuation control still functions as usual, and each channel feeds its own speaker load. The dip switches are set as shown in – Figure 19.

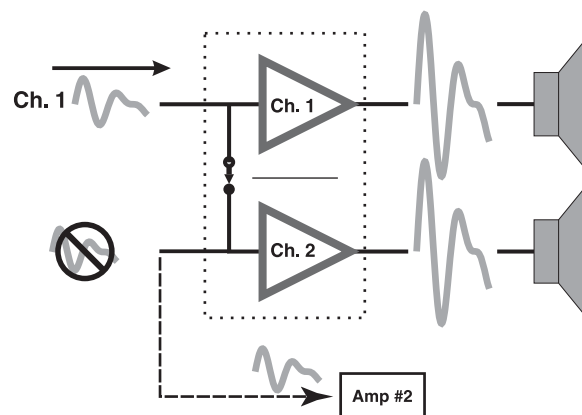
In Parallel mode, you can patch the input signal on to additional amplifiers by using any of the remaining input jacks. See Ch. 2 in – Figure 18.

Example:

One mono signal driving both channels, with independent attenuation control for each speaker system.



– Figure 18 –



Can be used to Daisy-chain additional amplifiers

– Figure 19 –

## Bridge Mono Mode

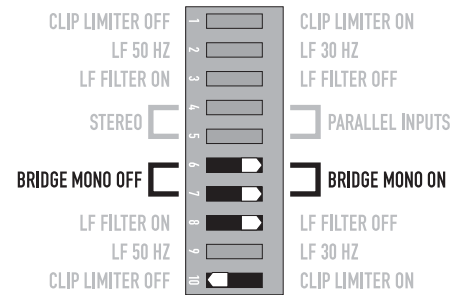
This mode combines the full power capabilities of both channels into a single speaker system. The amplifier internally re-configures so that both channels operate as a unit. This delivers double the output voltage, resulting in four times the peak power and three times the sustained power into a single 8 or 4Ω speaker load. The Bridge Mono mode section on page 10 describes the special loudspeaker connection used.

Examples:

- Driving a single 8Ω speaker with the combined 4Ω power of both channels.
- Driving a single 4Ω speaker with the combined 2Ω power of both channels.

Precautions:

- Bridge Mono mode makes it possible to drive thousands of watts into a single speaker. AC current consumption will usually be higher. Avoid excessive signal level, and make sure the wiring and speaker can handle the power.
- If the load is 4Ω or less and prolonged overloads occur, the amplifier will probably mute for several seconds during peaks, and the circuit breaker may trip.
- Do not use 2Ω loads.
- Ensure Channel 2 dip switches are set to off (– Figure 20), and Channel 2 attenuation control is set to maximum attenuation.



Set Channel 2 dip switches, 8 and 10, to off.

– Figure 20 –



**NOTE:** See the additional Bridge Mono precautions on page 10.

## Distributed Constant Voltage Outputs

Please refer to the above section on Bridge Mono mode for proper setup configuration.

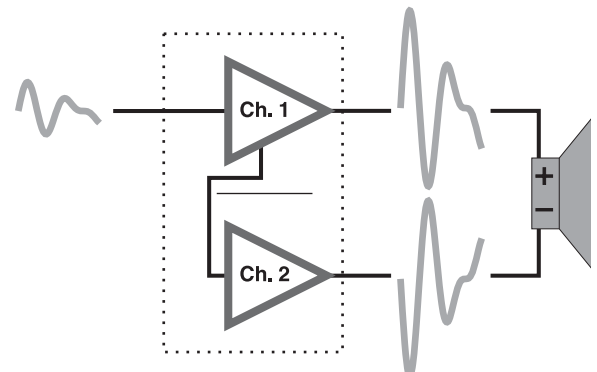
### 70/100 Volt Operation:

- The CMX 300Va and 500Va must be configured for Bridge Mono mode for 70 Volt operation.
- The CMX 800Va and CMX 2000Va can operate in 70 Volt operation in Stereo mode or Bridge Mono mode.
- The CMX 500Va and CMX 800Va must be configured for Bridge Mono mode for 100 Volt operation. Please refer to the Bridge Mono mode section for proper setup configuration.

The CMX 2000Va can operate in 70 Volt or 100 Volt operation in STEREO mode or BRIDGE MONO mode..

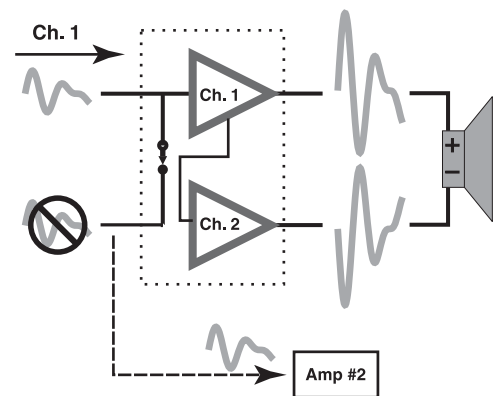
|                                    | CMX 300Va | CMX 500Va | CMX 800Va | CMX 2000Va |
|------------------------------------|-----------|-----------|-----------|------------|
| Stereo Mode (Both Channels Driven) |           |           |           |            |
| 70 Volt                            | -         | -         | 400 W     | 2500 W     |
| 100 Volt                           | -         | -         | -         | 1000 W     |
| Bridge Mono Mode                   |           |           |           |            |
| 70 Volt                            | 600 W     | 1200 W    | 2000 W    | 5000 W     |
| 100 Volt                           | -         | 600 W     | 2300 W    | 3600 W     |

– Table 2 –



Channel 1 Input, Channel 2 Not Used

– Figure 21 –



Channel 2 Can Be Used to Daisy-chain to Other Amplifiers.

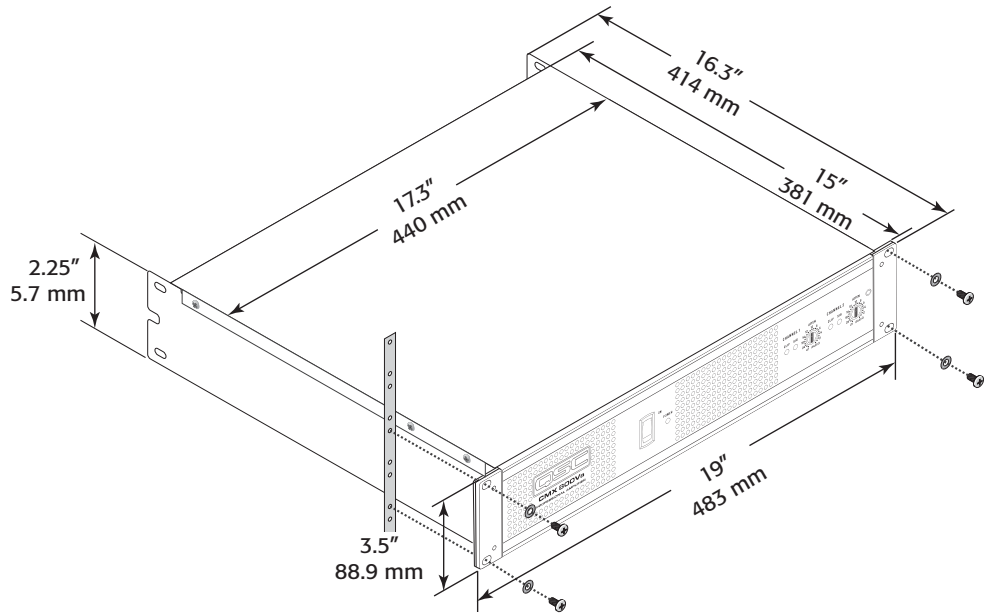
– Figure 22 –

# Installation

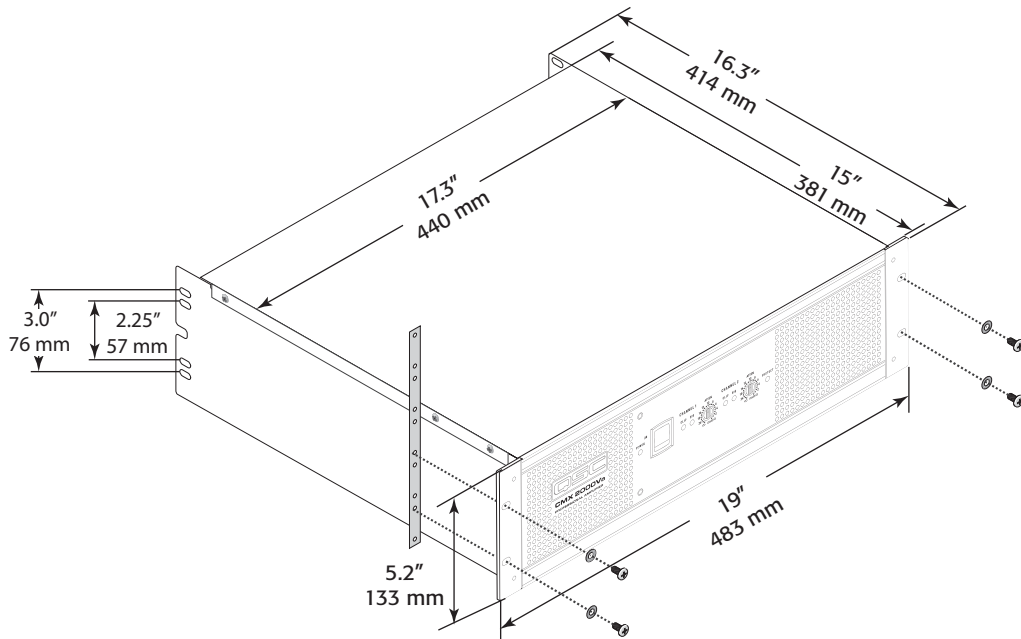
Rack mounting of the amplifier is optional.

Use four screws and washers when mounting the amplifier to the front rack rails.

Support the amp at the rear also, especially in mobile and touring use; rear rack mounting ear kits are available from QSC's technical services department or by special order from your dealer or distributor. Use the dimensions in – Figure 23 and – Figure 24 for planning.



– Figure 23 –



– Figure 24 –

# Connections

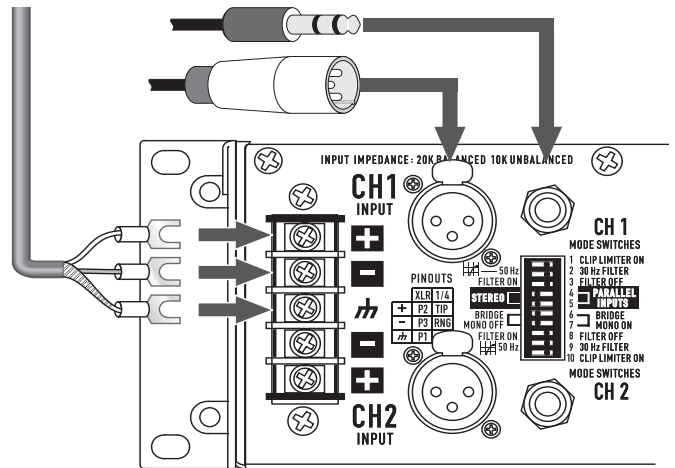
## Inputs

Each channel has active balanced XLR and 1/4" (6.3 mm) inputs wired in parallel (– Figure 25). The input impedance is 20 kΩ balanced, 10 kΩ unbalanced.

Balanced signals are less prone to AC hum, but unbalanced signals can be suitable for short cable runs. The signal source's output impedance should be less than 600Ω to avoid high frequency loss in long cables.

## Balanced Inputs

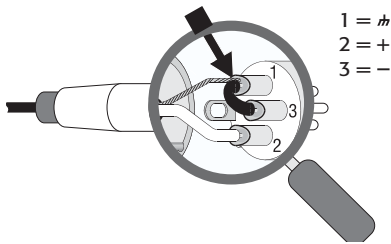
Use the XLR or 1/4" (6.3 mm) TRS input jacks, or the barrier strip (– Figure 26 through – Figure 28).



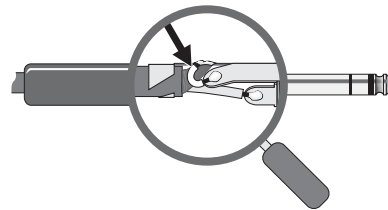
– Figure 25 –

## Unbalanced Inputs

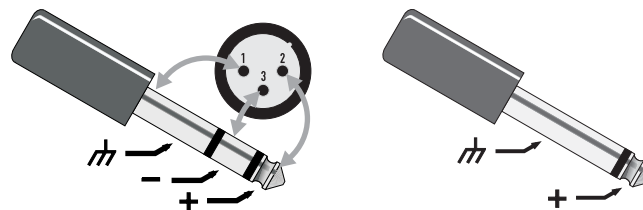
- Connect the unused side (Pin 3) of the balanced input to ground (Pin 1), as shown in – Figure 26.
- A tip-sleeve 1/4" (6.3 mm) connector will correctly terminate the unused side of the input as shown in – Figure 27.
- For Stereo operation, use the inputs for both Channel 1 and Channel 2. For Parallel or Bridge Mono operation, use the Channel 1 input.
- See the section on operating modes for more information. To patch the audio signal to other amps (Parallel and Bridge Mono modes only), see the instructions for using Parallel Inputs on page 9.



XLR unbalanced Jumper pin 1 to pin 3  
– Figure 26 –



TRS unbalanced  
No modification needed  
– Figure 27 –



Balanced Unbalanced  
– Figure 28 –

## Outputs

### NL4 Outputs

CMXa amplifiers offer a choice of output connections, with two NL4 jacks and a Terminal Block connector.

The NL4 connector is designed specially for high-power speaker connections. It locks in place, prevents shock hazard, and assures the correct polarity.

The upper NL4 jack has both Channel 1 and Channel 2 outputs, so it is especially useful for Parallel, bi-amp, or Bridge Mono mode operation (see Bridge Mono mode operating precautions on page 10). The other NL4 carries only the output from Channel 2.

For easier insertion, use the NL4FC connectors with quick-lock thumb latches (Not shown).

### Speaker Cabling

Larger wire sizes and shorter lengths minimize both loss of power and degradation of damping factor. Do not place speaker cables next to input wiring.



**WARNING!** To prevent electric shock, do not operate the amplifier with any of the conductor portion of the speaker wire exposed.

### Terminal Block Connector

The terminal block connector requires the following assembly.

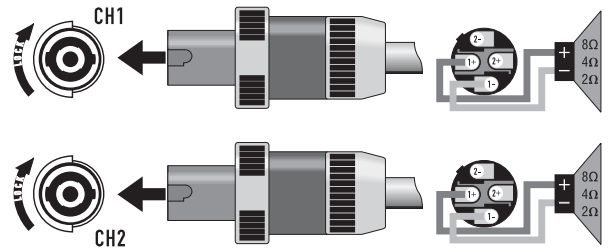
1. Strip the wires to 7 ~ 8 mm.
2. Insert the wires into the male part of the connector according to the Mode you are using. See below.
3. Use a flat-tip screwdriver to secure the wires. Tighten the screws to 6 in.-lbs.
4. Insert the plug into the receptacle on the amplifier.
5. Use a flat-tip screwdriver to secure the connector. Tighten the screws to 6 in.-lbs.

Stereo and Parallel Mode: Connect the wires as shown in – Figure 30, or as shown by the solid wires in – Figure 32.

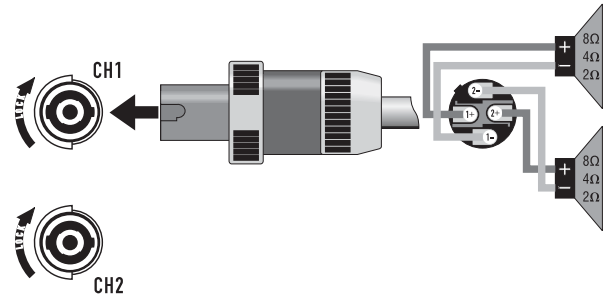
Bridge Mode: Connect the wires as shown in – Figure 31, or as shown by the dashed wires in – Figure 32.

| Terminal Block Connector Wiring      | UL       | IEC               |
|--------------------------------------|----------|-------------------|
| Wire range                           | -        | 6 mm <sup>2</sup> |
| Solid wire (AWG)                     | 28 – 10  | -                 |
| Stranded wire (AWG/mm <sup>2</sup> ) | 28 – 10  | -                 |
| Torque (lb.-in.)                     | 6        | -                 |
| Wire strip length                    | 7 – 8 mm | -                 |

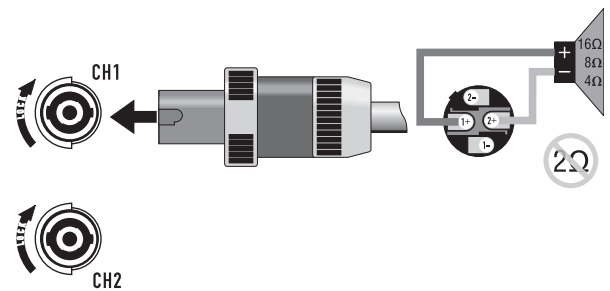
– Table 3 –



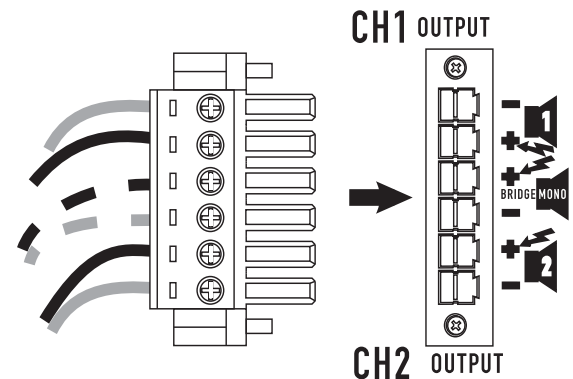
Stereo, Bi-amp, or Parallel Mode  
– Figure 29 –



Stereo, Bi-amp, or Parallel Mode  
– Figure 30 –



Bridge Mono Mode  
– Figure 31 –



– Figure 32 –

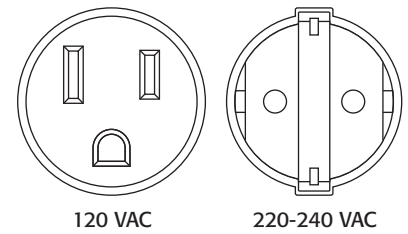
# Operation

## AC Power Switch (AC Mains)

Make sure you connect the amplifier to the correct AC line voltage, as shown on the serial number label. Connecting to the wrong line voltage is dangerous and may damage the amplifier (– Figure 33).

Before applying power, check all connections and turn the attenuation controls fully counter clockwise to maximum attenuation.

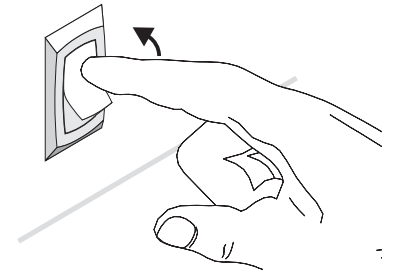
One second of muting is normal when the amp is turned on or off (– Figure 34).



– Figure 33 –

## Attenuation Controls

The controls are marked with a scale indicating attenuation. Maximum attenuation is fully counter clockwise, minimum attenuation is fully clockwise. The Attenuation controls are marked in numeric increments from ∞ to 0 (clockwise) indicating the amount of attenuation. Settings should normally be made within the lower attenuation range. The range above 14 on the attenuation scale should not be used for normal program levels, as the input headroom could be exceeded, but can be used for testing at reduced gain levels. At the maximum attenuation setting (∞), the signal is completely cut off (– Figure 35).

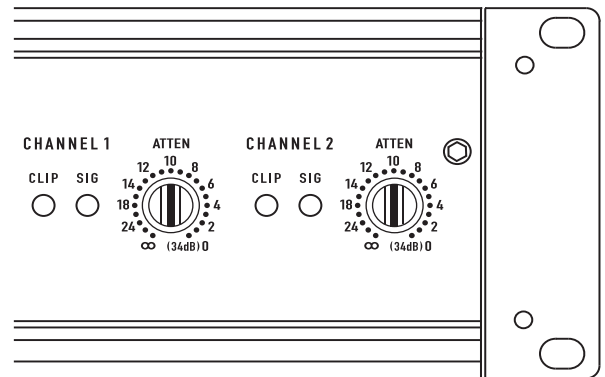


– Figure 34 –

## LED Indicators

The green SIGNAL LED indicators light at approximately 0.1% of full power.

The red CLIP LED indicator flashes during overload (clipping). If the amplifier's protection circuitry triggers protective muting, the signal and clip LEDs will not light. If this occurs during use, see the Troubleshooting section on page 17.



– Figure 35 –

## Fan Cooling

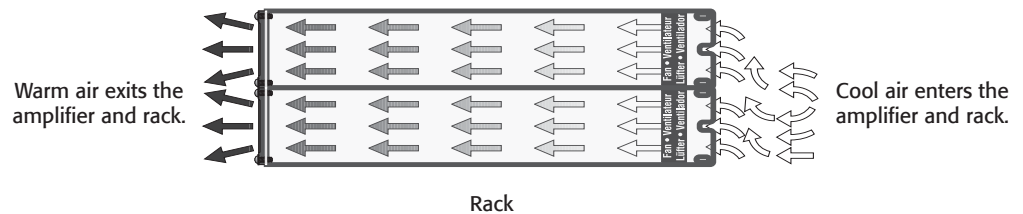
The fan speed varies automatically to maintain safe internal temperatures. Keep the front and rear vents clear to allow full air flow. Hot air exhausts out the front of the amp so it does not heat the interior of the rack. Make sure that plenty of cool air can enter the rack, especially if there are other units which exhaust hot air into it.

| Model      | Maximum Voltage Gain |
|------------|----------------------|
| CMX 300Va  | 31.6 x (30 dB)       |
| CMX 500Va  | 40 x (32 dB)         |
| CMX 800Va  | 46 x (33 dB)         |
| CMX 2000Va | 31.6 x (30 dB)       |

– Table 4 –

## Safe Operating Levels

The amp's protective muting system guards against excessive internal temperatures. With normal ventilation and 4 - to 8Ω loads, the amplifier will handle any signal level including overdrive-but make sure that the speakers can handle the full power! However, lower load impedances and higher signal levels produce more internal heating. Into 2Ω loads, frequent or prolonged clipping (indicated by constant flashing of the red CLIP LED) may trigger protective muting. Bridged mono mode doubles the output impedance of the amp; 4Ω is the minimum load impedance. Heavy clipping may cause muting. If this happens, see the Troubleshooting section on page 17.



– Figure 36 –



# Troubleshooting

## Problem: No Sound

**Indication:** POWER indicator not lit

Check the AC plug. Also check the circuit breaker on the rear panel.

Confirm that the AC outlet works by plugging in another device. If too many amplifiers are used on one outlet, the building's circuit breaker may trip and shut off power.

An overload in Bridged Mono mode may cause the amplifier to click off for several seconds. Check the load impedance (4Ω minimum), or reduce signal level.

An amplifier which keeps shutting off may have a serious internal fault. Turn it off, remove AC power, and have the amplifier serviced by a qualified technician.

**Indication:** SIGNAL LED responding to signal level

If the green SIGNAL indicators are lighting normally, the fault is somewhere between the amp and the speaker. Check the speaker wiring for breaks. Try another speaker and cable.

**Indication:** SIGNAL LED not lit

If the green POWER indicator LED is lit and the fan is running, yet the signal LEDs indicate no signal, check the input. Make sure the signal source is operating and try another input cable. Connect the source to another channel or amplifier to confirm its operation.

**Indication:** CLIP LED flashing

If the red CLIP indicator flashes when signal is applied, the amplifier output may be shorted. Check the speaker wiring for stray strands or breaks in the insulation.

**Indication:** CLIP LEDs bright and steady

The amplifier is in protective muting.

One second of muting is normal when the amp is turned on or off.

Overheating will cause protective muting. The fan will be running at full speed and the chassis will be hot to the touch; sound should resume within a minute as the amplifier cools to a safe operating temperature. Check for proper ventilation. If the fan isn't running at all, the amplifier requires servicing.

## Problem: Distorted Sound

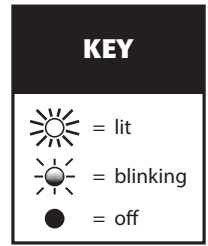
**Indication:** CLIP LED flashing

If the red CLIP indicator flashes before the signal indicator does, the load impedance is abnormally low or shorted. Unplug each speaker one-by-one at the amplifier. If the CLIP LED goes out when you disconnect a cable, that cable or speaker is shorted. Try another cable and speaker to locate the fault.

**Indication:** CLIP LED not flashing

This could be caused by a faulty speaker or loose connection. Check the wiring and try another speaker.

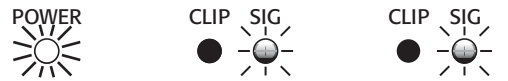
The signal source may be clipping. Keep the amplifier attenuation controls at mid point so that the source does not have to be overdriven.



– Figure 37 –



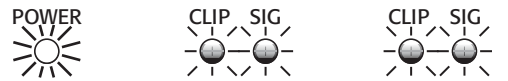
– Figure 38 –



– Figure 39 –



– Figure 40 –



– Figure 41 –



– Figure 42 –



– Figure 43 –



– Figure 44 –

### **Problem: No channel separation**

Check the switch settings on the back of the amplifier. Make sure the “Parallel Input” and “Bridge Mode” switches are OFF in dual-channel, bi-amp, or stereo use where different signals go to each channel.

Make sure other equipment in the signal path, such as mixers, preamps, etc., are set for stereo, not mono.

### **Problem: Hum**

Move cabling and signal sources to identify “hot spots” in the system. Cables with faulty shielding are a frequent entry point for hum.

### **Problem: Hiss**

Unplug the amplifier input to confirm that the hiss is coming from the source or a device upstream; erratic or popping noises indicate an electronic fault in the offending unit.

To keep the normal noise floor low, operate the primary signal source at full level, without clipping, and avoid boosting the signal further between the source and the amplifier.

### **Problem: Squeals and feedback**

Microphone feedback should be controlled with mixer controls. If noise continues to build up with zero mic gain, there is a serious fault in the signal processors or cables. Working in succession from the signal source towards the amplifier, check each device in the signal path by reducing its gain or unplugging it.

# Specifications

|   | CMX 300Va  | CMX 500Va         | CMX 800Va                                    | CMX 2000Va   |
|---|--|-------------------|--|--|
| Stereo Mode (both channels driven)        |  |                   |  |  |
| 8Ω / FTC 20 Hz - 20 kHz / 0.1% THD        | 185 W  | 260 W             | 450 W  | 1050 W   |
| 8Ω / EIA 1 KHZ / 0.1% THD                 | 200 W  | 300 W             | 500 W  | 1100 W   |
| 4Ω / FTC 20 HZ - 20 KHZ / 0.1% THD        | 280W   | 400 W             | 650 W  | 1600 W   |
| 4Ω / EIA 1 KHZ / 0.5% THD                 | 300 W  | 500 W             | 800 W  |  |
| 4Ω / EIA 1 KHZ / 1% THD                   |  |                   |  | 2000 W   |
| 2Ω / EIA 1 KHZ / 1% THD                   | 430 W  | 700 W             | 1200 W                                       | 2500 W   |
| 70 V - Direct drive / EIA 1 kHz / 1% THD  | -  | -                 | 400 W  | 2500 W   |
| 100 V - Direct drive / EIA 1 kHz / 1% THD |  |                   |  | 1000 W   |
| Bridge Mono Mode                          |  |                   |  |  |
| 8Ω / FTC 20 Hz - 20 kHz / 0.1%THD         | 530 W  | 800 W             | 1300 W                                       | 3200 W   |
| 8Ω / EIA 1 kHz / 0.1%THD                  | 600 W  | 900 W             | 1500 W                                       | 3600 W   |
| 4Ω / EIA 1 kHz / 1%THD                    | 830 W  | 1400 W            | 2400 W                                       | 5000 W   |
| 70 V - Direct drive / EIA 1 kHz / 1% THD  | 600 W  | 1200 W            | 2000 W                                       |  |
| 100 V - Direct drive / EIA 1 kHz / 1% THD | -  | 600 W             | 2300 W                                       | 3600 W   |
| 140 V - Direct drive / EIA 1 kHz / 1% THD |  |                   |  | 5000 W   |
| Distortion (SMPTE-IM)                     | < 0.02%  | < 0.01%           | < 0.01%                                      | < 0.01%  |
| Signal to Noise (20 Hz – 20 kHz) 8Ω       | > -100 dB  |                   |  |  |
| Input Sensitivity 8Ω                      | 1.15 V (+3.4 dBu)  | 1.15 V (+3.4 dBu) | 1.23 V (+4.0 dBu)                            | 1.42 V (+5.3 dBu)  |
| Voltage Gain (8Ω)                         | 30 dB  | 32 dB             | 33 dB  | 36 dB  |
| Output Circuitry                          | Class AB   | Class AB          | 2-tier Class H                               | 3-tier Class H   |
| Power Requirements                        |  |                   |  |  |
| Typical, 1/8 power, pink noise at 4Ω      |  |                   |  |  |
| 120 VAC                                   | 4.4 A  | 5.4 A             | 6.3 A  | 13.9 A   |
| 230 VAC                                   | 2.2 A  | 2.7 A             | 3.2 A  | 7 A  |
| Severe, 1/3 power pink noise at 4Ω        |  |                   |  |  |
| 120 VAC                                   | 6.6 A  | 9.6 A             | 15.6 A                                       | 26.9 A   |
| 230 VAC                                   | 3.3 A  | 4.8 A             | 7.8 A  | 13.5 A   |
| Frequency Response                        | 20 Hz – 20 kHz, +0, -1 dB -3 dB points:<br>5 Hz and 50 kHz (LF filter bypassed / 8Ω)   |                   |  | 20 Hz – 20 kHz, +/- 1 dB dB -3 dB points:<br>5 Hz and 50 kHz (LF filter bypassed / 8Ω) |
| Damping Factor                            | > 300 at 8Ω  |                   |  |  |
| Input Impedance (Ω)                       | 10 kΩ unbalanced / 20 kΩ balanced  |                   |  |  |
| Input Clipping                            | 10 Vrms (+22 dBu)  |                   |  | 6.4 Vrms (+18 dBu)   |
| Cooling                                   | Continuously variable speed fan, back-to-front air flow  |                   |  |  |
| Connectors (each channel)                 | Input: Active balanced; barrier strip, XLR and ¼" (6.3 mm) TRS tip and XLR (pin 2 positive)<br>Output: Detachable terminal block and NL4 |                   |  |  |
| Controls                                  | Front: AC Switch, Channel 1 and Channel 2 attenuation knobs<br>Rear: 10-position DIP switch  |                   |  |  |
| Indicators                                | Power-on: Green LED / Signal: Green LED (1 per channel) / Clip: Red LED (1 per channel)  |                   |  |  |
| Amplifier Protection                      | Stable into reactive or mismatched loads   |                   |  |  |
| Load Protection                           | On/off muting, AC Coupling   |                   | On/off muting, triac crowbar on each channel |  |
| Dimensions (HWD)                          | 2RU  |                   | 3RU  |  |
| Inches                                    | 3.5 x 19 x 15  |                   | 5.25 x 19 x 15                               |  |
| Millimeters                               | 89 x 483 x 381   |                   | 133 x 483 x 381                              |  |
| Weight                                    |  |                   |  |  |
| Net                                       | 35 lb (15.9 kg)  | 40 lb (18.2 kg)   | 44.5 lb (20.2 kg)                            | 75 lb (34 kg)  |
| Shipping                                  | 41 lb (18.6 kg)  | 46 lb (20.9 kg)   | 50.5 lb (23.0 kg)                            | 87 lb (39.5 kg)  |



Mailing Address:

QSC Audio Products, LLC  
1675 MacArthur Boulevard  
Costa Mesa, CA 92626-1468 USA

Telephone Numbers:

Main Number: (714) 754-6175

Sales & Marketing: (714) 957-7100 or toll free (USA only) (800) 854-4079

Customer Service: (714) 957-7150 or toll free (USA only) (800) 772-2834

Facsimile Numbers:

Sales & Marketing FAX: (714) 754-6174

Customer Service FAX: (714) 754-6173

World Wide Web:

[www.qsc.com](http://www.qsc.com)

E-mail:

[info@qsc.com](mailto:info@qsc.com)

[service@qsc.com](mailto:service@qsc.com)