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H A Harman International Company



GTX4/GTX2
4/2 CHANNEL AUTOMOTIVE ELECTRONIC CROSSOVERS
OWNER'S MANUAL



GTX4/GTX2

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Introduction

The JBL GTX4 and GTX2 electronic crossovers give the car audio enthusiast the ultimate in flexibility to achieve the ultimate in performance.

Please read all the information in this manual before attempting to install the GTX4 or GTX2. These units are sophisticated electronic devices that require proper installation and operation in order to realize their full performance potential.

Specifications

Frequency Response		20 - 20k Hz (± 0.1 dB)
THD	GTX4	0.025%
	GTX2	0.040%
Signal-to-Noise Ratio	GTX4	100 dBA
	GTX2	95 dBA
Crossover Frequency	GTX4	80 Hz installed, 50, 120, 250 Hz modules included, other values* available through authorized JBL dealers
	GTX2	80 Hz installed, 120, 250, 5k Hz modules included, other values** available through authorized JBL dealers
Crossover Slope		18 dB per octave (all sections)
Input Voltage		up to 3V (single-ended, line-level)
Input Impedance		20k ohms
Output Impedance		250 ohms
High-Pass Output Voltage		1:1 (unity gain) referenced to the input voltage
Low-Pass Output Level		-6 to +10 dB (referenced to high-pass)
Control Range		
Power Requirement		11 to 16V DC negative ground
Fuse Size		1A
Size (inches. L x W x H)		5-7/8 x 7 x 1-1/2

* 200, 375, 500, 650, 2.5k, 5k HZ ** 50, 200, 375, 500, 650, 2.5k HZ

Features:

Non-fading, Constant Bass Subwoofer Output (GTX4):

The GTX4 provides a non-fading, constant bass subwoofer output, along with high-pass front and rear outputs that can still be faded from the head unit.

4 or 2 Channel Input Configuration (GTX4):

The GTX4 can be configured to accept front and rear (4 channel) inputs from a head unit featuring front and rear pre-amp outputs. In this set-up, the fading capability of the front and rear high-pass outputs will be retained, and the head unit's fader control will remain functional. When switched to a 2 channel input mode, any head unit with only one pair of pre-amp inputs (right and left) can be used. The signal will be routed to all sections of the crossover.

Crossover Module System (GTX4, GTX2):

The crossover roll-off frequency can be modified by replacing the plug-in modules inside the electronic crossover. The crossover module concept offers the unique combination of the versatility of changeable crossover frequencies, along with the protection from unauthorized tampering with the delicate adjustments of a well-tuned audio system.

Independent Low-Pass and High-Pass Crossover Frequency Adjustments (GTX4, GTX2):

This allows for overlapping or staggering the output frequencies in order to emphasize certain frequencies, eliminate resonances, or fine-tune the bandwidth of operation for a specific speaker. The front and rear high-pass frequencies are also independently set in the GTX4.

18 dB per octave Crossover Slope (GTX4, GTX2):

18 dB per octave filtering optimizes both bandwidth and phase characteristics. All crossover slopes are set to 18 dB per octave.

Low Output Stereo/Mono Switch (GTX4, GTX2):

Allows the use of a mono or single-speaker subwoofer system.

Continuously Adjustable Low-Pass Output Level Control (GTX4, GTX2):

Allow compensation for different speaker efficiencies, amplifier gain, and frequency response shaping.

Pulse Width Modulation (PWM) DC-to-DC Switching Mode Power Supply (GTX4):

Provides excellent transient response, headroom, and immunity to installation-related noises (such as alternator whine).

Low Noise Input Section (GTX4, GTX2):

All JBL electronic crossovers are designed with special attention to the capability of their input section not only to reject induced noises such as alternator whine or spark noise, but to provide audiophile-quality signal-to-noise ratio as well.

Gold-plated RCA Input Connectors (GTX4, GTX2):

For most accurate signal transmission and lowest possible loss. Gold-plated terminals are immune to signal deterioration over time that can be caused by corrosion in the connectors.

Third-order, 18 dB per octave, Capacitive/Inductive Power Supply Input and Output Filtering (GTX4):

For low radio frequency interference (RFI) and excellent immunity to system noises such as alternator whine.

Second-order, 12 dB per octave, Capacitive/Inductive Power Supply Input Filtering (GTX2):

This specially designed battery voltage input section provides excellent immunity to system noises such as alternator whine.

Full Protection Circuitry (GTX4, GTX2):

JBL electronic crossovers are protected against over-temperature, over-current, over-voltage, and input overload. These special circuitries protect the unit from installation errors and unfriendly environmental conditions. However, none of these protection systems is in the signal path. They cannot interfere with the sonic performance of the crossover.

About Installation

The GTX4 and GTX2 are sophisticated devices that must be properly installed and adjusted in order to provide proper performance. This requires knowledge of car audio equipment and automotive DC power systems and some basic mechanical "know how". If you do not have the necessary knowledge and skills we strongly recommend you have the GTX4/2 installed by an authorized JBL installation specialist. If you plan to do your own installation, prepare well before you start.

- 1) Read all installation and connection instructions carefully. Pay particular attention to the caution notes and installation tips.
- 2) Carefully select the equipment to be used with the GTX4/2 and be sure that all input and output voltage and impedance requirements are met.
- 3) Have the installation completely planned before you start. The routing of wires, the power supply connection points and the equipment installation locations should be carefully planned before beginning.
- 4) Work carefully and check each step as it is performed. Before operating the system, recheck the installation to be sure each connection is correct, properly insulated and secure.

Installation Precautions and Tips

Before beginning the installation of the GTX4/2 read all of the following information carefully. Failure to heed these warnings could result in **PERSONAL INJURY OR DAMAGE TO PROPERTY.**

CAUTION: The GTX4/2 should be installed only in vehicles that have a 12 volt negative ground electrical system. Connecting it to other types of systems could damage the unit and/or the electrical system of the vehicle.

CAUTION: Before drilling the pilot holes for the GTX4/2 mounting screws be sure that doing so will not damage critical parts of the vehicle, such as electrical wires, fuel lines or hydraulic brake lines. Damage to any of these parts can cause immediate or delayed **HAZARDS TO LIFE AND PROPERTY.** Double walled panels can obscure the location of such critical components. Be **EXTREMELY** careful when planning and implementing the installation.

CAUTION: Wear eye protection whenever cutting, drilling or filling any parts of the vehicle.

To ensure reliability, all power wiring connections must be strong and well insulated. Connections should be made by soldering the connections and insulating them with electrical tape or heat-shrink tubing or with insulated crimp-on connectors.

Never bypass or modify the fuse holder in the yellow + 12 volt power supply wire. Never replace the 1.0 amp power supply fuse with a higher capacity fuse. Doing so could result in damage to the unit or the vehicle's electrical system.

NOTE: Repeated fuse burn out indicates improper installation.

NOTE: If it is necessary to extend the + 12 volt power supply wire, another fuse should be placed in the wire as close as possible to the power supply connection point. This will prevent damage if the +12 volt power supply wire is short circuited near the power supply connection point.

The GTX4/2 must not be installed where it will be exposed to moisture, excessive heat, dust, dirt or vibration. It should be installed only in the passenger or trunk compartments.

Do not mount the GTX4/2 where something could lay up against it.

Choose a mounting location for the GTX4/2 that allows access to the wiring connections and output level controls.

If the power supply wires must be extended and run outside the passenger or trunk compartments be sure to use heat and chemical resistant automotive wire. Be sure all wiring is secure and run where it will not be damaged. If wires are routed through metal panels or are placed where they might be pulled they should be protected with grommets and/or strain reliefs

Audio signal wires should never be run outside the passenger/trunk compartments. They are not made to withstand exposure to heat and chemicals.

Do not run audio signal wires where they will lay along side the power supply wires for the audio system or the wire harnesses of the vehicle or near components such as ignition control modules, fuel pumps, or fan motors. This reduces the chance that noise from the electrical system of the vehicle will be picked up by the audio signal wires.

It may be necessary to remove trim panels and sections of carpeting to completely hide the wires. Work carefully and the effort will be rewarded with a reliable, attractive installation.

Associated Equipment

The signal source used with the GTX4/2 must have pre-amp level (also called "line level" or "low level") outputs. Similarly the amplifiers used in the system must have pre-amp level inputs. Equipment that has line level inputs and outputs typically has phono plug (also called "RCA plug") audio signal connectors, which are compatible with the GTX4/2. Head units that only feature speaker outputs can be made compatible using a JBL GTL1 Speaker-to-Line Level Converter.

If an equalizer is to be used in the system, it is important that it be a high quality, low distortion unit that will not degrade the performance of the

other components. If the equalizer does not have pre-amp outputs, it can be interfaced with the GTX4/2 using the GTL1 Speaker-to-Line Level Converter. The equalizer should be placed in the system between the signal source and the GTX4/2.

It is also important that an equalizer be operated properly. An equalizer is simply a very flexible tone control. It will not compensate for deficiencies in other components in the system. An equalizer is most effective when it is used to suppress objectionable sound characteristics. For example, if the sound is too "bright", don't boost the low frequency controls in an effort to balance the sound. Boosting controls makes the amplifiers in the system work harder and produce more heat and distortion. Instead, turn down the high frequency controls to eliminate the "brightness". A high quality system will sound best when equalization and tone controls are used with moderation.

System Configurations

The GTX4 and GTX2 are very flexible devices that can be used in many different system configurations.

The GTX2 has two channel inputs and high pass outputs. The low pass outputs can supply a stereo or mono signal. It may be used for either midrange/tweeter or main speaker/subwoofer crossover functions.

The GTX4 has four channel inputs and high pass outputs. If a two channel input is used the GTX4 can be configured to provide a four channel high pass output. The low pass output can supply a mono or stereo, non-fading signal. The GTX4 is typically used as a main speaker/subwoofer crossover.

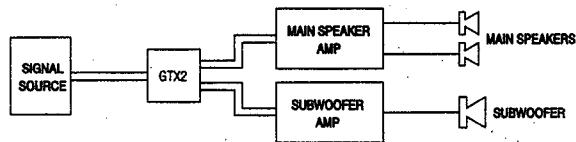
See the "Mode Switches" section for more information.

The high pass crossover frequency and the low crossover frequency can be set to different points. In addition, with the GTX4, the high pass crossover points for the front and rear high pass outputs can be set to different frequencies. Such unusual control settings should be used only after

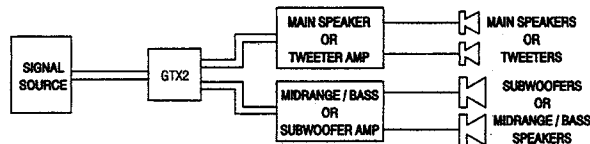
consulting with a JBL installation specialist who has the knowledge and test equipment needed to know when such control settings should be used. See the "Alternative Control Settings" section for more information.

Typical System Configurations

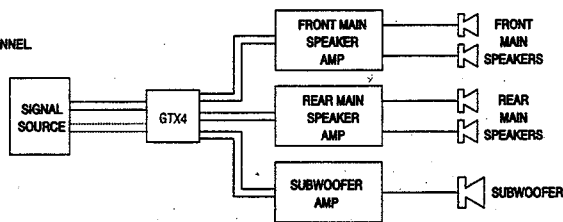
ONE PAIR OF MAIN SPEAKERS WITH
A SINGLE MONO SUBWOOFER



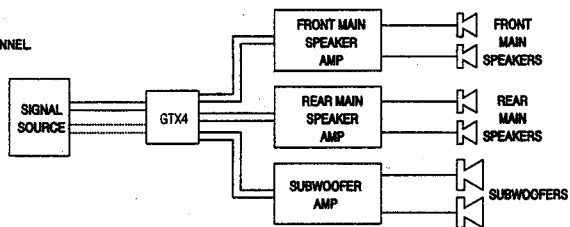
ONE PAIR OF MAIN SPEAKERS WITH
DUAL MONO OR STEREO SUBWOOFERS
OR
ONE PAIR OF TWEETERS WITH
STEREO MIDRANGE/BASS SPEAKERS



FRONT AND REAR MAIN SPEAKERS WITH
A SINGLE MONO SUBWOOFER.
SIGNAL SOURCE MAY BE TWO OR FOUR CHANNEL.



FRONT AND REAR MAIN SPEAKERS WITH
DUAL MONO OR STEREO SUBWOOFERS.
SIGNAL SOURCE MAY BE TWO OR FOUR CHANNEL.



Crossover Frequency Setting

If you want to change the crossover frequency modules, change them before the GTX4/2 is mounted. The crossover frequency modules may also be changed after the unit is installed. However, never change the crossover frequency modules when the GTX4/2 is on. That can damage the system components.

The GTX4 and GTX2 are shipped with the 80 Hz crossover modules installed. In addition the GTX2 is supplied with modules for 120 Hz, 250 Hz and 5,000 Hz crossover points and the GTX4 is supplied with modules for 50 Hz, 120 Hz and 250 Hz crossover points. Other modules are available from JBL authorized dealers.

The GTX2 has two crossover frequency modules; one for the high pass section and one for the low pass section. The GTX4 has three crossover frequency modules; one each for the front and rear high pass sections and one for the low pass section. The modules are clearly labeled on the circuit board.

To change the crossover frequency, remove the crossover module cover. Using a DIP-puller, available from electronics stores, gently pull the crossover frequency modules out of their sockets. Be sure the pins of the new modules are straight. Push them gently into the sockets. NOTE: Use only a DIP-puller to remove the crossover modules. Do not use pliers or screwdrivers. Installing the new module can be done by hand (no pliers or screwdrivers!). The modules may be installed in the sockets either way. Be sure each pin on the modules goes into the corresponding hole in the socket. Replace the cover.

Beginning The Installation

Remove any parts of the vehicle that may limit access to the installation location. Position the GTX4/2 in the installation location to be sure there are no obstructions that will interfere with the installation or limit access to the controls.

Decide where the power supply connections will be made and how the power supply wires will be run to the connection points. Consider where the amplifiers will be mounted and how the audio signal wires will be run from the signal source to the GTX4/2, and from the GTX4/2 to the amplifiers. The length of the audio signal wires should be kept as short as possible to keep noise levels in the system low.

Physical Installation

Review the "Caution" note about drilling holes. Set the GTX4/2 in the installation location and mark the mounting screw hole locations. Set the GTX4/2 aside and drill pilot holes for the mounting screws with a 1/16" bit. (Note: If the panel on which the GTX4/2 is being mounted is covered with carpeting or upholstery, cut a small "x" in the material at each screw hole location before drilling the holes. This will help prevent tearing or stretching of the material and will reduce the chance that carpet fibers will be pulled out and entangle the drill.) Set the GTX4/2 back in the installation location. Put a lock washer and flat washer on the supplied self-tapping sheet metal screws. Drive the screws into the pilot holes until they are firmly set, but be careful not to over tighten them.

Power Supply Connections

The power supply wires for the GTX4/2 are terminated with a plug that connects to pins that extend from the side of the chassis.

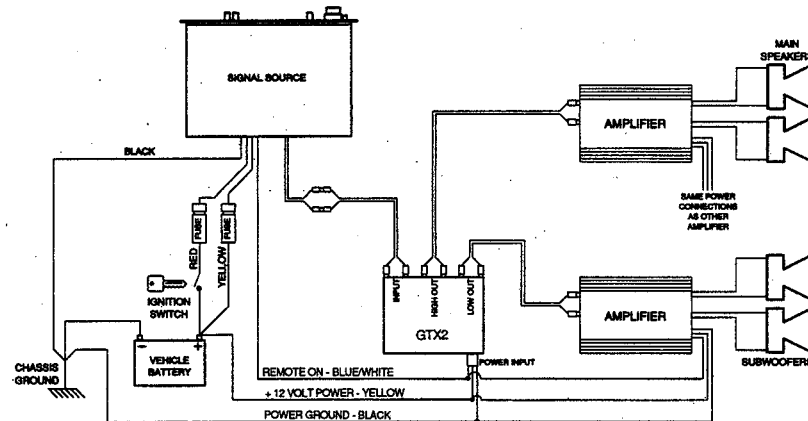
If it is necessary to extend the power supply wires to make them reach the power supply connections points, keep the extensions as short as possible. If extensions wire must be run outside the passenger and trunk compartments use heat and chemical resistant automotive wire. Be sure the wire connections are strong and well insulated.

Yellow Wire - Battery (+), 12 volt power input. Connect this wire directly to the battery's positive (+) terminal. If this lead is extended, be sure to use an additional in-line fuse holder, with a 1A fuse; as close as possible

to the battery's positive (+) terminal. Use 12-gauge wire for extending this lead.

Black Wire-Battery ground. Proper grounding is extremely important. It has a significant effect on the overall performance and noise level of the system. This wire should be connected to a solid electrical ground point on the frame of the vehicle or somewhere in the electrical system. If the ground wire is connected to a part of the vehicle frame that is painted scrape, off the paint and primer to ensure a good ground connection.

Power Supply Wiring Diagram (GTX2 shown, GTX4 similar)



This diagram shows a system with GTX2 used as a subwoofer crossover. See the system Configuration section for information on other audio configurations.

Blue/White Wire - Remote Turn-on. Connect this wire to a +12 volt source this is turned on and off with the system. Most signal sources have a "remote on" power antenna" wire that can be used for this connection. Alternatively, the Blue/White wire can be connected to a +12 volt source that is turned on and off with the accessory system of the vehicle.

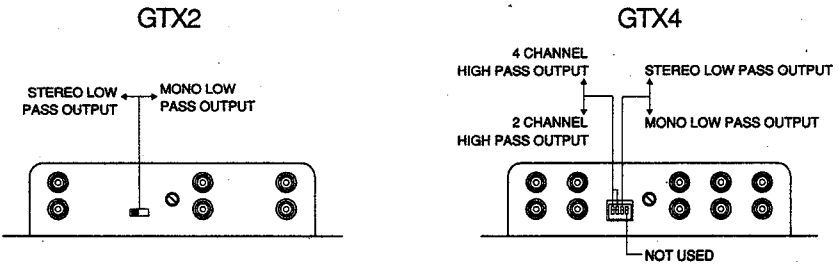
Mode Switches

NOTE: The switches on the GTX2, and especially on the GTX4 are very delicate. Change switch positions only with a jeweller's screwdriver. Be very gentle and careful. Do not force or pry these switches.

CAUTION: Do not change the mode switch settings when the system is on.

GTX2 - The "Low-Pass Stereo/Mono" switch on the GTX2 switches the low pass outputs from mono stereo. When the switch is set to Stereo the low pass outputs have normal stereo separation. Use this setting when the GTX2 is used as a midrange/tweeter crossover or when you have stereo subwoofers. When the switch is set to Mono the low pass outputs are summed to mono. Use this setting when the GTX2 is used with a single subwoofer or when you want to drive multiple subwoofers with a mono output.

GTX4 - There are four switches on the GTX4. (The switch furthest to the right is not used.) The switch second from the right changes the low pass outputs from mono to stereo. When the switch is up the low pass outputs have normal stereo separation. Use this position when you have stereo subwoofers. When the switch is down the low pass output is mono. Use this position to drive a single subwoofer or to drive multiple subwoofers with a mono output.



The two switches to the left set the GTX4 to two or four channel mode. **These two switches should always be in the same position.** When the switches are up the GTX4 is in four channel mode. Then separation is maintained between the front and rear inputs and high pass outputs. When the switches are down the GTX4 is in two channel mode. Then the front and rear inputs are tied together. In this mode the GTX4 will take a two channel input (from either the front or rear input) and provide a four channel high pass output. Then a cassette/tuner or CD Player with a two channel output can drive four channels of amplification.

Audio Connections

The signal voltage levels and impedances of the inputs and outputs of the GTX4/2 are compatible with virtually all signal sources that feature pre-amp (line) level outputs, and amplifiers. Making the audio connections to the GTX4/2 is simply a matter of plugging the cables from the signal source into the inputs and connecting the outputs to the amplifiers of the system. To interface a signal source with speaker level outputs to the GTX4/2, use JBL GTL1 Speaker-to-Line Level Converter (sold separately).

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The connections to and from the GTX4/2 should be made with high quality shielded cables terminated with standard RCA connectors. These cables should be kept as short as possible to minimize the chance of noise being picked up. Never attempt to splice together shielded wires.

The inputs and outputs of the GTX4/2 are labeled for identification. The top row of inputs and outputs are for the left channel, the bottom row is for the right channel.

Refer to the "System Configuration" section and "Typical System Configurations" diagrams for more information.

Low-Pass Control Adjustment

The "Low-Pass Output Level" control lets you set the volume level of the low pass outputs from +10 dB to -6 dB compared to the level of the high pass outputs. This lets you compensate for differences in the efficiency of the speakers and for differences in the gain levels of the amplifiers in the system, as well as contouring the overall tonal balance of the system.

Ideally this control should be set using test instruments. Many car stereo installation specialists have this type equipment and will set the controls to their proper position as part of their installation.

Alternatively the control can be set with a series of trial and error adjustments in conjunction with careful listening evaluation. To do this set all the tone and equalization controls in the system to their "flat" positions and turn off the "loudness compensation" circuit if the signal source has one. Use a small screw driver to turn the Level control down (counter-clockwise) all the way. Listen to the system and if necessary turn up the Level Control slightly. Listen to the system again and turn up the control more if necessary. Continue this trial and error adjustment until the proper low-frequency balance is achieved.

Avoid the temptation to turn the low-pass level control up too far in an effort to get "impressive" sounding bass. Try to get the most natural, well balanced sound possible. Then, if you feel a particular piece of music would benefit from additional bass, use the normal bass and/or equalization controls of the system to get it.

Alternative Control Settings

There are two alternative control settings that may be used in certain situations. One is using different crossover frequencies for the front and rear high pass outputs of the GTX4. Another is using different crossover points for the high pass and low pass sections of either the GTX4 or GTX2. Such unusual control settings should be used only after consulting a JBL installation specialist who has the knowledge and test equipment needed to know when they should be used.

Using Different Crossover Frequencies For the Front and Rear High Pass Outputs of the GTX4

- Often the main front and front and rear speakers in a system are different types. For example the front speakers may be small door mounted units that have limited bass response, while the rear speakers may be larger deck mounted units that provide fairly deep bass response. In such a situation the small front speakers might be crossed over at 200 Hz, and the larger rear speakers crossed over at 80 Hz. This type of set up would allow you to take advantage of the extended bass response of the larger speakers, while giving the smaller front speakers only as much bass as they could reliably reproduce. The crossover frequency for the subwoofer should be set at the point that provides the best sound balance.

Using Different Crossover Points For The High And Low Pass Sections

Sometimes the acoustical characteristics of the vehicle in which the system is installed will produce either a peak or a dip in the low frequency range. Because the high pass and low pass sections of the GTX4 and GTX2 can be set to crossover at different points, such problems can, in some cases, be controlled. For example, if there is a peak at 150 Hz the high pass section of the GTX4/2 can be crossed over at 200 Hz and the low pass section crossed over at 120 Hz. This will reduce the combined output of the main speakers and subwoofers between 120 Hz and 200 Hz, thus reducing the response peak.