

## 1. Introduction

Thanks for purchasing your new GT series automotive amplifier. The GT series amplifier you have chosen includes many unique features to enhance its performance and utility. The power amplifier circuitry is a fully discrete design notable for its low distortion and unusually clean and clear sound quality. Your GT series amplifier will easily connect to virtually any car audio system, whether it is factory installed or one purchased separately. In addition to conventional preamp level inputs, this model features JBL's Universal Interface design, which facilitates simple connection to factory radios with the low distortion that is usually only associated with preamp level connection. With Universal Interface, a factory radio can be used either as the main music source or combined with a CD player or changer, which includes volume control capability, simultaneously connected to the amplifier. By providing this two-unit direct connection, Universal Interface circuitry eliminates the need for an FM modulator to interface a CD player to factory radios, improving the fidelity of digital playback. In addition, when using a high-powered (BTL) radio through the speaker-level inputs, Common Sense turn-on circuitry senses the common-mode voltage present on the radio's speaker wires, turning the amplifier on without an additional "remote" wire. Also, the built-in active crossover provides either full-range, high-pass or low-pass operation. This lets your GT series amplifier power

either subwoofer or component speakers in a bi-amplified system, or conventional full-range speakers in simpler systems. The GTS300 and 600 also include preamp-level outputs which can provide either full-range, high-pass or low-pass signal to drive additional amplifiers. This lets you build systems of virtually any design without requiring a separate electronic crossover.

### 1.2 About Installation

Although the GTS300 and GTS600 are designed to make installation as easy as possible, they are sophisticated products that require proper installation to realize their full performance potential. If you feel you do not have the necessary knowledge and skills **we strongly recommend that the installation be done by your authorized JBL dealer.**

If you choose to install the GTS300 or GTS600 yourself read *all* of the information in this manual *before* you start the installation. Pay particular attention to the safety precautions and notes.

## 2. Installation and Use

Refer to the "Crossover Frequency Adjustments" and "Speaker Level Input Impedance Adjustments" sections of this manual to see if you will need to make alterations to their factory settings. If you are not using the built-in crossover, or the speaker level inputs, you may skip this step.

1. Disconnect the negative cable from the battery. *Note: If the vehicle's radio features a code type security system, make certain you know the code*

*before disconnecting the battery!*

2. Run a minimum AWG #8 power cable complete with a 40 amp fuse (not included) for the GTS300 or an AWG #6 or AWG #4 cable with an 80 amp fuse for the GTS600 directly from the positive + 12V battery terminal to the desired amplifier location. Keep the fuse to within 6" of the battery terminal, and before the wire runs through any metal partition.

*Note: All wiring connections should be made either by soldering with heatshrink tubing insulation or with high quality crimp type insulated connectors installed with a professional type, articulated crimping tool. Soldering crimp type terminals is recommended for additional security. Never use wire-nuts, insulation-displacement connectors (i.e. ScotchLok type), or "twist and tape" connections. Do not use electrical tape; it will loosen with age and extreme temperatures.*

3. Mount amplifier in the desired location using four screws.
4. Connect power wiring as shown in the Wiring Diagram.
5. Connect the outputs from the head unit to the appropriate inputs of the amplifier according to the Wiring Diagram with either high quality low-level signal cables with RCA plugs, with the supplied speaker-level input connector, or both.
6. Connect the speakers to the amplifier according to the wiring diagram.

7. Turn the input gain adjustment to the 1/4 position.
8. Set the crossover switches as desired.
9. Set the input mode switch to stereo, left + right or right input only operation.
10. Set the bass boost switch to the desired position.
11. Reconnect the negative battery cable.
12. Turn on the signal source at a low volume level and check for the correct output from each speaker.
13. Adjust the amplifier gain control using the procedure described in the "Adjusting the Gain" section.

## **2.2 Controls and Connectors**

1. *Preamp-Level Input Connector* – Use these connectors for line (preamp) level input to the amplifier.
2. *Preamp-Level Output Connector* – Use these outputs to send the signal to additional amplifiers.
3. *Speaker-Level Input Connector* – Use this connector for speaker level input signals. A wire harness is supplied for use with this connector. This input also includes JBL's Common Sense input circuitry which turns the amplifier on as soon as the high powered head unit connected to this input is turned on.
4. *Speaker Output Connector* – Connect speaker wiring to this connector. See "Wiring" directions for more information.
- 5., 6., 7., 8., *Power Connector* – Connection for power wires #A. See "Wiring" directions for information on proper connections.

9. **Fuse** – 40 Amp ATC type fuse for the GTS300 and two 40 amp fuses for the GTS600.

10. **Gain Control** – Use this control to adjust the input sensitivity of the amplifier. See the “Adjusting the Gain” section for tips on proper setup.

11. **Preamp-Output Crossover Switch** – This switch controls the built-in crossover that is directed to the preamp-output connectors. Set the switch to “Flat” for full band operation. Set this switch to “Low-Pass” to activate the low-pass filter on the preamp output (for subwoofer use). Set the switch to “High-Pass” to activate the high-pass filter for use with satellite speakers.

12. **Speaker Output Crossover Switch** – This switch controls the built-in crossover that is connected to the power amplifier circuitry. Set the switch to “Flat” for full band operation. Set this switch to “Low Pass” to activate the low

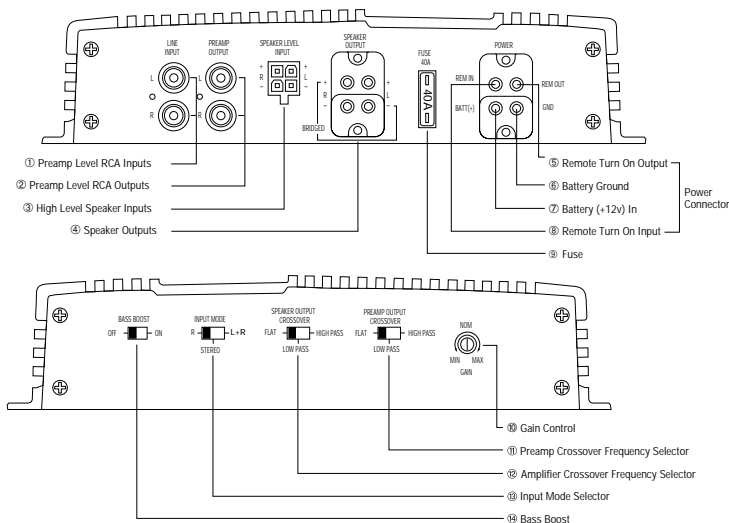
pass filter on the amplifier (for subwoofer use). Set the switch to “High Pass” to activate the high pass filter for use with satellite speakers.

13. **Input Mode Selector** – This switch is used to set the input mode for both preamp and speaker-level inputs.

Set this switch to Stereo for normal operation using both left and right inputs. Set this switch to R to drive both the left and right output channels with only a single input on the right channel. Set this switch to “L+R” to sum the left and right inputs for a mono output on both amplifier channels.

**Power Indicator LED (on chassis top)** – LED steadily illuminates for normal operation. LED blinks when protection circuitry or muting is engaged.

14. **Bass Boost Switch** – This activates a built-in Bass Boost circuit used to increase low-bass output.



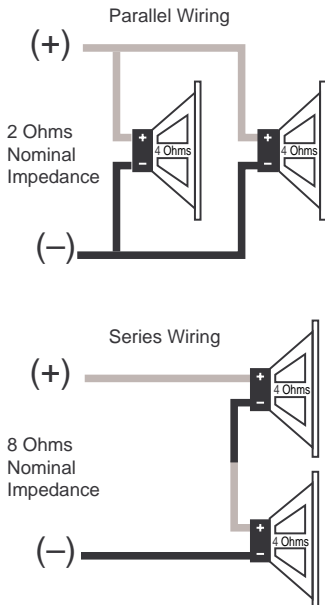
### 3. System Design Using the GTS300 or GTS600:

#### 3.1 Speaker Requirements

When used in the non-bridged mode the GTS300 or GTS600 can easily drive 2 ohm speaker loads. When only one speaker is connected to each channel, virtually any conventional speaker may be used.

When the GTS300 or GTS600 is in bridged mode, the combined impedance of the speaker (or speakers) connected to the bridged channel should be at least 4 ohms. Sustained operation of the GTS300 or GTS600 in bridged mode with less than 4 ohms will likely cause overheating.

**The GTS300 or GTS600 must not be used with speakers that have either one of their input terminals wired to the frame of the speaker or to the chassis of the vehicle.**



#### 3.2 Signal Sources

The low level preamp outputs of any radio/tape deck, CD player or preamp/equalizer so equipped can drive the GTS300 or GTS600. The gain controls of the GTS300 or GTS600 are used to match the amplifier's input sensitivity to the output voltage of the source. This matching is important to keep noise low and is explained in the "Adjusting the Gain" section of this manual.

Thanks to Universal Interface Circuitry, the GTS300 or GTS600 can also be connected to power amplifiers, radios or equalizers that are equipped with only speaker outputs by connecting them through the speaker level input connector. Inside the GTS300 or GTS600, the speaker-level and preamp-level inputs are connected through a mixing circuit, which allows them to be used simultaneously. Therefore a low level source, such as a CD player equipped with a volume control may be connected to the preamp-level inputs at the same time as a powered radio/tape unit is connected to the speaker-level inputs. This provides a higher performance alternative to an FM Modulator connection when you wish to add CD capability to a factory cassette stereo. Switching from one source to the other is as simple as turning the desired source on and turning the undesired one off – no additional switches or relay connections are needed.

#### 4. Wiring

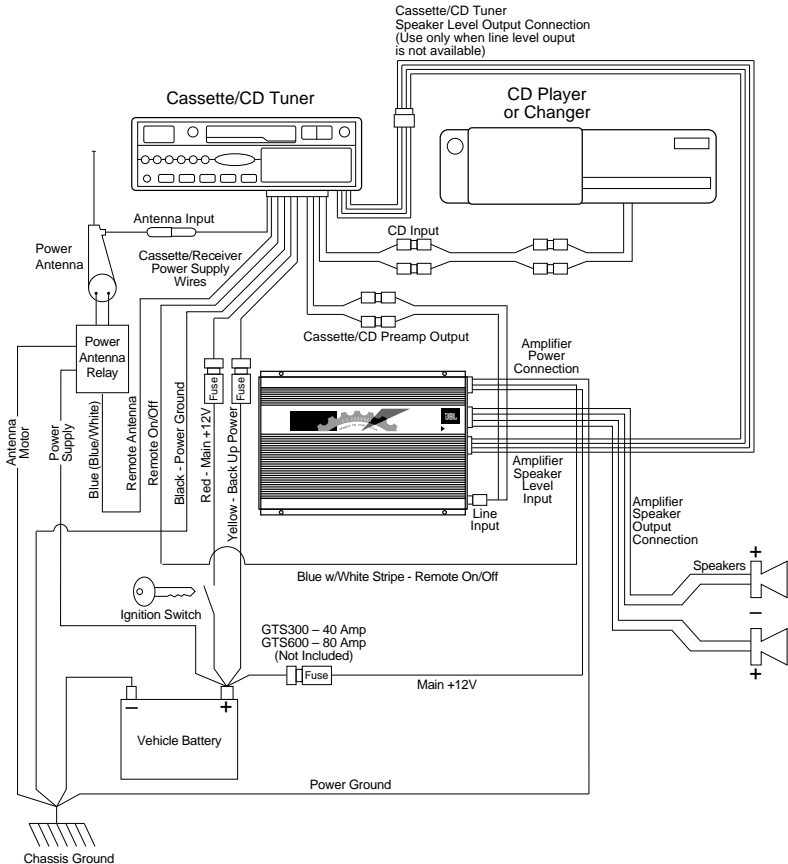
Proper wiring of the GTS300 or GTS600 and the associated

components is extremely important for proper performance and long term reliability.

All wiring connections should be made either by soldering with heatshrink tubing insulation or with high quality crimp type insulated connectors installed with a good crimping tool. Soldering crimp connections is recommended to further enhance connection reliability. Never use wire-nuts, insulation-displacement connectors (i.e. ScotchLok type), or "twist and tape" connections. Do not use electrical tape; it will

loosen with age and extreme temperatures. Never leave bare wire exposed.

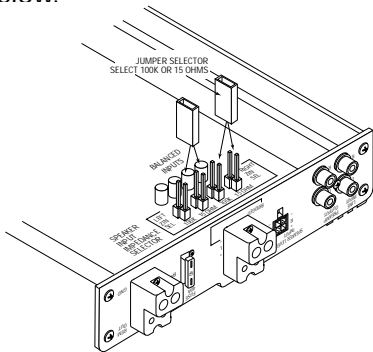
Route the wiring through the car carefully. Do not allow wires to lay against sharp sheet metal edges or any other surfaces that might wear away or cut through the insulation of the wire. Use insulated strain reliefs, rubber grommets and plastic tubing to protect the wires whenever they are run through sheet metal panels or are placed where they might be pulled or damaged.



## 5. Internal Adjustments

### Speaker-Level Input Impedance Adjustments

The speaker level inputs of the GTS300 and GTS600 come factory set with 100K ohm input impedance. This will provide the lowest distortion operation from the speaker outputs of most modern head units by reducing the power the amplifier in the head unit must deliver to practically nothing. On some older, or lowerpriced head units, this load will not facilitate proper fader operation. To provide for this, we have provided the ability to change the input impedance of the speaker-level inputs to 15 ohms. This is accomplished by connecting the jumpers as shown in the diagram below.



- If the head unit has 4 channels of builtin amplification and/or an electronic fader control, you should leave the jumpers in the factory set position.
- If the head unit has 2 channels of amplification, with a speaker-level fader, the jumpers should be set to the 15-ohm position. This will always be a rotary-type control, not one controlled by electronic pushbuttons.

## Crossover Frequency Adjustments

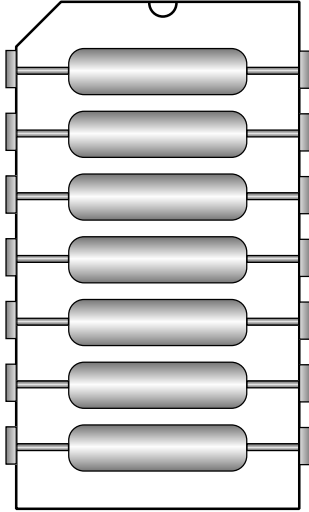
The GTS300 and GTS600 amplifiers include built-in frequency selectable crossovers. One crossover is connected in series with the amplifier circuitry and the other crossover is connected to the preamp level output jacks. These crossovers can be set in either the "flat" (full bandwidth operation), Low Pass (Subwoofer operation), or High Pass (satellite operation).

- The crossover frequencies are set by "chips" inside the amplifier. These "chips" are simply a set of resistors, connected across the pins and molded into a single package. The crossover frequencies may be changed to any value desired by changing the resistor network. JBL has "chips" available in the popular values listed in the table below. If none of these suit your system, you may purchase compatible resistor networks from a local electronics store, or you may build you own custom values from discrete resistors mounted on a 14-pin "DIP Header" using the instructions which follow.

<i>Frequency</i>	<i>Resistor Value</i>	<i>JBL Part Number</i>
50 Hz	47 K	GTM 50
80 Hz	33 K	GTM 80
120 Hz	20 K	GTM 120
200 Hz	12 K	GTM 200
250 Hz	10 K	GTM 250
500 Hz	4.7 K	GTM 500
2.5 Hz	1 K	GTM 2500
5 Hz	470	GTM 5000

Regardless of whether you build or buy it, the necessary resistor network has the following configuration:

### Custom "Chip" Construction



- Each resistor in the package has the same value.
- If you know the crossover frequency you want, you can calculate the resistor value necessary by solving the following equation:

$$\text{Resistor Value in Ohms} = \frac{2,500,000}{\text{Crossover Frequency in Hz}}$$

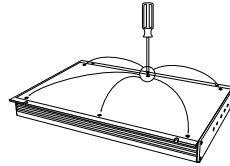
- Use the following equation if you have a resistor pack of a known value, and want to find its crossover frequency:

$$\text{Crossover Frequency in Hz} = \frac{2,500,000}{\text{Resistor Value in Ohms}}$$

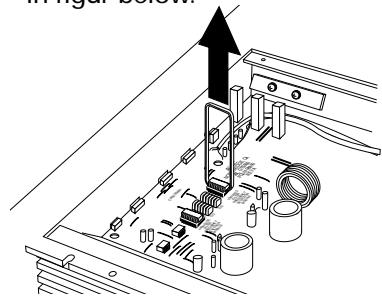
- To build "chips" from discrete resistors, solder the resistors to a standard 14-pin "DIP Head" according to the diagram. If a DIP Header is not available, you may bend the leads of 1/4 watt resistors 90 degrees, trim them to 3mm-length, and insert them directly into the chip sockets.

To change the crossover frequency change the resistor network as follows:

1. Remove the screws from the bottom panel as shown below.



2. Select which resistor module, high pass or low pass, that you wish to change.
3. A chip puller, which can be obtained from any electronics store, is used to remove the resistor chip. Pull the resistor chip from the socket as shown in figure below.



4. Place the new module in the socket making sure all pins are lined up with the socket holes. Press the module firmly into the socket.
5. Replace the bottom lid.

## 6. Input Gain Adjustment

Before operating the GTS300 or GTS600, recheck all wiring connections to make sure they are correct and secure. Be sure that a fuse (40 amp for GTS300 and two 40 amp fuses for the GTS600, not included) is installed in the +12V line near the battery. Reconnect the negative ground (-) terminal of the battery. Make sure that the input mode selector, speaker output crossover frequency modules, and preamp output crossover switch are properly set.

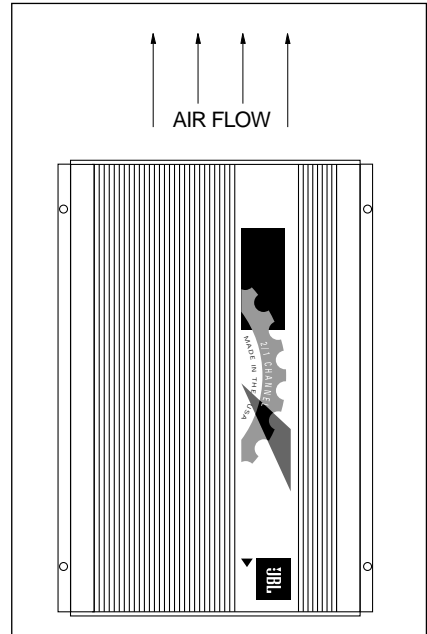
### *Adjusting the Gain*

- The setting of the gain control on the GTS300 and GTS600 is important to ensure proper performance, low noise levels, and maximum reliability in the system.  
Using a high signal level from the source and a low gain setting on the amplifier will help keep background noise levels in the system low.
- To adjust a system using a single amplifier, start with the amplifier gain controls fully counterclockwise.

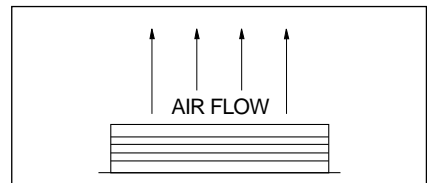
Set all Bass/Treble or equalizer controls to their centered or bypassed positions. While listening carefully to the system output, adjust the volume control of the radio/tape deck to the point where you first begin to hear audible distortion. Reduce the level just to the point where the distortion goes away. If this setting does not provide adequate volume levels, gradually increase (turn clockwise) the gain control on the GTS300 or GTS600

until the system plays as loud as necessary or when the first signs of distortion are heard.

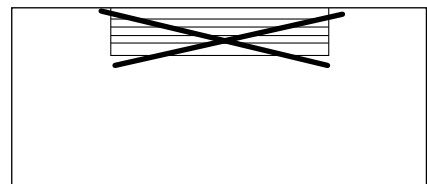
### BEST-Vertical Mounting



### GOOD-Horizontal Mounting



### NEVER-Mount Upside Down





## **7. Typical Applications**

The following diagrams show the most common basic system configurations of the GTS300 and GTS600. A combination of one or more of these “building blocks” may be combined to form elaborate system designs.

# Application 1

## Stereo Full-Range or Subwoofer Operation

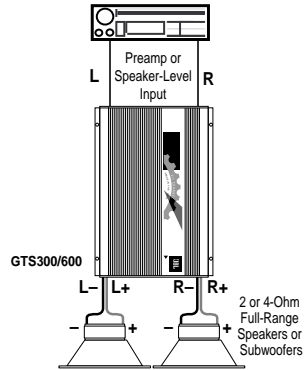
### Full-Range Operation

Speaker Output Crossover Switch	Input Mode Switch
Flat	Stereo

### Subwoofer Operation

Speaker Output Crossover Switch	Input Mode Switch
Low Pass	Stereo

Main speakers are driven by head unit or additional amplifier.



# Application 2

## Bridge-Mode Operation

### Single Amplifier: Subwoofer-Operation (Mono)

Amp	Speaker Output Crossover Switch	Input Mode Switch
B	Low Pass	L + R

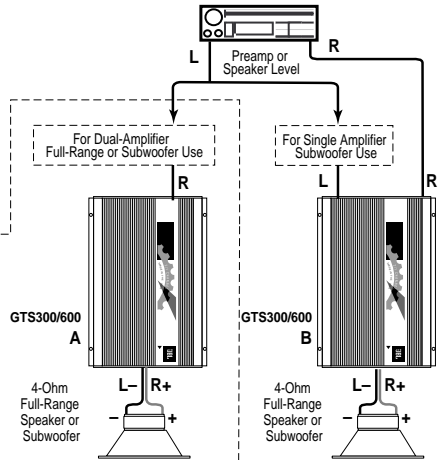
Main speakers are driven by head unit or additional amplifier.

### Dual Amplifier: Subwoofer-Operation (Stereo)

Amp	Speaker Output Crossover Switch	Input Mode Switch
A + B	Low Pass	R

### Full-Range Operation (Stereo)

Amp	Speaker Output Crossover Switch	Input Mode Switch
A + B	Flat	R

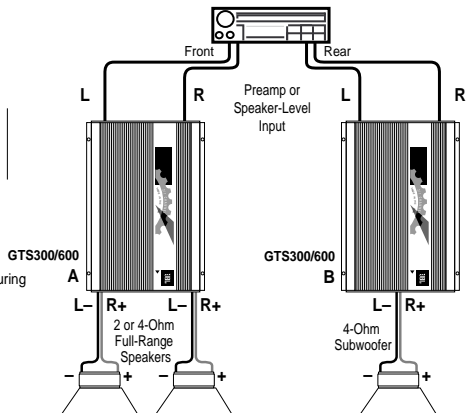


# Application 3

## Bi-amplified, Three-channel Subwoofer/Satellite System

Amp	Speaker Output Crossover Switch	Input Mode Switch
A	High Pass	Stereo
B	Low Pass	L + R

Stereo Subwoofers may be used by configuring Amp B as shown in Application #1.

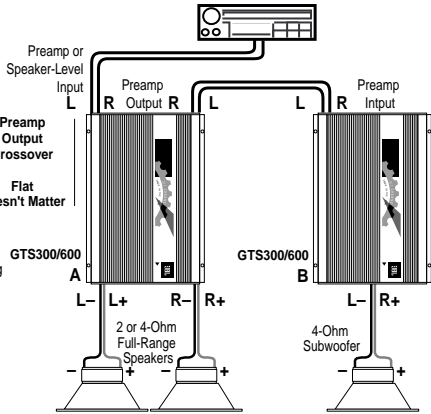


# Application 4

## Bi-amplified, System Using Preamp Output Capability

Amp	Speaker Output Crossover Switch	Input Mode Switch	Preamp Output Crossover
A	High Pass	Stereo	Flat
B	Low Pass	L + R	Doesn't Matter

Stereo Subwoofers may be used by configuring **Amp B** as shown in **Application #1** or by using dual GTS amplifiers as shown in **Application 2**.

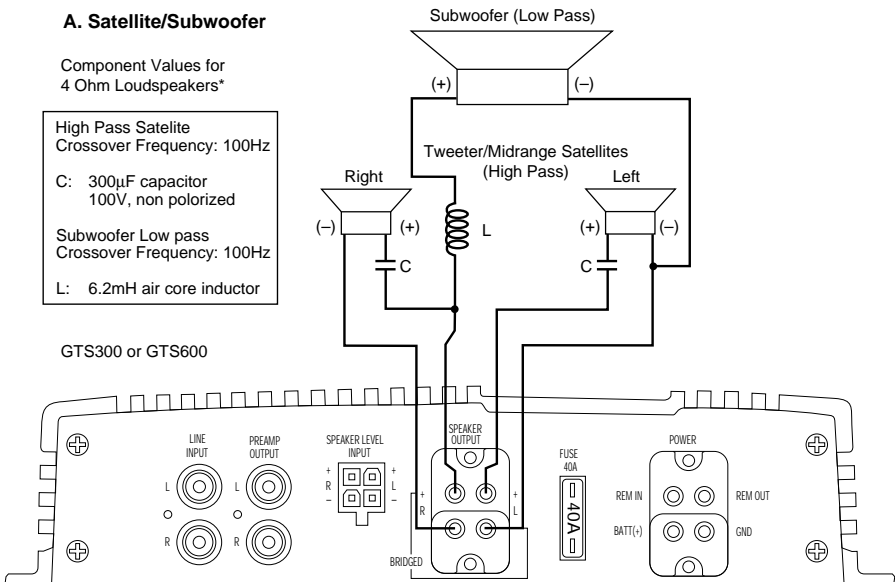


## Simultaneous Stereo-Mono Connection Diagrams

### A. Satellite/Subwoofer

Component Values for 4 Ohm Loudspeakers\*

High Pass Satellite Crossover Frequency: 100Hz
C: 300µF capacitor 100V, non polarized
Subwoofer Low pass Crossover Frequency: 100Hz
L: 6.2mH air core inductor



\*You may change the subwoofer satellite crossover frequency by using the Inductor and Capacitor values calculated with the following formulas:

$$\text{High Pass (Satellite Crossover): } \frac{30,000}{\text{Desired crossover Frequency in Hz}} = \text{New Capacitor Value in } \mu\text{F}$$

$$\text{Low Pass (Subwoofer Crossover): } \frac{620}{\text{Desired crossover Frequency in Hz}} = \text{New Inductor Value in mH}$$

## 8. In Case of Difficulty

Power-on light does not come on

- Head unit not on; turn the head unit on.
- Ground wire is disconnected or defective; check for continuity with an ohm-meter between the amplifier's ground terminal and a known chassis ground point.
- Battery wire is disconnected or defective; check approximately +12 volts between the amplifier's battery and ground terminals.
- Blown fuse; check amplifier's located on the endpanel near the power connector. If it is blown replace it with an identical one. If the new fuse blows immediately, then check all the wiring connection. If no fault is found, consult your JBL dealer.
- Remote-on wire between the head unit and the amplifier is disconnected or defective; check for +12 volts between amplifier's remote-on input terminal and the ground input terminal with the head unit on.

Power light is on, but no sound is heard from some or all of the speakers

- Incorrect switch settings; make sure that all switches (input mode and crossover) are in their correct positions for your system configuration.
- Incorrectly connected or shorted speaker wires; check for shorts in wiring.
- Defective or disconnected audio cables; check for continuity and replace if necessary.
- Incorrect Gain Adjustment; verify that the amplifier gain controls are not turned completely down. If they are, sound output level may be very low and may give the impression that the system) or part of the system) is dead.
- Defective head unit or signal processor; check each component for proper wiring and operation.

Power On light is blinking, indicating a fault condition, and sound is intermittent or off

Alternator whine through the audio system with the engine running

Bass output from speakers too low

- Defective GTS300 or GTS600; If there is audio signal present at the input of the amplifier and there is no output, the GTS300 or GTS600 may be defective.
- Incorrectly connected or shorted speaker wires; check for shorts, frayed wiring, damaged wiring insulation or incorrect wiring.
- The speaker combination connected to the amplifier is less than the minimum requirement; reconfigure speaker connection after consulting with section 3.1 "Speaker Requirements."
- Amplifier is damaged; consult your JBL Dealer.
- Ground loops; verify that the chassis grounding point you have chosen is true ground by checking for continuity between the chassis ground point and battery ground.
- Speaker wired out of phase; check for proper polarity on all speaker wiring (+ amp terminal to + speaker terminal and - amp terminal to - speaker terminal).

## 9. Specifications

Specifications	GTS300	GTS600
Power Output (10Hz -50kHz, 14.4V Battery Voltage)	100 Watts x 2 (4 Ohms, 0.05% THD)	200 Watts x 2 (4 Ohms, 0.05% THD)
	150 Watts x 2 (2 Ohms, 0.08% THD)	300 Watts x 2 (2 Ohms, 0.08% THD)
	300 Watts x 1 (4 Ohms, 0.08% Thd)	600 Watts x 1 (4 Ohms, 0.08% Thd)
Signal to Noise Ratio	100dBA	100dBA
Frequency Response	10Hz - 50kHz (+0, -1dB) 20Hz - 20kHz (+0, -0.1dB)	10Hz - 50kHz (+0, -1dB) 20Hz - 20kHz (+0, -0.1dB)
Damping Factor	>200	>200
Line Level Input Sensitivity (For Rated Power)	100mV - 4V RMS (500mV Nominal)	100mV - 4V RMS (500mV Nominal)
Line Level Input Impedance	10k Ohms	10k Ohms
Speaker Level Input Impedance	15 Ohm or 100k Ohm (Selected By Internal Jumpers)	15 Ohm or 100k Ohm (Selected By Internal Jumpers)
Speaker Level Input Sensitivity	200mV - 8V RMS (2V Nominal)	200mV - 8V RMS (2V Nominal)
Preamp Output Sensitivity	1V out for 4V Speaker Level Input	1V out for 4V Speaker Level Input
Minimum Speaker Impedance Single Ended (Non-Bridged)	2 Ohms	2 Ohms
	Bridged	4 Ohms
Built in Electronic Crossover Frequency and Slope	18dB per Octave Low Pass Filter, Frequency Chips Available from 50-5kHz	18dB per Octave Low Pass Filter, Frequency Chips Available from 50-5kHz
	18dB per Octave High Pass Filter, Frequency Chips Available from 50-5kHz	18dB per Octave High Pass Filter, Frequency Chips Available from 50-5kHz
Bass Boost Frequency and Magnitude	4dB at 40Hz	4dB at 40Hz

Specifications	GTS300	GTS600
Power Requirement	11 to 16V DC Negative Ground	11 to 16V DC Negative Ground
Fuse Size	40 Amp ATC Type Fuse	40 Amp ATC Type Fuse (2 per Amplifier)
Size (L x W x H)	13 1/4" x 9 1/4" x 2" (337 mm x 235 mm x 51 mm)	17 1/4" x 11 1/4" x 2" (438 mm x 286 mm x 50.8 mm)
Weight	10 lbs 8.5 oz (4.8 Kg)	13 lbs 11.5 oz (6.2 Kg)
Speaker Level Input Mating Connector	Molex Mini-Fit Jr. # 39-01-2045-P Metal Pins: 39-00-0039	Molex Mini-Fit Jr. # 39-01-2045-P Metal Pins: 39-00-0039

DECLARATION OF CONFORMITY



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GERMANY, (date tbd)

A handwritten signature in black ink, appearing to read 'Steen Michaelsen'.

Steen Michaelsen

Harman Marketing Europe a/s

*The appliance conforms with EEC  
directive 87/308/EEC regarding  
interference suppression*

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