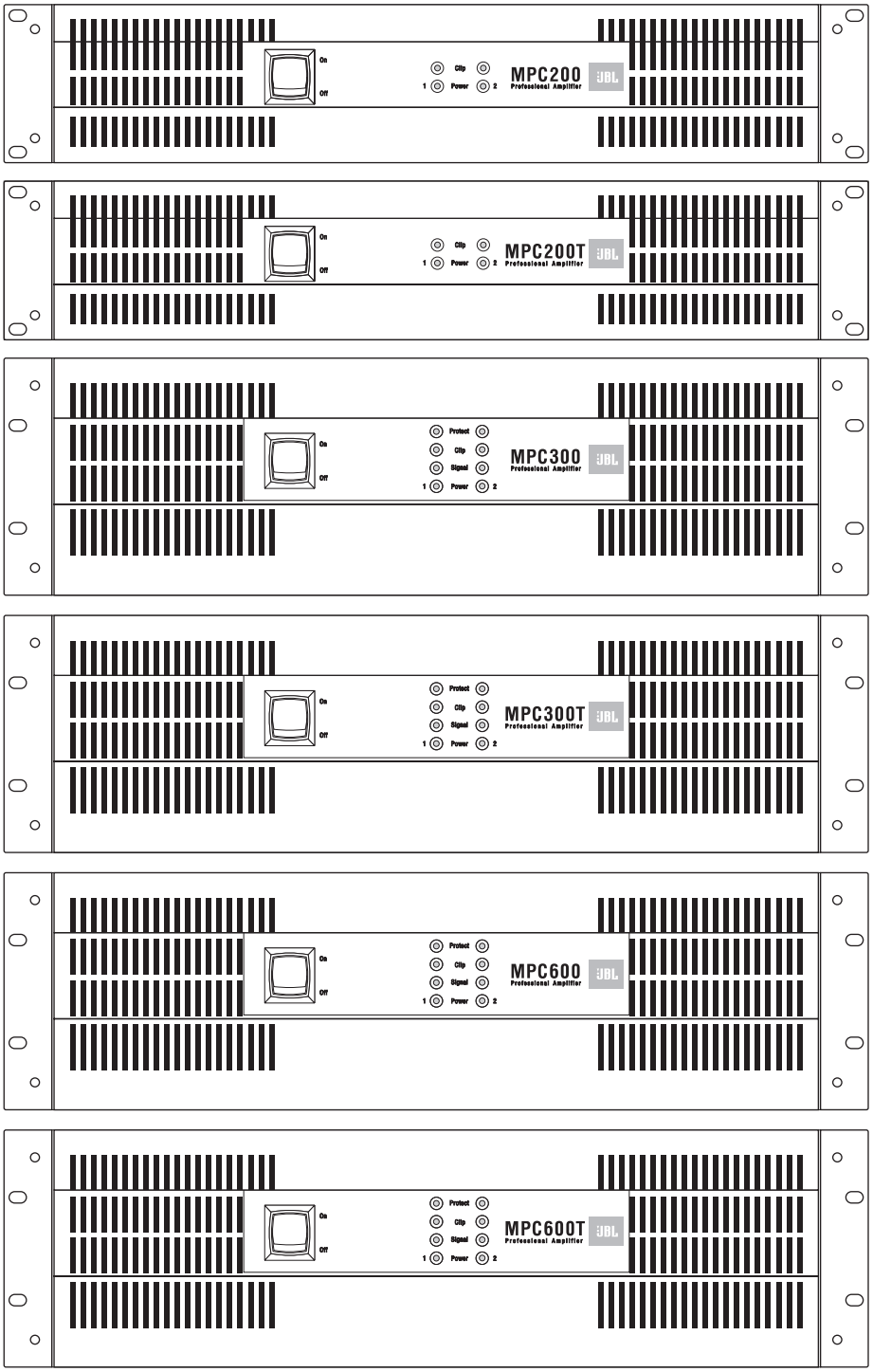
JBL PROFESSIONAL

# MPC Series Power Amplifiers

# Owner's Manual




TD-000074-00
**Rev. C**

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# Cautions

### Rack Mounting Precautions

To avoid damage to the amplifier mounting ears and/or rack rails, the amplifier must be supported at all four corners when used in portable racks.

Consult JBL Service Dept for availability of Rear Support Brackets.

### Lifting Precautions

In order to safely move or install the amplifier, it is recommended that two persons share the weight when lifting and positioning the unit.

**CAUTION**

**TO AVOID ELECTRIC SHOCK, DO NOT INSERT FINGERS OR OBJECTS INTO ANY OPENINGS IN THE CHASSIS.**

# Sicherheitsvorschriften

### Sicherheitsvorschriften für den Einbau in ein Gestell

Um Schäden auf den Befestigungsleisten des Verstärkers und/oder den Gestellschienen zu vermeiden, muß der Verstärker beim Einbau in ein tragbares Gestell an allen vier Ecken gestützt werden.

Erkundigen Sie sich bei der JBL-Kundendienstabteilung nach Stützen für die Rückseite des Verstärkers.

### Sicherheitsvorschriften beim Hochheben

Um den Verstärker sicher zu verschieben oder einzubauen, wird empfohlen, das Gewicht des Verstärkers beim Hochheben und Verschieben gleichmäßig auf zwei Personen zu verteilen.

**VORSICHT**

**UM ELEKTRISCHEN SCHLAG ZU VERMEIDEN, KEINE FINGERN ODER GEGENSTÄNDE IN ÖFFNUNGEN DES GEHÄUSES STECKEN.**

# Warning notices

### Speaker Output Shock Hazard

A MPC amplifier is capable of producing hazardous output voltages. To avoid electrical shock, make sure the cover is in place over the output terminals, and do not touch any exposed speaker wiring while the amplifier is operating.

### Rack Mounting Precautions

To minimize twisting stress of the front mounting ears, the amplifier's internally mounted output transformers are located close to the front panel. Nevertheless, when rack mounting any MPC amplifier, make sure it is well supported at all four corners to avoid damage to either the amplifier mounting ears or to the mounting rails. Rear support brackets are available.

### Lifting Precautions

In order to safely move or install the amplifier, it is recommended that two persons share the weight when lifting and positioning the unit.

# Description

The MPC Series from JBL is a line of professional power amplifiers specifically designed for contracting applications. There are six models, each with two independent channels. Each model in the MPC Series line is available in a "T" version for driving either 200V, 140V, 100V, 70V, 50V, or 25V "constant voltage" lines and in a "non-T" versions for driving loudspeaker systems with impedances as low as 2 ohms. (See section on bridging for information about 200V, 140V, and 50V drive capabilities).

**Power Capabilities—**The table below lists the power ratings under various load conditions:

| Model | 4Ω[1] | 2Ω[2] | 100 Volts | 70 Volts | 25 Volts |
|---|---|---|---|---|---|
| **MPC200** | 225 W × 2 | 350 W × 2 | | | |
| **MPC200T** | 225 W × 2 | 350 W × 2 | 175 W × 2 [3] | 175 W × 2 [3] | 150 W × 2 [3] |
| **MPC300** | 300 W × 2 | 450 W × 2 | | | |
| **MPC300T** | 300 W × 2 | 450 W × 2 | 250 W × 2 [4] | 250 W × 2 [4] | 200 W × 2 [4] |
| **MPC600** | 600 W × 2 | 900 W × 2 | | | |
| **MPC600T** | 600 W × 2 | 900 W × 2 | 500 W × 2 [4] | 500 W × 2 [4] | 400 W × 2 [4] |

1 FTC watts per channel, 20 Hz–20 kHz, 0.1% THD
2 EIA watts per channel, 1 kHz, 1% THD
3 Watts per channel, band limited for 50 Hz–15 kHz response, 0.25% THD
4 Watts per channel, band limited for 45 Hz–15 kHz response, 0.25% THD

**Channel Separation—**Each channel has its own power transformer secondary to provide maximum audio separation (minimum sound leakage) between the two channels, minimizing interaction that can otherwise occur on amplifiers with a common power supply.

**High Efficiency—**The MPC200, 200T, 300 & 300T utilize complementary Class AB linear output circuitry. For improved efficiency, the MPC600 and 600T utilize Class H step-linear complementary output circuitry using multi-rail power supplies.

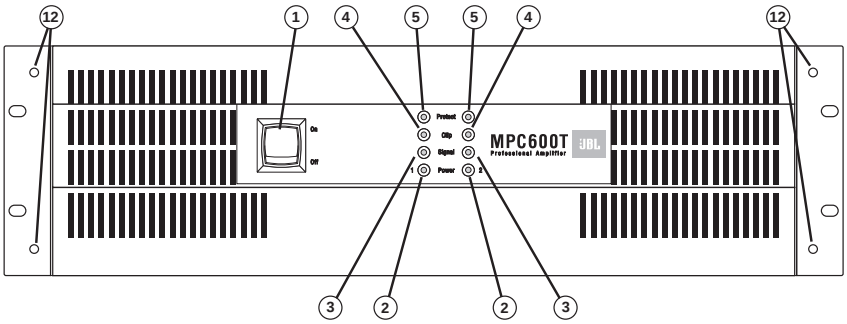
**High Cooling Capacity—**Every MPC amplifier features a large diameter two-speed fan and massive extruded aluminum heat sinks. The output devices couple *directly* to the heat sink. This provides better cooling of the output devices while eliminating problematic insulating wafers that are an integral part of most other amplifier designs. Forced air cooling in a back-to-front direction provides for more effective cooling, preventing problems that otherwise occur from a continual heat build-up inside the equipment rack, which occurs in amplifiers with front-to-back or side-to-side flow schemes. These design factors allow the MPC amplifiers to work in high duty-cycle instances when many other professional amplifiers cannot.

**Weight Balance—**The power transformers, as well as the output transformers on the T models, are mounted in the front of the amplifier chassis, as close to the front mounting rails as possible. This keeps the unit's center of gravity forward to minimize the twisting force on the front mounting ears.

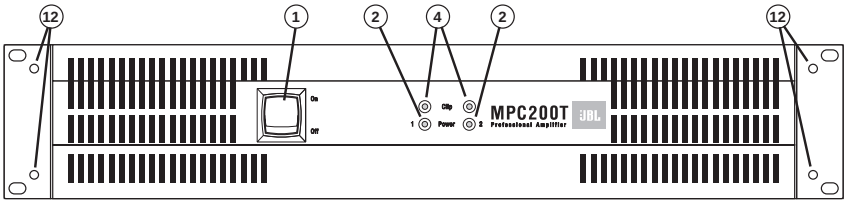
**Rail Support—**The amplifier should be supported at all four corners, especially if it is in a portable rack. The flow-through cooling scheme allows you to rack-mount the amplifiers on top of the other, with no clearance necessary in between. This mounting technique also helps support the weight of the upper amplifiers. In permanent fixed installations, the rear of the amplifiers can receive physical support by installing the amplifiers at the bottom of the equipment rack. Make sure that the direct weight of the back of the amplifier is supported from the bottom of the rack.

**Dimensions—**

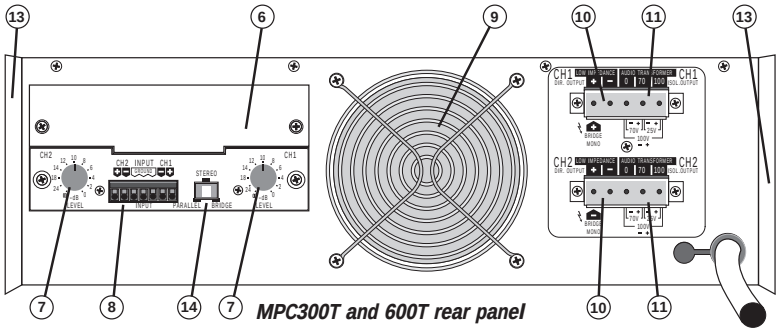
a) Height—The MPC200 and 200T are 2 rack spaces high. The MPC300, 300T, 600 and 600T are 3 rack spaces high.



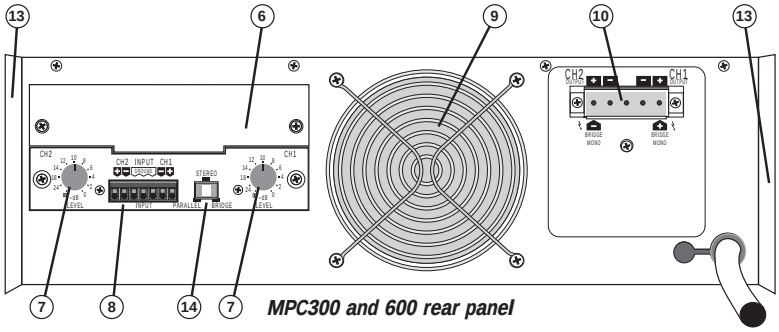

*MPC600T front panel*
*(MPC300, 300T, and 600 are similar)*



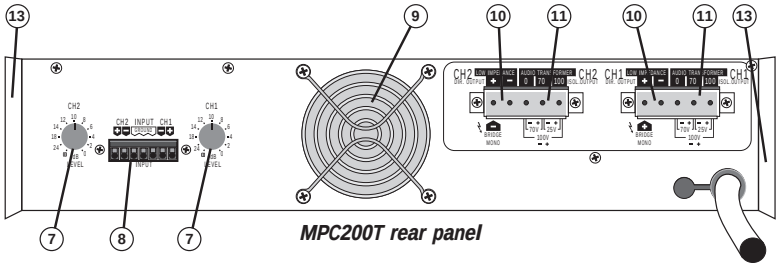

*MPC200T front panel*
*(MPC200 is similar)*



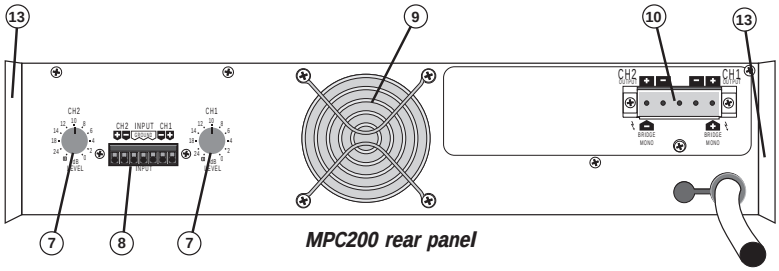

*MPC300T and 600T rear panel*




*MPC300 and 600 rear panel*




*MPC200T rear panel*




*MPC200 rear panel*

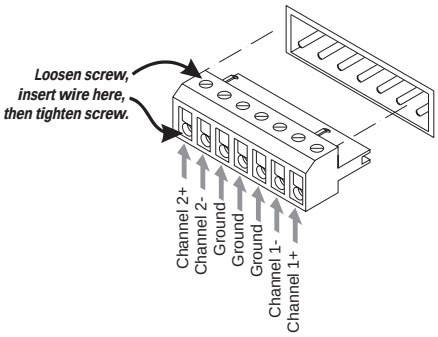
1 Power Switch
2 Power Indicators (Ch. 1 & Ch. 2)
3 Signal Indicators (Ch. 1 & Ch. 2)
4 Clip Indicators (Ch. 1 & Ch. 2)
5 Protect Indicators (Ch. 1 & Ch. 2)
6 Accessory Slot Cover
7 Gain Control
8 Detachable Input Header Block
9 Cooling Fan
10 Shrouded Output Connector (Direct Outputs)
11 Shrouded Output Connector (Audio Transformer Outputs)
12 Mounting Holes for Optional Handles
13 Rear Support Ears
14 Parallel/Stereo/Bridge Switch

b) Depth—The amplifiers require a rack depth of 45.7 cm (18 in) to clear the rear support ears. The rear panel is 42.9 cm (16.9 in) behind the plane of the front mounting rails, allowing some room for routing of wires.

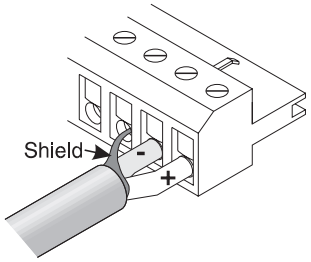
**Stability, Reliability and Protection—**The MPC Series is engineered for stability and exceptional reliability, with protection for open or short circuits and mismatched (under-impedance) loads. Protection is also built-in for ultrasonic, infrasonic (subsonic) and RF. To protect the loudspeakers the outputs mute during turn-on and turn-off and also in the event of a DC load fault. (The MPC200 and 200T are AC coupled and cannot pass DC to the load; thus DC fault muting is not required on these models.) See section on Protection Circuits for additional information.

All protection circuitry automatically resets to normal when conditions assure safe operation.

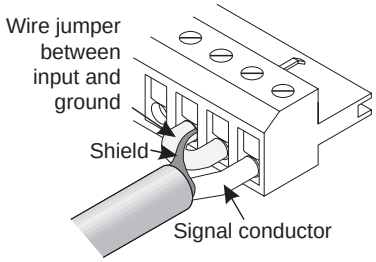
# Inputs




MPC amplifiers feature balanced inputs, connected via a Euro-style 7-terminal detachable header.




**Balanced Connection—**Attach as shown. Connect the (+) wire, (-) wire and ground wire to terminal pins as marked.

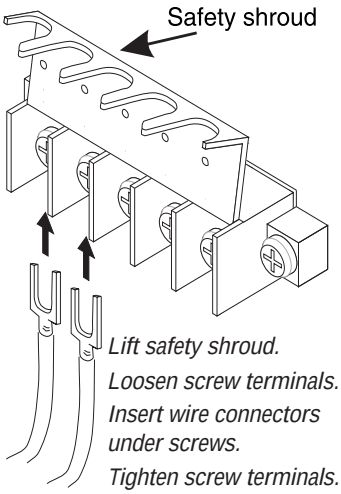



**Unbalanced Connection—**Attach input signal wires as shown. Use the non-inverting (+) input and the ground terminals of the header, and also connect a wire jumper between the inverting (-) input and the ground terminal. The wire jumper will prevent a reduction in gain caused by a floating unbalanced input.

**Input Sensitivities—**Audio signals of the following levels will produce full rated output power at 8 ohms with the volume control turned up full.

MPC200 & 200T 0.96 Volts
MPC300 & 300T 1.02 Volts
MPC600 & 600T 1.00 Volts

# Outputs

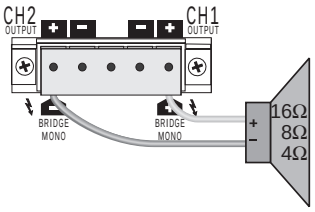



*Lift safety shroud.*
*Loosen screw terminals.*
*Insert wire connectors under screws.*
*Tighten screw terminals.*
*Lower safety shroud.*

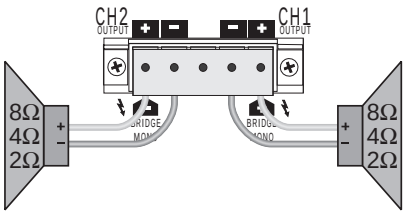
Covered barrier strips located on the rear panel allow safe, shockproof speaker cable connections to the amplifier outputs. See the diagrams for details on connecting speakers and/or distributed (25V, 70V, 100, 140V, and 200V) lines. Insulated connectors of the type shown are recommended. Always make sure the amplifier is turned off before you change any output connections or before lifting the safety shroud.

For driving 140V or 200V distributed lines, the amplifier must be set into bridged mono mode. See "Bridged Mono Mode" section later in this manual for information about this mode.

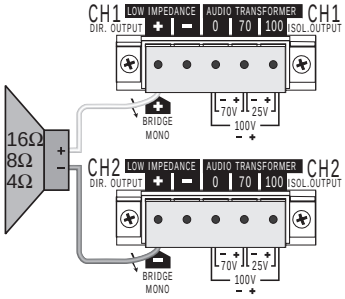
***Output connection for MPC, bridged mono mode.***



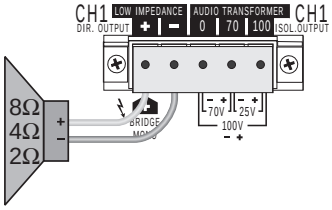

***Output connection for MPC, parallel or stereo mode.***



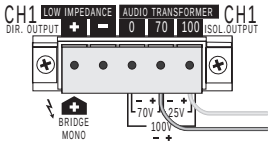

***Output connection for MPC "T" models, bridged mono mode.***



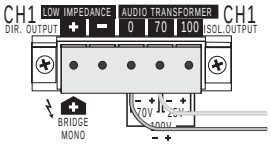

***Output connection for MPC "T" models, direct low impedance.***



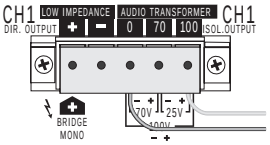

***Output connection for "T" models, 25 volt line.***



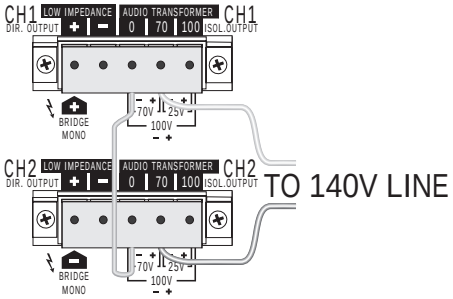

***Output connection for "T" models, 50 volt line.***



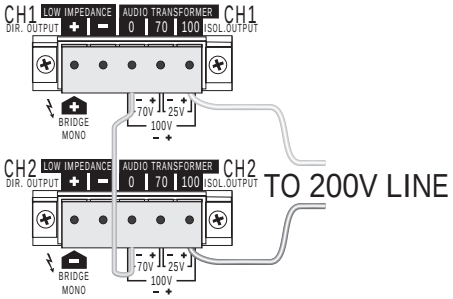

***Output connection for "T" models, 100 volt line.***




***Output connections for "T" models, bridged mono mode, 140 volt line***




***Output connections for "T" models, bridged mono mode, 200 volt line***



# Driving Distributed Lines

Make sure the sum of the power settings of all the speakers does not exceed the power rating of the amplifier. Be aware that the actual power draw on some loudspeakers can vary considerably from their tap labels. The tap labelings on some speakers refers to their power draw from the distributed line, while on others they refer to the power delivered from the transformer into the loudspeaker. In the latter case, the insertion loss of the transformer means that the actual power draw from the amplifier is higher than the tap setting. Also, loudspeaker impedances commonly vary with frequency, drawing more power at some frequencies than at others.

*It is a good practice to allow a 20% safety margin.* For example, if the amplifier has a power rating of 250 watts, it is good practice to make sure the sum of the loudspeaker loads on the distributed line is 200 watts or less.

## Low-Impedance and Distributed Speakers on T-Version Amplifiers

MPC amplifiers are among the very few amplifiers that allow simultaneous use of low-impedance speakers (connected to the *LOW IMPEDANCE* terminals) and distributed lines (connected to the *AUDIO TRANSFORMER* terminals) not only on the same amplifier, but also on the same channel.

**Applications—**This versatility can be very useful in some applications. Examples 1 through 3 illustrate combining distributed lines and low-impedance speakers on the same channel, while example 4 describes using them on separate channels of the same amp.

**Application Example #1: A theater or performance venue—**The main loudspeakers can be operated from the low-impedance output while speakers in a restroom, lobby area, or green room can be driven from the 100V or 70V output of the *same* amplifier channel. This saves money, eliminating the need for an additional dedicated distributed amplifier.

**Application Example #2: A club or restaurant—**The main loudspeakers can be driven from the low-impedance output while the 100V or 70V output drives backstage monitors or restaurant loudspeakers.

**Application Example #3: Extending low frequency performance—**Adding a low impedance subwoofer (4Ω or 8Ω) to a distributed speaker system on the same channel extends the sound spectrum with less risk of low frequencies saturating the transformers.

**Balancing subwoofer and full-range speaker sensitivity—**The sensitivity balance between full-range speakers and subwoofers (the relative output level of each device) can be adjusted by choosing appropriate tap settings on the speaker transformers and by positioning the subwoofer(s). For example, suspending a subwoofer outdoors or in the center of a room, with no nearby boundary such as a wall, floor, or ceiling, is acoustically the least efficient positioning; this is called placement in "free space" because the sound radiates freely in all directions. Placing the subwoofer on one boundary—on a wall or in the center of the ceiling—adds 3 dB of acoustic output because the boundary reflects half the acoustic energy back into the listening space, reinforcing the other half. Moving the subwoofer to a two-boundary junction (of 2 walls, a wall and ceiling, or a wall and floor) adds 3 dB more. Yet another 3 dB can be obtained by placing the subwoofer in a corner (the junction of two walls and the ceiling or two walls and the floor). Selective subwoofer placement therefore gives an adjustment range of 9 dB, which represents an approximate doubling of its perceived acoustic volume.

**Application Example #4: Using two channels for delay applications—**When you need delay for some, but not all, of the speakers (for example, to time-align speakers located in the back of a venue), use both channels of the amplifier. The low-impedance output of one amp channel can drive the main loudspeakers, while the same input signal is routed through a delay and into the second channel to run a line of speakers for under-balcony or delayed-lobby use. The delayed speakers can be either low-impedance, or more typically, 70V or 100V. This eliminates the expense of an additional distributed amplifier.

**Loading an amp channel—**Be careful not to overload the channel when combining low-impedance and distributed loads on the same amplifier channel, because either load affects the amount of power available for the other. The next two paragraphs explain how they load the amplifier output.

**Internal output signal flow—**Each T-version amplifer output connects directly to the *LOW IMPEDANCE* output terminals *and* to the primary of the audio output transformer. The transformer secondary and its tap connect to the channel's *AUDIO TRANSFORMER* terminals labeled 0V, 70V, and 100V. As with all transformers, there is some insertion loss, so slightly less power comes out of the transformer than goes into it from the amplifier circuitry. If nothing is connected to the *AUDIO TRANSFORMER* outputs, the transformer will look like a very high impedance to the amp output, and therefore virtually the entire power capacity of the amp will be available to the low impedance load. If a lightly-loaded distributed line is connected to the transformer outputs, the transformer will look like a somewhat lower impedance, and less power will be available for the low-impedance load. The more heavily loaded the distributed line is, the lower the impedance the transformer presents to the amp's output circuitry.

**Minimum impedance considerations—**The minimum load allowable for an MPC amp is 2Ω per channel, whether low impedance, distributed line, or a combination of the two. Therefore, if a 2Ω load is connected to the *LOW IMPEDANCE* terminals, then *no* additional power is available for the *AUDIO TRANSFORMER* outputs. Likewise, as the distributed line's power demand grows, the channel's low-impedance capabilities diminish.

## Computing channel loading

These two formulas can help you determine how to combine a low impedance and a distributed line on an amp channel without overloading it. The first starts with a known low-impedance load and calculates the *maximum* power available for the distributed line; the sum of the power taps on the speaker transformers should not exceed that amount. The second formula starts with your knowing the total power draw on a distributed line and calculates the *minimum* load impedance, if any, that you can connect to the *LOW IMPEDANCE* output terminals.

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Due to frequency-dependent impedance variations, "constant voltage" loudspeakers can sometimes draw more power from the distributed line than their transformer tap labels indicate. Although driving too low an impedance will not harm your MPC amplifier, it might activate its protection circuitry or cause less-than-optimal performance. *When in doubt about actual loudspeaker characteristics, we recommend you use a slightly higher nominal load impedance on the* LOW IMPEDANCE *output and/or a slightly lower total power demand (i.e., sum of all the power taps) on the* AUDIO TRANSFORMER *outputs than what the following formulas suggest.*

---

**1) Computing maximum allowable distributed line loading with a known low-impedance load**

The formula is:

$$MaxATP = [RatedLZP - ((2 \times RatedLZP)/Impedance)]/2$$

*MaxATP* is the sum of the power taps of the speakers connected to the *AUDIO TRANSFORMER* output(s).
*Rated LZP* is the maximum rated power of the amplifier into a 2Ω load.
*Impedance* is the load impedance connected to the *LOW IMPEDANCE* output.

**Example:** One channel of an MPC300T has a 4Ω load connected to the *LOW IMPEDANCE* output. What is the maximum power left available to drive a distributed line? The answer is:

$MaxATP = [450 - ((2 \times 450)/4)]/2 =$ **112 watts**

**2) Computing the minimum low impedance load with a known distributed line load**

The formula is:

*MinZ* = 2 × [*RatedLZP*/(*RatedLZP* – (*Actual HZP* × 2))]

*MinZ* is the minimum load impedance that can be connected to the *LOW IMPEDANCE* output.
*RatedLZP* is the maximum rated power of the amplifier into a 2Ω load.
*ActualHZP* is the sum of all the power taps connected to the *AUDIO TRANSFORMER* output(s).

**Example:** One channel of an MPC300T has 100 watts of distributed loudspeakers connected to the 70V (or 100V) output. What is the minimum impedance load that can be connected to the *LOW IMPEDANCE* output?

*MinZ* = 2 × [450/(450 – (100 × 2))] = 3.6 ohms

The next-larger common speaker impedance is 4 ohms, so a load of 4 ohms or higher should work satifactorily.

*The tables below are general guidelines on which combinations are acceptable.*

## MPC200T

| | | **Sum of Speaker Taps Connected to *AUDIO TRANSFORMER* Outputs** | | | | |
|---|---|---|---|---|---|---|
| | | 0 W | 22 W* | 44 W** | 88 W*** | 175 W**** |
| **Load connected to *LOW IMPEDANCE* output** | 2Ω | ✔ | ✗ | ✗ | ✗ | ✗ |
| | 4Ω | ✔ | ✔ | ✔ | ✗ | ✗ |
| | 8Ω | ✔ | ✔ | ✔ | ✔ | ✗ |
| | 16Ω | ✔ | ✔ | ✔ | ✔ | ✗ |
| | 32Ω | ✔ | ✔ | ✔ | ✔ | ✗ |

## MPC300T

| | | **Sum of Speaker Taps Connected to *AUDIO TRANSFORMER* Outputs** | | | | |
|---|---|---|---|---|---|---|
| | | 0 W | 31 W* | 62 W** | 125 W*** | 250 W**** |
| **Load connected to *LOW IMPEDANCE* output** | 2Ω | ✔ | ✗ | ✗ | ✗ | ✗ |
| | 4Ω | ✔ | ✔ | ✔ | ✗ | ✗ |
| | 8Ω | ✔ | ✔ | ✔ | ✔ | ✗ |
| | 16Ω | ✔ | ✔ | ✔ | ✔ | ✗ |
| | 32Ω | ✔ | ✔ | ✔ | ✔ | ✗ |

## MPC600T

| | | **Sum of Speaker Taps Connected to *AUDIO TRANSFORMER* Outputs** | | | | |
|---|---|---|---|---|---|---|
| | | 0 W | 62 W* | 125 W** | 250 W*** | 500 W**** |
| **Load connected to *LOW IMPEDANCE* output** | 2Ω | ✔ | ✗ | ✗ | ✗ | ✗ |
| | 4Ω | ✔ | ✔ | ✔ | ✗ | ✗ |
| | 8Ω | ✔ | ✔ | ✔ | ✔ | ✗ |
| | 16Ω | ✔ | ✔ | ✔ | ✔ | ✗ |
| | 32Ω | ✔ | ✔ | ✔ | ✔ | ✗ |

* -9 dB from full
** -6 dB from full
*** -3 dB from full
**** full loading

**✔ = Acceptable**
**✘ = Do not use**

In general, if the *CLIP* indicator flashes occasionally, the amplifier is approaching its maximum long-term power capacity. If it is lit about half the time, the amplifier channel will probably go into thermal protection within a few minutes.

### Using Multiple Distributed Line Voltages

The MPC amplifiers allow you to connect distributed lines to any of the 100V, 70V, and 25V outputs at the same time. For example, a single channel could drive both a 70V and a 25V line; such flexibility could save you the expense of an additional amplifier.

The *total power* of all the speakers connected to the *AUDIO TRANSFORMER* outputs should always be less than the power rating of the channel. For example, an MPC300T is rated for a maximum power output of 250 watts; therefore, the total of all the speakers' power taps for all the lines connected to the 100V, 70V, and 25V outputs must not exceed 250 watts.

MAKE SURE THAT LOCAL BUILDING CODES PERMIT THE USE OF THE OUTPUT VOLTAGE YOU SELECT.

# Bridged Mono Mode

Bridged Mono mode combines the output power of both channels to drive a single load. Channel 2 is fed with an inverted signal from Channel 1. Thus, when one channel "pushes," the other "pulls," providing twice the voltage swing of a single channel. The speaker connects between the "+" terminals of each channel.

***BRIDGED MONO MODE CAUTION:***

**ALL MODELS—*Output voltages as high as 160 volts rms are available between the MPC amplifier's bridged terminals (200 volts at isolated outputs).***

**MPC200T, MPC300T, and MPC600T *(140V and 200V operation)—Fully insulated CLASS ONE wiring must be used to connect the amplifier to the loudspeakers.***

***MODE BRIDGÉ MONO: ATTENTION***

**TOUT LES MODÈLES—*Des tensions de sorties aussi élevée que 160 volts rms sont disponible aux bornes du amplificateur MPC en mode bridgé mono (200 volts aux sorties isolés).***

**MPC200T, MPC300T, et MPC600T *(opération 140V et 200V)—On doit utiliser du câblage entièrement isolé de CLASSE 1 pour relier l'amplificateur aux haut-parleurs.***

***VORSICHT BEI MONO-BRÜCKENBETRIEB:***

**ALLE TYPEN—*Zwischen den Ausgangsklemmen der MPC-Verstärker können Ausgangsspannungen bis 160 Volt RMS anliegen (200 Volt bei isolierten Ausgänge).***

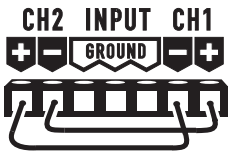
**MPC200T, MPC300T, und MPC600T *(140V- und 200V-Betrieb)—Der Anschluß muß vom Verstärker bis zum Lautsprecher mit vollisoliertem Kabel erfolgen.***

***PRECAUCIÓN PARA EL MODO MONO PUENTE***

**TODO LOS MODELOS—*Voltajes de salida de hasta 160 Vrms existen entre los terminales de puente del amplificador MPC (200 voltios a las salidas aisladas).***

**MPC200T, MPC300T, y MPC600T *(operación 140V y 200V)—Utilice cableado de CLASE UNO totalmente aislado para conectar las altoparlantes.***

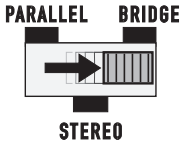
**Bridged Mono Input Connection—**The following diagrams show input and output connections for bridged mono mode. Note that the MPC200 and 200T models use a different method for bridged mono than do the MPC300, 300T, 600 & 600T.




## MPC200 & 200T Bridged Mono Configuration

1) To engage the bridged mono mode, jumper the barrier strip inputs on the rear, in accordance with the diagram printed under the barrier strip inputs.

2) Connect the amplifier input to channel 1 only with the jumpers as shown to channel 2. *Channel 1 and channel 2 gain control settings must be set the same!*




## MPC300, 300T, 600 & 600T Bridged Mono Configuration

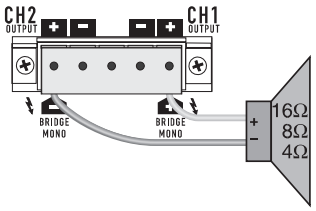
1) Set the mode switch on the back panel to the "bridge" position.

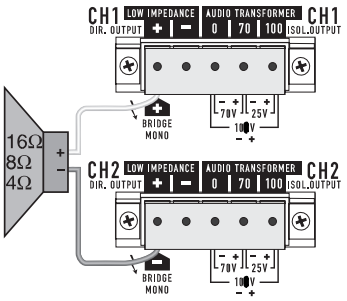
2) Connect the signal to channel 1's input only. Do not connect an input signal to channel 2.

3) Use only channel 1's gain control to set the level. Both channels' *SIGNAL* and *CLIP* indicators should flash identically when the amplifier is operating.

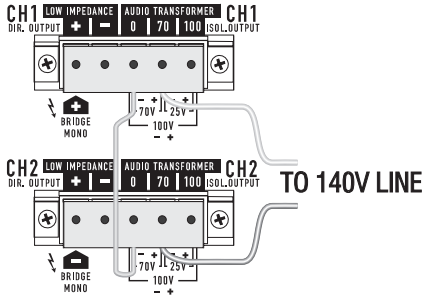
## Bridged Mono Speaker Connection

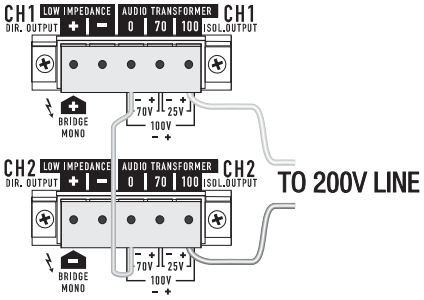
*Low impedance*—A speaker load of 4 ohms or higher can be connected across the two "+" low impedance terminals of the two channels. The positive speaker wire goes to channel 1's "+" terminal and the negative wire to channel 2's "+" terminal.




*Audio transformer*—For bridged mono operation using the *AUDIO TRANSFORMER* outputs, a jumper wire *must* be connected between the *AUDIO TRANSFORMER* "0V" terminals of the two channels. See hookup diagrams.




When operating the amplifier in bridged mono mode, neither of the speaker wires is at ground potential. Grounding either of the speaker wires can short out one side of the power amplifier. Use the same precautions in handling and dressing the wire as you would for the normal "hot" outputs. Ensure that neither wire connects to ground anywhere along its length. Do not use grounded autoformers on the loudspeakers.

### Low Impedance Bridged Mono

**Applications—**The bridged mono mode produces higher output voltages with the trade-off of requiring a higher impedance load and providing a slightly lower damping factor. Nevertheless, it is an effective way of providing very high power levels to loudspeakers such as 4Ω or 8Ω subwoofers.

**Minimum Impedance—**The bridged mono configuration places the two channels of the amplifier in series with each other. As such, each channel is seeing *half* the total load impedance. For example, connecting a 4Ω speaker in bridged mono results in each amp channel "seeing" a 2Ω load. Since each channel individually is capable of driving a 2Ω minimum impedance, a bridged mono MPC amplifier requires a ***4Ω*** minimum impedance.

**Power Drive Capabilities—**The table below shows the *low impedance* power drive capabilities into 4Ω and 8Ω loads of the MPC amplifiers in bridged mono mode:

| *Model* | *Minimum Load* | *Power Into 8Ω* | *Power Into 4Ω* | *Power Into 2Ω* |
|---|---|---|---|---|
| MPC200 & 200T | 4Ω | 450 Watts | 700 Watts | **DO** |
| MPC300 & 300T | 4Ω | 600 Watts | 900 Watts | **NOT** |
| MPC600 & 600T | 4Ω | 1200 Watts | 1800 Watts | **USE** |

### High Impedance Bridged Mono

**Distributed System Bridged Mono Applications—**Placing the "T" models in bridged mono mode permits higher drive voltages (140V and 200V) for reducing the effect of cable resistance when driving extremely long loudspeaker lines. The loudspeakers and speaker transformers connected to these lines must be capable of handling these higher voltages, and the speaker cabling itself may be subject to special local or national safety code requirements.

# Parallel Mono Configuration

The "Parallel" mode ties the two channel inputs together so that both are driven by the same signal, without the need for external jumpers or wiring. After the inputs, both channels operate independently. Though they carry the same signal, their gain controls affect only their respective channels, and they must use separate speakers. ***Never parallel the speaker outputs!***

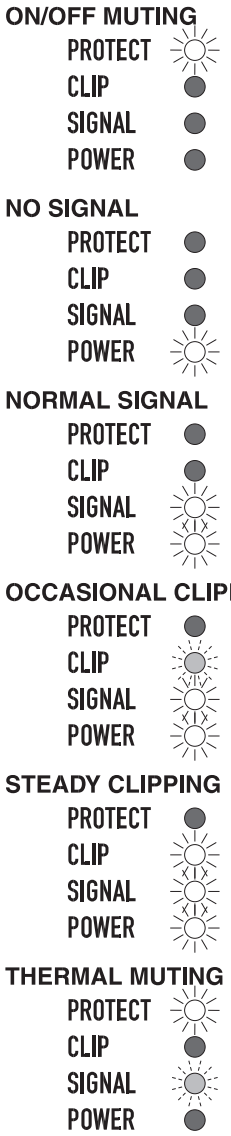
Only the models MPC300, 300T, 600, and 600T feature a mode switch; to place any of these in parallel mode, set the switch to the "Parallel" position. To feed the same input signal to the two channel inputs on models MPC200 and 200T, simply use jumper wires on the Euroblock barrier strip input connector to parallel the two channel inputs: "+" to "+" and "-" to "-."

# Controls

The channel attenuator controls, labeled in dB of attenuation, are located on the rear panel. They have 11 detents and are adjustable from 0 dB (full gain) to ∞ (full attenuation).

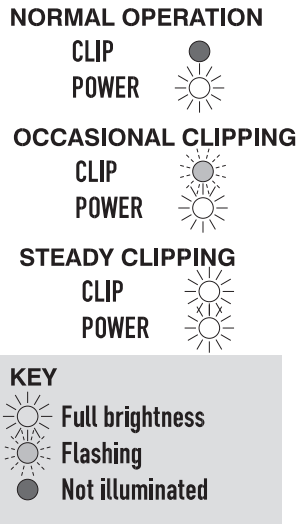
# Displays

The LED displays on models MPC200 and 200T are different from those on models MPC300, 300T, 600, and 600T.




◀ *Models MPC300, MPC300T, MPC600, & MPC600T*

*Models MPC200 & MPC200T* ▼



# AC Power

The MPC amplifiers are available for 120 or 220–240 VAC, 50 or 60 Hz operation. Each amplifier is factory configured for the line voltage of the market into which it is sold.

# Operation

Before first turning on the amplifier, turn the gain controls off—i.e., fully counterclockwise—until you confirm the amplifier is operating properly.

### MPC200 & 200T

Upon turning on the AC switch, the *POWER* LEDs will light and the amplifier will mute for 3 seconds. After this turn-on sequence, the amplifier should work normally.

Turn up the gain controls until the speakers produce the desired sound levels. The gain controls should usually be kept in the upper half of their ranges for full performance and most precise adjustability.

The *POWER* LEDs indicate the operation of each channel. The red *CLIP* LEDs indicate overdrives of their respective amplifier channels.

The mute circuit cuts off the sound as soon as you turn off the amp and mutes for 3 seconds when you turn on the amplifier. This blocks turn-on and turn-off thumps.

### MPC300, 300T, 600, & 600T

When the amplifier is turned on, the red *PROTECT* LED on each channel lights for about 2 to 3 seconds, during which the output relays mute the speakers. After the turn-on muting interval, the *PROTECT* LEDs turn off, the green *POWER* LEDs light and the output relays enable the speaker outputs. Even during the muting interval, the yellow *SIGNAL* and red *CLIP* LEDs operate normally if there is a signal present. If the *CLIP* LED is on while the amplifier is muted, immediately cut the gain back to avoid a full power blast of sound when the output relays close. If a channel stays muted with its *PROTECT* indicator lit, or if its *SIGNAL* or *CLIP* indicators light when the gain is turned all the way down, it may be defective; see the troubleshooting segment for more information.

The *SIGNAL* LED indicates signal levels that are -30 dB (referenced to full rated output power) or higher.

The mute circuit cuts off the sound as soon as you turn off the amp, and the *PROTECT* indicators remain lit until the power supplies are discharged.

# Protection Circuits

The design of the MPC Series takes a comprehensive approach to protection.

**RF Protection—**As in all JBL power amplifiers, the inputs are resistively buffered for overload and RF protection. Chassis bypass capacitors at inputs and outputs further improve RF rejection.

**Short-Circuit Protection—**MPC amplifiers use the proven Output Averaging™ short circuit protection system. The circuit permits full output current even into resistive or reactive 2Ω load, but reduces the current safely by about 75% if the output is shorted.

**Transient Muting—**Turn-on and turn-off muting keeps transients—both from the amplifier itself and from upstream equipment—from reaching the speakers when the amplifier is turned on or off. The turn-on delay is approximately 3 seconds to allow the power supplies and circuitry to stabilize. Turn-off muting occurs almost immediately after power is shut off. Muting occurs whether power is turned on and off using the front panel power switch or externally at the AC source.

**Inrush Protection—**It is common in some amplifiers for a large surge of current from the AC power line to occur in the first seconds after the amplifier is turned on, during which the depleted power supply capacitors charge. This inrush current can trip circuit breakers—severely limiting the number of amplifiers that can be switched on at the same time—and can also damage the internal workings of the amplifier. To guard against this, models MPC300, 300T, 600, and 600T feature an internal NTC (negative temperature coefficient) thermistor in series with the power switch and the transformer primary to limit inrush current. The thermistor initially has a high resistance, which then diminishes rapidly as it warms to avoid power loss. Typically, the inrush current of such an MPC amplifier is about what you could expect from a typical amplifier of $^1/_3$ to $^1/_2$ the MPC's power rating. The smaller models, MPC200 & 200T, have low inrush currents and do not require an NTC thermistor.

**DC Fault Protection—**When the fault protection circuitry of an MPC300, 300T, 600, or 600T senses a DC voltage on a channel output, it actuates a relay that shorts the output to ground to help protect the load against damage. (The amplifier's high pass filter, described below, will itself block DC coming into the amplifier inputs.) The amplifier's Output Averaging protection circuitry limits current to further protect the output devices. If the DC problem persists, that channel will go into thermal protection mode and should be serviced by a qualified technician. The output stage of models MPC200 and 200T has AC coupling to prevent it from passing DC.

**Thermal Protection—**Temperature sensors on the channel heatsinks *and* on the power transformers are part of the thermal management circuitry. The sensors govern whether the dual-speed fan runs at low or high speed. Below 55°C the fan runs at low speed; above it runs at high speed. Above 85°C, the channel mutes for thermal protection.

**Infrasonic / Subsonic and Saturation Protection—**Built-in second-order 50 Hz (MPC200T) and third-order 45 Hz (MPC300T and 600T) Butterworth high-pass filtering helps prevent saturation in speaker transformers by sharply reducing the amount of ultra-low frequency energy the amplifier delivers. However, some lower-quality speaker transformers have responses that do not extend that low; if you have any of these in your distributed line system, you should insert a corresponding high-pass filter in the audio path before the amplifier(s) unless you are also using subwoofers. All models have a subsonic filter to prevent passing DC or excessive subsonic energy.

# Glossary

*Distributed output*, *isolated output*, *audio transformer output*, and *constant voltage output* all refer to the terminals labeled "AUDIO TRANSFORMER" on the shrouded output connectors of the MPC200T, 300T, and 600T models. Various terms for 200V, 140V, 100V, 70V, 50V, or 25V systems are *constant voltage speaker system*, *distributed speaker system*, or an *isolated system* (if using full-isolation transformers in the amp—as do the MPC amplifiers—and on the loudspeakers).

*Direct output* and *low impedance output* refer to the output terminals that drive *low impedance* loads, such as 16Ω, 8Ω, 4Ω, and 2Ω speakers.

# Specifications

| *Electronics* | MPC200 | MPC300 | MPC600 | MPC200T | MPC300T | MPC600T |
|---|---|---|---|---|---|---|
| **Direct Power Out** | | | | | | |
| 4Ω bridge 1 kHz, 1% THD[1] | 700 W | 900 W | 1800 W | 700 W | 900 W | 1800 W |
| 8Ω bridge 45 Hz–20 kHz, 1% THD | 450 W | 600 W | 1200 W | 450 W | 600 W | 1200 W |
| 2Ω load/channel[2], 1 kHz, 1% THD[1] | 350 W | 450 W | 900 W | 350 W | 450 W | 900 W |
| 4Ω load/channel[2], 45 Hz–20 kHz, 1% THD | 225 W | 300 W | 600 W | 225 W | 300 W | 600 W |
| **Isolated Constant Voltage Out** | | | | | | |
| 200V or 140V Bridge: | | | | 350 W | 500 W | 1000 W |
| 100V or 70V/Channel | | | | 175 W | 250 W | 500 W |
| 25V/Channel: | | | | 150 W | 200 W | 400 W |
| **Frequency Response** | | | | (bandlimited by built-in highpass filter) | | |
| Direct Outputs: | 20 Hz–20 kHz ±0.2 dB | | | 50 Hz–20 kHz* | 45 Hz–20 kHz** | |
| Isolated Outputs | | | | 50 Hz–16 kHz* | 45 Hz–16 kHz** | |
| | * -3 dB @ 50 Hz, -0.2 dB @ 20 kHz ** -3 dB @ 45 Hz, -0.2 dB @ 20 kHz | | | | | |
| Sensitivity (for full output): | 0.96V | 1.02V | 1.0V | 0.96V | 1.02V | 1.0V |
| Voltage Gain (direct outputs): | 35 (31 dB) | 40 (32 dB) | 56 (35 dB) | 35 (31 dB) | 40 (32 dB) | 56 (35 dB) |
| Output Circuit Type: | AB | AB | H | AB | AB | H |
| AB = *Class AB+B complementary linear stage* H = *Class AB+B linear stage with Class H 2-step high-efficiency circuit* | | | | | | |
| Distortion: | SMPTE-IM less than 0.05% | | | | | |
| Damping Factor: | Greater than 200 (direct outputs) | | | | | |
| Noise: | Less than 100 dB below rated output (20 Hz to 20 kHz) | | | | | |
| Input Impedance: | 20k ohm balanced, 10k ohm unbalanced | | | | | |
| Amplifier Protection: | Short circuit, open circuit, ultrasonic, RF, thermal muting, over-temperature. Stable into reactive or under-impedance loads. | | | | | |
| Load Protection: | Turn-on / turn-off muting, DC-fault load grounding relay (MPC300, 300T, 600, 600T) with internal fault fuses. | | | | | |
| Power Requirements: | 100V, 120V, 220–230V AC, 50–60 Hz (Not user configurable) | | | | | |
| **Physical:** | | | | | | |
| Controls | | | | | | |
| Front Panel: | Power Switch | | | | | |
| Rear Panel: | Ch 1 & Ch 2 gain controls (11 detents: 0 dB, -2, -4, -6, -8, -10, -12, -14, -18, -24, off); Parallel/Stereo/Bridge switch (except MPC200 & 200T) | | | | | |
| Connectors | Input: Euro-style detachable header with screw-down terminal for bare wires<br>Output: Covered barrier strip for bare wires or spade terminal | | | | | |
| Cooling: | Two-speed fan with back-to-front airflow | | | | | |
| Net Weight: | 14 kg (27 lb) | 19 kg (42 lb) | 23 kg (50 lb) | 18 kg (37 lb) | 25 kg (55 lb) | 31 kg (67 lb) |
| Shipping Weight: | 17 kg (33 lb) | 23 kg (49 lb) | 27 kg (58 lb) | 21 kg (42 lb) | 28 kg (62 lb) | 34 kg (75 lb) |
| Indicators: | CLIP: Red<br>POWER: Green<br>PROTECT: Red *(except MPC200 and 200T)*<br>SIGNAL: Green *(except MPC200 and 200T)* | | | | | |
| Dimensions (H × W × D) | | | | | | |
| MPC200T & 200: | 89 × 483 × 455 mm (rack depth 450 mm); 3.5 × 19 × 17.9 in (rack depth 17.7 in); 2 RU high | | | | | |
| MPC300T, 300, 600T, & 600: | 133 × 483 × 455 mm (rack depth 450 mm); 5.25 × 19 × 17.9 in (rack depth 17.7 in) 3 Rack Units high | | | | | |
| Agency Approvals: | UL & CUL approved, CE compliant, and approved by Lucasfilm for THXÒ installations | | | | | |
| Optional Accessories: | MP-RRB1: Rear Rack Bracket for 3RU (5.25 in) models (set of 2)<br>MP-RRB2: Rear Rack Bracket for 2RU (3.5 in) models (set of 2) | | | | | |

[1] Typical
[2] Both channels drive, 120V 60 Hz mains.

JBL continually engages in research related to product improvement. Changes introduced into existing products without notice are an expression of that philosophy.

# Power Consumption

Some background on AC ratings is necessary to fully understand power consumption specifications. Essentially, there are three ratings of interest: (1) the legal operating current as measured by the Safety Agencies, (2) the maximum expected average current draw under worst-case program material, and (3) the peak current draw at full output power.

All major safety agencies around the world measure amplifier current and temperature rise under the same "normal operation conditions," using a pink noise signal with an average power equal to 1/8 of maximum rated average power. To put this level in perspective, typical music and speech signals contain peaks of 12 dB to 20 dB above the average signal level, so operating at 1/8 of rated average power will typically result in heavily clipped program material.

JBL engineering standards call for the ability to operate at 1/3 power, in order to meet worst-case demands.

The electrical current consumption at 120 VAC for each audio power level and load impedance is shown in the table below. *Multiply the current figures by 0.5 for 230 VAC operation.*

Note: the audio test signal for 1/8 and 1/3 power testing is pink noise; the signal for full-power testing is a 1 kHz sine wave.

| Model | Channel Load | Full Power | 1/3 Power | 1/8 Power* | Idle |
|---|---|---|---|---|---|
| MPC200, MPC200T | 8Ω + 8Ω | 5.7 A | 3.4 A | 2.3 A | 0.4 A |
| | 4Ω + 4Ω | 9.2 A | 5.2 A | 3.5 A | 0.4 A |
| | 2Ω + 2Ω | 13.3 A | 7.4 A | 4.9 A | 0.4 A |
| | 25V, 70V, 100V | 8.7 A | 5.0 A | 3.3 A | 0.4 A |
| MPC300, MPC300T | 8Ω + 8Ω | 7.7 A | 4.9 A | 3.3 A | 0.6 A |
| | 4Ω + 4Ω | 12.5 A | 7.4 A | 4.8 A | 0.6 A |
| | 2Ω + 2Ω | 18.8 A | 11.0 A | 7.2 A | 0.6 A |
| | 25V, 70V, 100V | 11.2 A | 6.7 A | 4.5 A | 0.6 A |
| MPC600, MPC600T | 8Ω + 8Ω | 14.7 A | 8.4 A | 4.5 A | 0.8 A |
| | 4Ω + 4Ω | 23 A | 12.4 A | 6.1 A | 0.8 A |
| | 2Ω + 2Ω | 33 A | 16.5 A | 8.0 A | 0.8 A |
| | 25V, 70V, 100V | 21 A | 10.9 A | 5.7 A | 0.8 A |

***** *Analogous to normal audio program with moderate to heavy clipping.*

# Heat Emission

Any power that enters the amplifier through the power cord and does not exit through the speaker outputs turns into heat, which the amplifier must rid itself of by exhausting it to the outside. In indoor use this may present a challenge to the building's air conditioning system. Use the table below to predict the heat that will be emitted by your amplifier.

Note: the audio test signal for 1/8 and 1/3 power testing is pink noise; the signal for full-power testing is a 1 kHz sine wave.

| | | Full Power | | 1/3 Power | | 1/8 Power* | | Idle | |
|---|---|---|---|---|---|---|---|---|---|
| **Model** | **Channel Load** | **BTU/hr** | **kcal/hr** | **BTU/hr** | **kcal/hr** | **BTU/hr** | **kcal/hr** | **BTU/hr** | **kcal/hr** |
| **MPC200, MPC200T** | 8Ω + 8Ω | 645 | 163 | 615 | 155 | 510 | 128 | 85 | 22 |
| | 4Ω + 4Ω | 1265 | 318 | 1060 | 267 | 830 | 210 | 85 | 22 |
| | 2Ω + 2Ω | 2340 | 590 | 1700 | 429 | 1295 | 326 | 85 | 22 |
| | 25V, 70V, 100V | 1365 | 344 | 1050 | 264 | 800 | 202 | 85 | 22 |
| **MPC300, MPC300T** | 8Ω + 8Ω | 1406 | 354 | 1020 | 257 | 604 | 152 | 229 | 58 |
| | 4Ω + 4Ω | 2525 | 637 | 1617 | 408 | 921 | 232 | 229 | 58 |
| | 2Ω + 2Ω | 4658 | 1174 | 2532 | 638 | 1290 | 325 | 229 | 58 |
| | 25V, 70V, 100V | 2010 | 507 | 1503 | 379 | 1141 | 288 | 229 | 58 |
| **MPC600, MPC600T** | 8Ω + 8Ω | 1791 | 452 | 1239 | 312 | 805 | 203 | 297 | 75 |
| | 4Ω + 4Ω | 3330 | 840 | 2081 | 525 | 1222 | 308 | 297 | 75 |
| | 2Ω + 2Ω | 5698 | 1437 | 3146 | 793 | 1611 | 406 | 297 | 75 |
| | 25V, 70V, 100V | 3772 | 951 | 2338 | 589 | 1280 | 323 | 297 | 75 |

***** *Analogous to normal audio program with moderate to heavy clipping.*

# Troubleshooting

**PROBLEM: Channel will not come out of muting.**

• Reduce the gain to ∞ attenuation. If this releases the muting, raise the gain back up slowly while you watch the *SIGNAL* and *CLIP* indicators. The problem may be an abnormal signal (possibly with excessive ultrasonic energy, for example) that could otherwise damage your speakers.

• If reducing the gain control to ∞ attenuation does not release muting, the channel is defective or overheated (see "overheating" section).

**PROBLEM: No Sound (MPS 300, 300T, 600 & 600T only)**

• Is the *PROTECT* LED lit? If so, the channel may be muted (see below).

• Is the *SIGNAL* LED lit or flashing? If so, the speaker may be open or blown, there may be an open circuit in the speaker wiring, or there may be an open circuit in the internal output wiring of the amplifier.

• If the *SIGNAL* indicator is dark, there may not be enough signal, or none at all. Try turning up the rear panel attenuators or boosting the signal level of the device that is sending the signal to the amplifier.

• If the *SIGNAL* indicator shows little or no activity but the *CLIP* LED is lit or flashing, there is probably a short circuit in the speaker wiring, especially if the *PROTECT* indicator starts flashing. It is also possible, but less likely, that the channel's output relay is defective and will not open, thereby short-circuiting the channel output and producing the same symptoms.

**PROBLEM: Hum in the audio**

• Because of its grounded-collector output transistor configuration, which maximizes thermal efficiency, the signal ground on an MPC amplifier cannot be lifted. The amplifier's balanced inputs are meant to reject hum, but if hum remains a problem, check the tightness of the two mounting screws on the input panel (except MPC200 & 200T). If they are loose, the panel itself might not be well grounded to the chassis. In some cases, such as when the audio signal cables are routed near lighting dimmers that use triacs, you may need to use external input transformers because of the extremely high noise field produced by the dimmer circuitry.

**PROBLEM: Channel goes into muting, with *PROTECT* LED on (MPS300, 300T, 600 & 600T only)**

• If the fan is running full speed, the channel probably suffers from severe overheating. Unless there is a blockage in the flow of cooling air, the channel should return to normal within a minute or so (see "overheating" section).

• If the fan is not running at full speed, or the channel does not reset to normal after a cool-down period, the muting is probably caused by a DC fault or other amplifier failure (especially if the *SIGNAL* or *CLIP* indicators are lit even with the attenuator turned all the way down).

**PROBLEM: Overheating**

• The thermal management system features a two-speed fan that modulates the cooling air flow over the heatsinks in response to the cooling needs. If the air flow is blocked, however, or if the amplifier is overdriven into very low impedance loads, the amplifier could overheat even though the fan is running at full speed.

• *MPC200 & 200T:* At 85°C both channels mute. The *POWER* indicator remains lit, although the *CLIP* indicator is dark. The amplifier remains this way until the temperature drops to a safe level.

• *MPC300, 300T, 600 & 600T:* At 85°C, the channel's output relay mutes the output. The channel remains muted until the temperature drops to a safe level. Even while the channel is muted, the *SIGNAL* and *CLIP* indicators function normally. If the *CLIP* indicator is flashing or continuously lit, reduce the gain to hasten the cool-down and prevent repeated thermal shutdowns.

# For Further Assistance

## WITHIN THE UNITED STATES:

### General Information or Technical Assistance

For more information on JBL products, including these power amplifiers, contact your nearest JBL Professional products dealer or the JBL factory at the address below.

### Repairs

Please do not ship your amplifier to JBL or a JBL authorized repair facility without prior authorization. You may obtain that authorization by contacting the factory or repair facility directly. Please ship amplifiers in the original packing materials or equivalent to prevent further damage during shipment, and insure the shipment adequately. Mark the return materials authorization number (RMA) clearly on the outside of the package and on any correspondence.

JBL Professional
8400 Balboa Blvd.
Northridge, CA 91329
(818) 894-8850

## OUTSIDE THE UNITED STATES:

For general information, technical assistance or repairs, contact the JBL Professional Distributor in your country.


JBL Professional 8500 Balboa Boulevard, P.O. Box 2200 Northridge, California 91329 U.S.A.