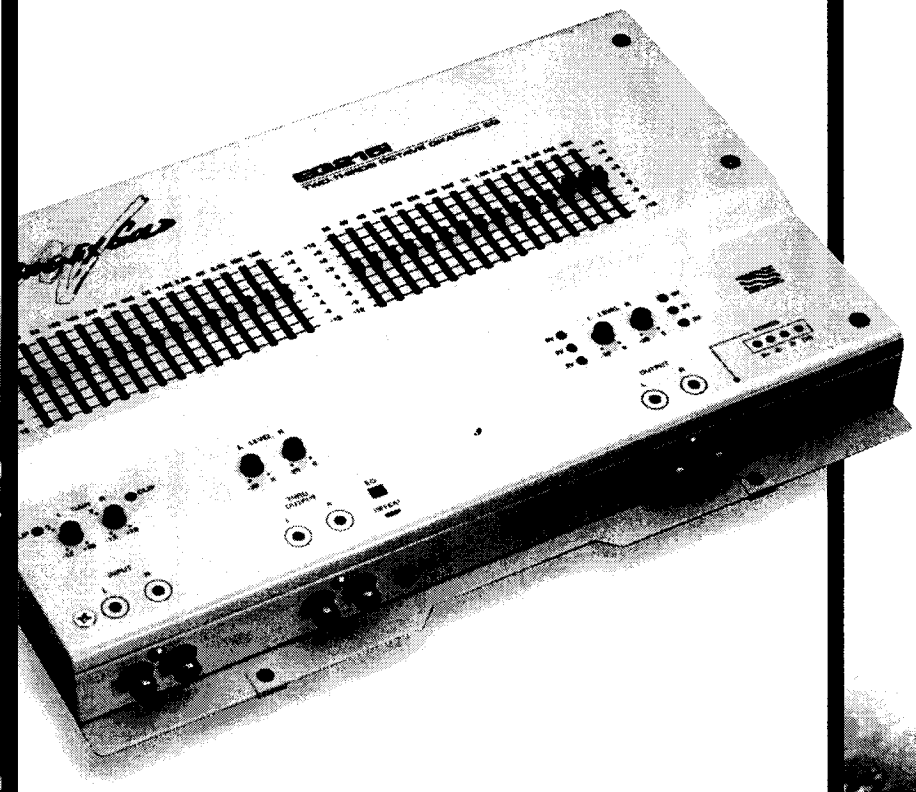
OWNER'S MANUAL

EQ215i

TWO-THIRDS OCTAVE GRAPHIC EQUALIZER



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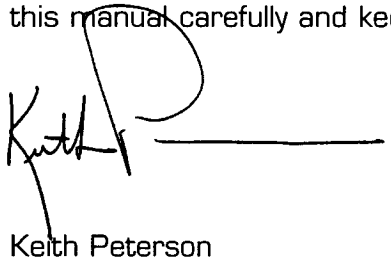
NO LIMITS!

Dear Phoenix Gold enthusiast,

I thank you for purchasing this Phoenix Gold product. By doing so, you have demonstrated a desire to own the finest audio components available for the car and home. At Phoenix Gold, we use state-of-the-art design, engineering and production methods to continually improve the quality, reliability and performance of our products.

The EQ215i provides precision equalization capabilities for the most demanding audiophile or competitor. Properly installed by an Authorized Phoenix Gold Mobile Electronics Retailer, this equipment will provide years of enjoyment. For proper operation, please read this manual carefully and keep it for future reference.



Keith Peterson
President

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- Separate Left and Right Input Sensitivity Controls
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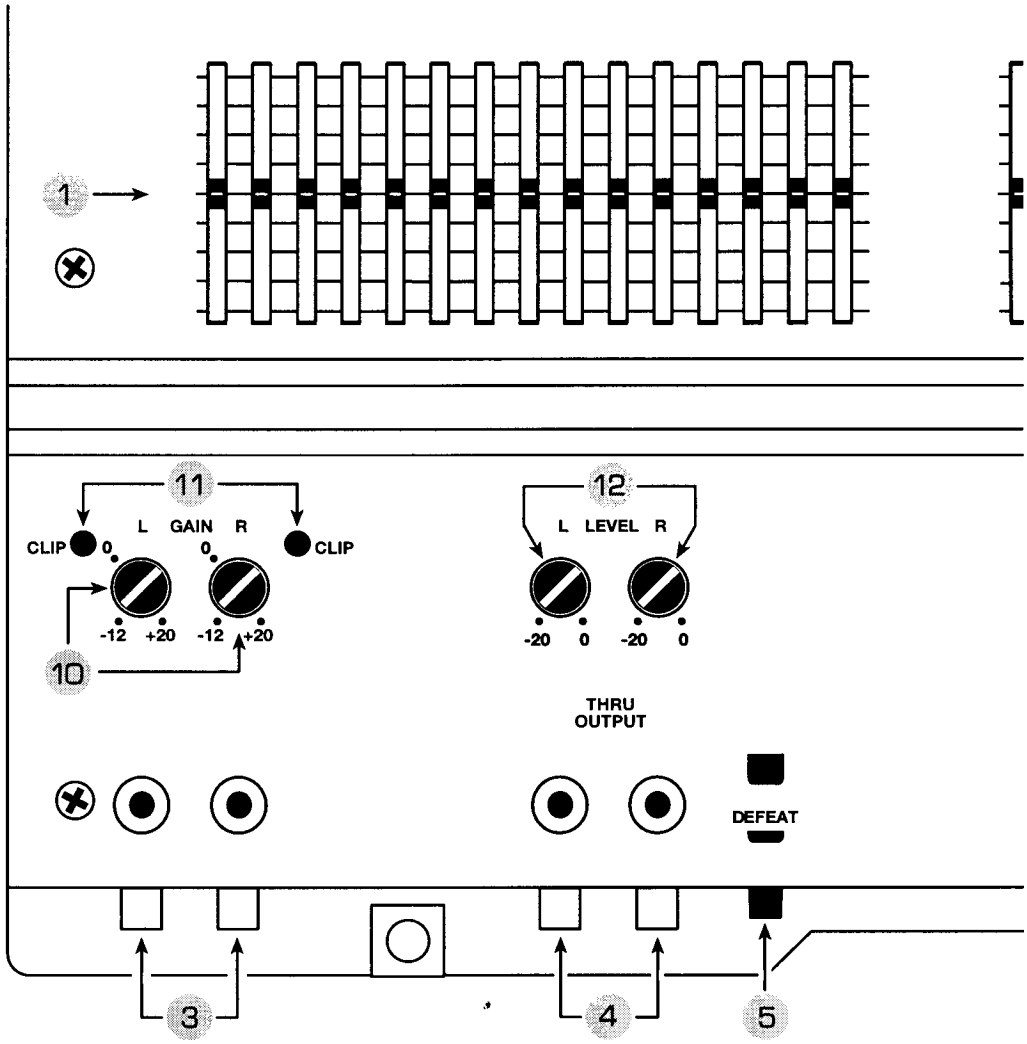
- 24kt Gold Plated, two layer Copper, G10 Glass-epoxy Printed Circuit Boards
- Audiophile Grade 1% Metal Film Resistors
- Precision Laser Cut 16 Gauge White or Black Powder Coated Steel Chassis

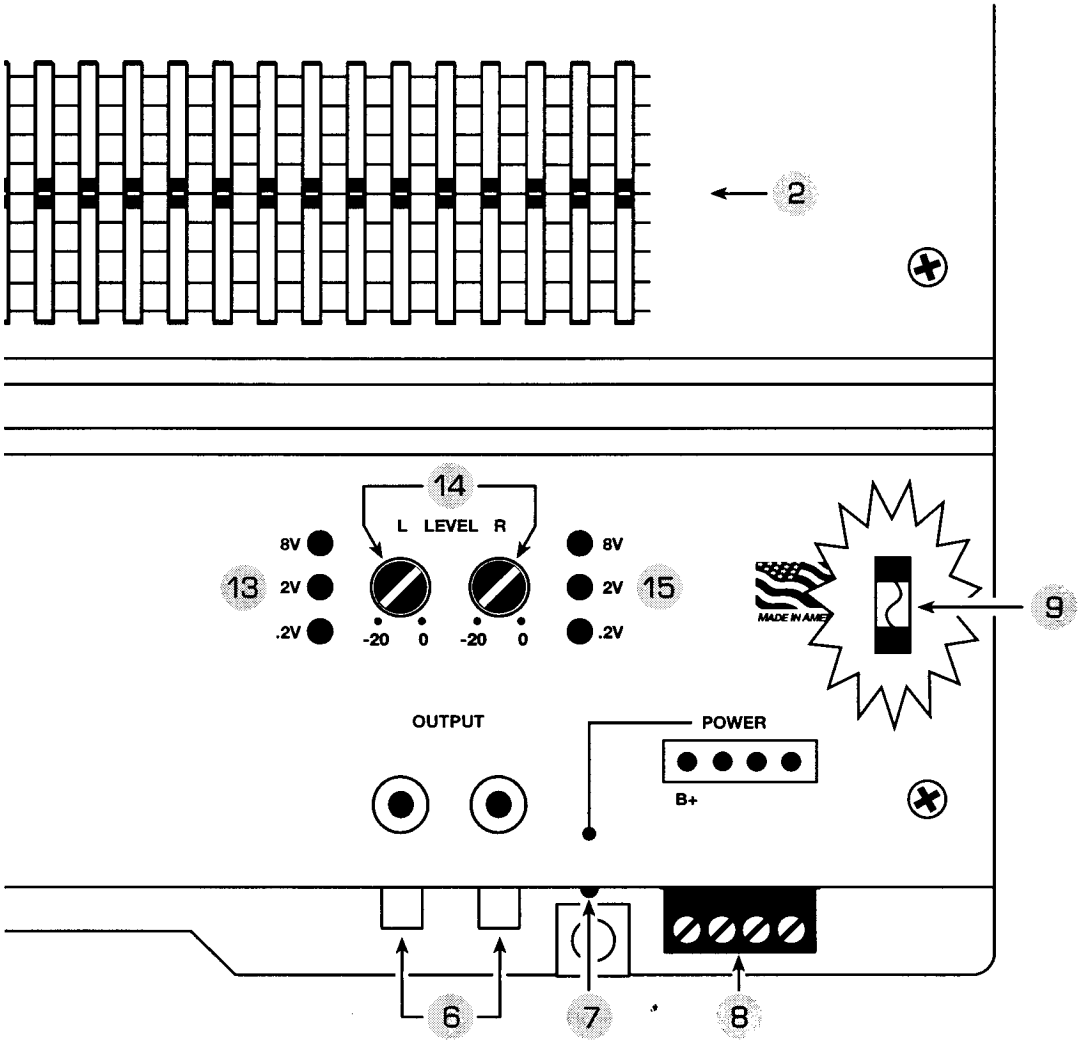
SPECIFICATIONS

- Frequency Response.....±1dB, 10Hz to 30kHz
- S/N Ratio (A-weighted).....>105dB ref. to 8 Volts
- Total Harmonic Distortion plus Noise @ 1 kHz, 1 VRMS.....<.02%
- Q, Equalization Controls 2.15
- Boost/Cut Range, Equalization Controls .....+12dB to -12dB
- Center Frequency Spacing, Equalization Controls .....2/3 octave
- Thru Output Frequency Bandwidth.....20Hz to 20kHz
- Input Impedance.....5kΩ
- Output Impedance.....510Ω
- Input Sensitivity .....-12dB to +20dB
- Input Signal Range .....0.8 Volts to 32 Volts
- Output Level Range, all outputs.....-20dB to 0dB
- Maximum Output Level, all outputs .....8 Volts
- DC Operating Range .....10 volts to 15.5 volts
- Typical DC Current Draw.....1 amp
- Internal DC Power Fuse .....GMC 2 amp
- Dimensions, Chassis .....11.25"L x 6.9"W x 1.6"H
- Dimensions, Overall.....11.25"L x 7.9"W x 1.8"H

Due to continuous product development, features, specifications and availability are subject to change without notice.



1. **Left Channel Equalization Controls:** These controls are used to boost or cut various left channel frequencies as much as 12dB. There are fifteen separate frequency bands spaced 2/3 octave apart from 25Hz to 16kHz. A center detent indicates when a control is set to zero.
2. **Right Channel Equalization Controls:** These controls are used to boost or cut various right channel frequencies as much as 12dB. There are fifteen separate frequency bands spaced 2/3 octave apart from 25Hz to 16kHz. A center detent indicates when a control is set to zero.



3. **Input Jacks:** These inputs are for standard RCA style signal cables from the headunit, line driver or other signal processor.
4. **Thru Output Jacks:** These outputs are for standard RCA style signal cables that connect to an amplifier or another signal processor. The Equalization Controls #1 and #2 do not affect these outputs.
5. **Equalizer Defeat Switch:** This switch determines whether the Main Output Jacks #6 are affected by the Equalization Controls #1 and #2 or if they remain unequalized. This allows an instant comparison of the system's sound quality with and without equalization. This switch does not affect the Thru Output Jacks #4.

6. **Main Output Jacks:** These outputs are for standard RCA style signal cables that connect to an amplifier or another signal processor.
7. **Power-On LED Indicator:** This LED turns on whenever the EQ215i is on. The unit cannot turn on unless it is grounded through the B- terminal and is receiving 12 volts at both the B+ and Remote Turn-on terminals of the Quick Disconnect Power Plug #8.
8. **Quick Disconnect Power Plug:** This Plug is easily removed for servicing wiring connections and contains the following four terminals:

   B+ Terminal (Battery Positive): Connect to the power distribution system that is connected directly to the positive battery terminal. DO NOT connect to the vehicle's factory fuse box. Use a 16 gauge cable.

   B- Terminal (Chassis Ground): Connect to a clean, solid chassis ground of the vehicle. Use a 16 gauge cable. Keep the cable as short as possible. DO NOT connect directly to the negative battery terminal.

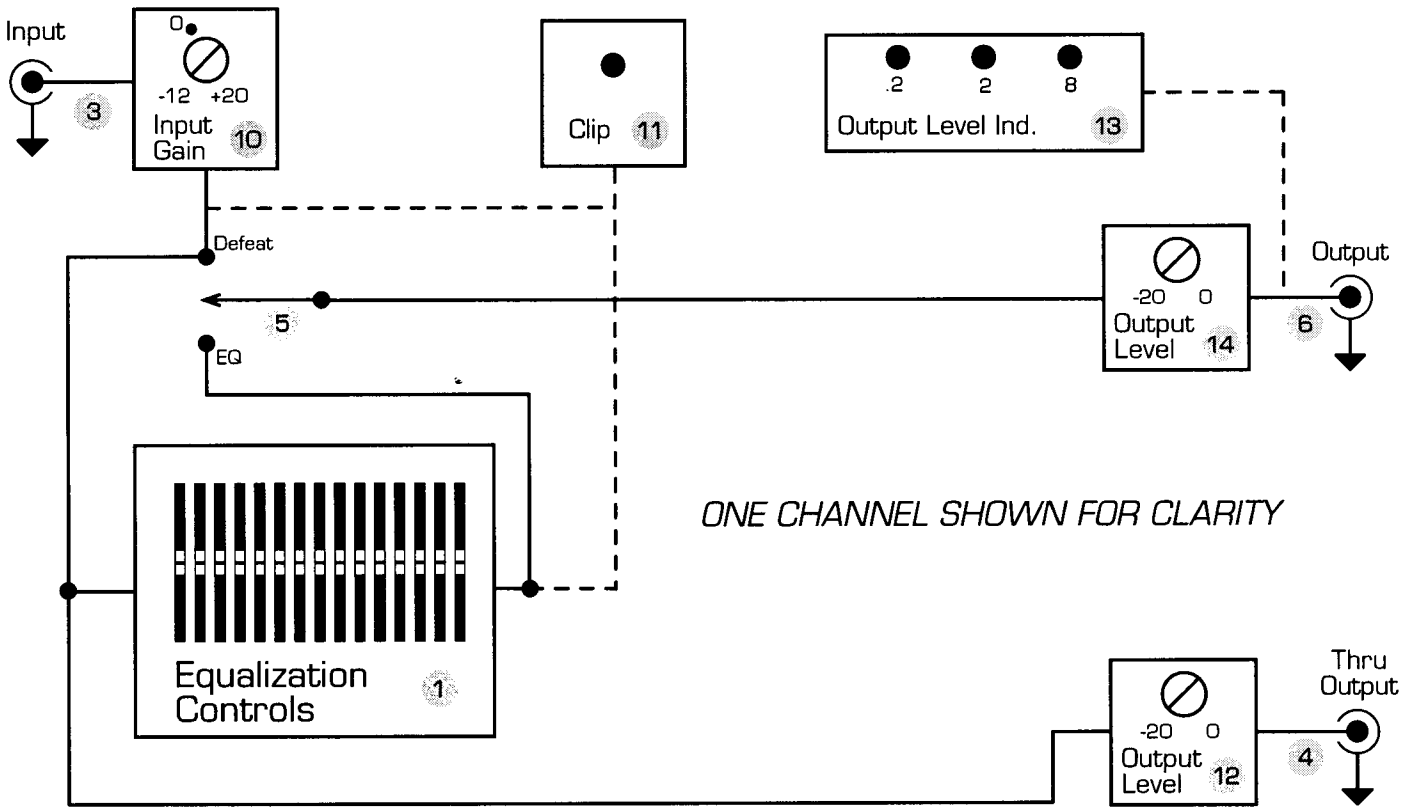
   R Terminal (Remote Turn-on): This connection allows the EQ215i to turn on and off remotely. Connect to a switched 12 volt source such as the "remote out" or "power antenna" wire from the headunit.
   Note: Test the power antenna wire with a voltmeter to insure it has 12 volts when both the tuner and Tape/CD are playing. DO NOT connect this terminal to the B+ cable.

   DR Terminal (Delayed Remote Turn-on Output): This output is used to delay the turn-on of amplifiers if they reproduce noises (turn-on pop) generated by pre-amp components as the system is first powered up. DO NOT connect this output to other signal processors.
   Note: There is an inherent voltage drop of about 1 volt when using the DR output. It may be necessary to use a standard automotive relay controlled by the DR output when turning on multiple amplifiers.
9. **Internal Power Fuse:** This fuse is installed inside the EQ215i to protect the power supply from improper connection (reverse polarity) or a short in the B+ cable. It should never blow from normal operation. If replacement is necessary, use

a fuse of the same size and type (GMC 2 amp). NEVER USE A FUSE WITH A HIGHER RATING.

10. **Input Sensitivity Controls:** These controls allow separate left and right input sensitivity adjustments. Input signal may be boosted as much as 20dB or cut as much as 12dB. These knobs ARE NOT volume controls for the equalizer. The EQ215i may be driven to its proper operating voltage (8 volts) with a wide range of signal levels (0.8 to 32 volts). A signal level lower than 8 volts will require increased sensitivity. A signal level higher than 8 volts will require decreased sensitivity.
11. **Input Clipping LED Indicators:** These separate left and right LEDs will light when peaks in the musical signal are approaching the 8 volt level. They sense the signal level passing through the Input Sensitivity Controls #10 and the Left and Right Equalization Controls #1 and #2.
12. **Thru Output Level Controls:** These controls allow the left and right Thru Output Jacks #4 to be adjusted separately. The level may be cut as much as 20dB. With these controls set to maximum, the EQ215i may pass 8 volts to the next component. The next component in the system will determine the amount of output signal required. Consult the manufacturer's specifications to determine the proper input signal level.
13. **Left Tri-level Output LED Indicators:** This set of LEDs will indicate the level of signal being sent to the next component in the system. They sense the peak signal level passing through the left Output Level Controls #14.
14. **Main Output Level Controls:** These controls allow the left and right Main Output Jacks #6 to be adjusted separately. The level may be cut as much as 20dB. With these controls set to maximum, the EQ215i may pass 8 Volts to the next component. The next component in the system will determine the amount of output signal required. Consult the manufacturer's specifications to determine the proper input signal level.
15. **Right Tri-Level Output LED Indicators:** This set of LEDs will indicate the level of signal being sent to the next component in the system. They sense the peak signal level passing through the right Output Level Control #14.

SIGNAL FLOW DIAGRAM



PLANNING

A successful installation must begin with planning. There are several things to consider.

1. **Inspect the vehicle's electrical system:**

   The vehicle's battery and charging system must be in excellent condition. If necessary, have the electrical system inspected and repaired by a qualified technician.

2. **Plan the mounting locations for all components:**

   Choose a location for each component. Consult with a qualified custom installer before attempting any custom work. Trying to modify your vehicle without the proper tools and experience can lead to damaging the equipment or vehicle.

   a. Speaker placement: This is the most important consideration for a great sounding system. Try to mount the front left and right mid/high frequency speakers an equal distance from the listening position. The kick panel area is a good location. Low frequency speakers are less critical.

   b. Pre-amp components: Easy access to a component's adjustments will make the system easy to adjust while it's operating. Make sure no loose cargo or other items can cause damage or accidentally alter the component's settings.

   c. Amplifiers: The primary consideration for amplifier placement is ventilation. Make sure your amplifiers will receive plenty of fresh air to avoid overheating.

3. **Plan all system cable routes:**

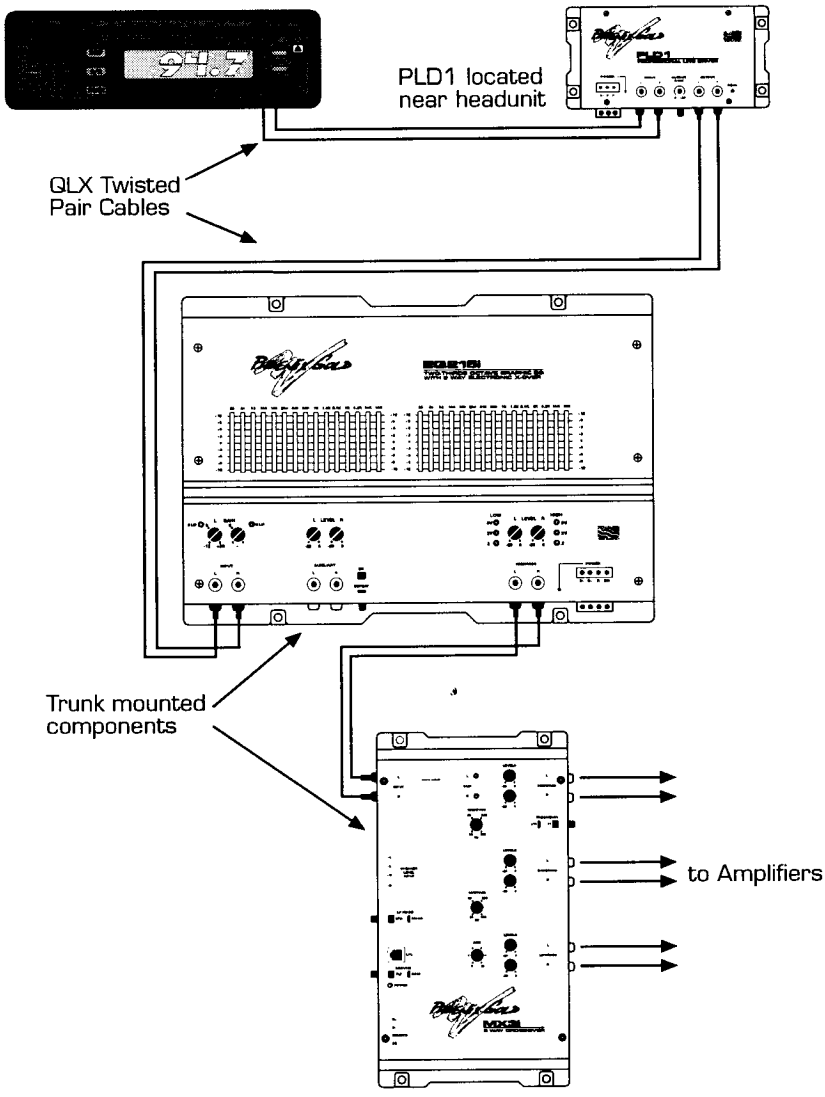
   Do not allow system cables to interfere with the mechanical operation of the steering wheel, gas pedal, brake pedal, clutch pedal, trunk hinges, etc.

   a. Power cables: All main power cables must be fused within 18 inches of the positive battery terminal. Do not route power cables near hot engine components such as exhaust manifolds. Power cables must be protected with grommets when they pass through any metal panels such as the firewall.

   b. Signal cables: Do not run signal cables alongside power cables. Make sure to route them away from all other vehicle wiring and electrical components such as computers. Wherever possible, use Phoenix Gold QLX, TRX, or XS series interconnects to maximize noise rejection.

RECOMMENDED EXAMPLE

The following system diagram is offered as an example of how to integrate an EQ215i into a system.



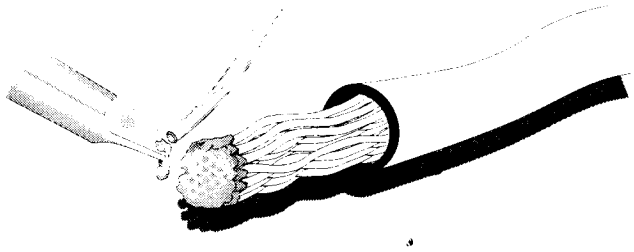
MOUNTING

You can mount the EQ215i in almost any position. There are only a few precautions to observe.

1. Never mount the EQ215i where it can get wet. The limited warranty does not cover water damage.
2. Do not mount the EQ215i where debris or cargo can damage it or change the settings. The limited warranty does not cover physical damage.
3. Mount the EQ215i to a flat surface with screws. Make sure the base does not flex or distort.
4. Do not mount the EQ215i where it may be exposed to excessive amounts of heat from other stereo components (amplifiers).

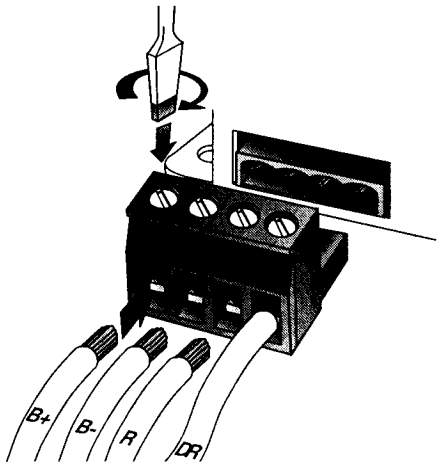
ELECTRICAL

Use the removable power connector for all power connections. Strip 1/4" of insulation from the end of the wire and "tin" the tip with solder.



Insert each wire into the appropriate position in the power connector and tighten the set screw with a flat blade screwdriver.

Note: Use 16 gauge cable for the B+ and B- connection. Use 18 gauge cable for the Remote and Delayed Remote connections.



Properly tuning the EQ215i requires the following steps:

1. Setting system Input Sensitivity and Output Levels.
2. Adjusting Equalization Controls.

INPUT SENSITIVITY & OUTPUT LEVEL SETTING

1. Install the system's power fuses after connecting all power, speaker and signal cables.
2. Set the EQ215i's Input Sensitivity Controls and Output Level Controls to their minimum settings (full counterclockwise).
3. Set the EQ/Defeat Switch to the (DEFEAT) position.
4. Set all other signal processor input sensitivity controls and output level controls to their minimum settings.
5. Set all amplifier input sensitivity controls to their minimum settings.
6. Turn the headunit on with the volume set to minimum.
7. Visually check the EQ215i's condition. The green Power-on LED should be on. The red Input Clip LED indicators and Tri-Level Output LED indicators should be off.
8. Visually check the power-on indicators (if equipped) of all other system components to verify that they are on.
9. Set the headunit's tone controls, balance and fader to the center (flat) position and turn off any loudness features or other processing effects.
10. Set the volume control of the headunit to approximately 7/8 of maximum (maximum undistorted output). Play a very clear and dynamic recording. Turn on the headunit's repeat track feature.
    Note: Do not be alarmed if you don't hear much sound coming from the speakers at this time.
11. Adjust all pre-amp components between the headunit and EQ215i for maximum undistorted output as per the manufacturer's instructions. Start with the first component after the headunit and work your way towards the EQ215i.

12. Turn up the EQ215i's left and right Input Sensitivity Controls separately until the red LED Input Clipping Indicators flicker on about once a second with the peaks in the music.
Note: The positions of the sensitivity controls should be similar but not necessarily identical when set correctly.

13. At this point approximately 800 millivolts is being passed through the Main and Thru Output Level Controls to the next components in the system. It is possible to send as much as 8 volts to the next component's inputs by turning up each Output Level Control. The input signal needs of the next component determine the correct settings.

EQ215i outputs going directly to an amplifier:

Turn up each Output Level Control separately until the speakers reach maximum undistorted output. If this adjustment cannot distort the speakers, then leave the Output Level Control at maximum and use the amplifier's input sensitivity control to reach maximum undistorted output.
Note: The idea is to establish the maximum undistorted output of each amplifier channel and its associated speakers independently of the others. When each output is properly adjusted, go to step 14.

EQ215i outputs going to another signal processor:

a. Turn up each Output Level Control separately until the next signal processor is receiving the maximum amount of signal it can accept (consult the manufacturer's specifications). The Tri-Level Output LED Indicators will show the amount of signal being sent to the processor connected to the Main outputs.

b. Turn up the output level adjustments of the next signal processor according to the input needs of the following signal processor. Repeat this procedure for each processor until the correct input sensitivity is set for the last signal processor.

c. Turn up the output level of the last processor until the speakers reach maximum undistorted output. If this adjustment cannot distort the speakers, then leave the output level control at maximum and use the amplifier's input sensitivity control to reach maximum undistorted output.

d. The idea is to establish the maximum undistorted output of each amplifier channel and its associated speakers independently of the others.

14. Once the maximum undistorted output for each amplified channel is established, it will be necessary to listen to the overall balance of the system and readjust the level controls for some channels.
Example: If the right channel sounds louder than the left channel, the right channel's output should be lowered until it is equal to the left channel. Compare left to right, front to rear, etc. until the system is properly balanced. The idea is that all the channels in the system must be referenced to the weakest amplifier and speaker combination.

15. When all input sensitivities and output levels are set correctly, the system will reach maximum undistorted output at the volume level set in step 10. If more overall volume is desired, it will be necessary to increase amplifier power or speaker capability or both.

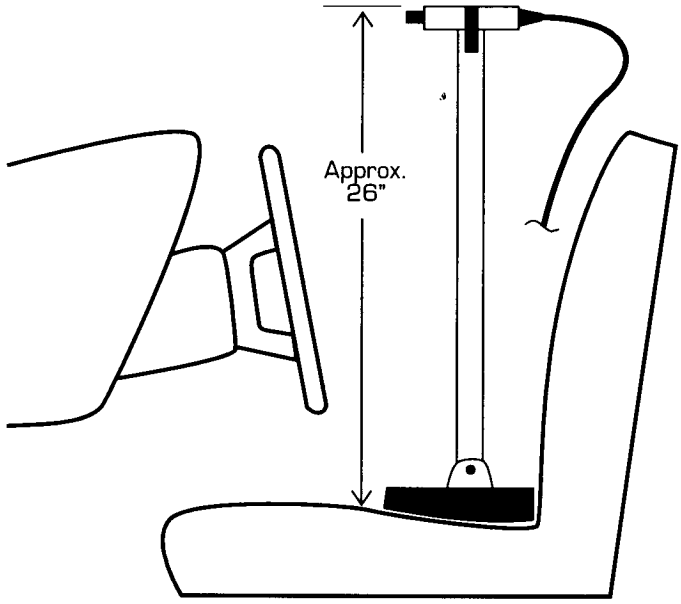
ADJUSTING EQUALIZATION CONTROLS

The equalization process should not begin until all other system adjustments are complete. Use speaker placement, crossover points, phase and level adjustments to achieve the best possible sound quality before applying equalization.

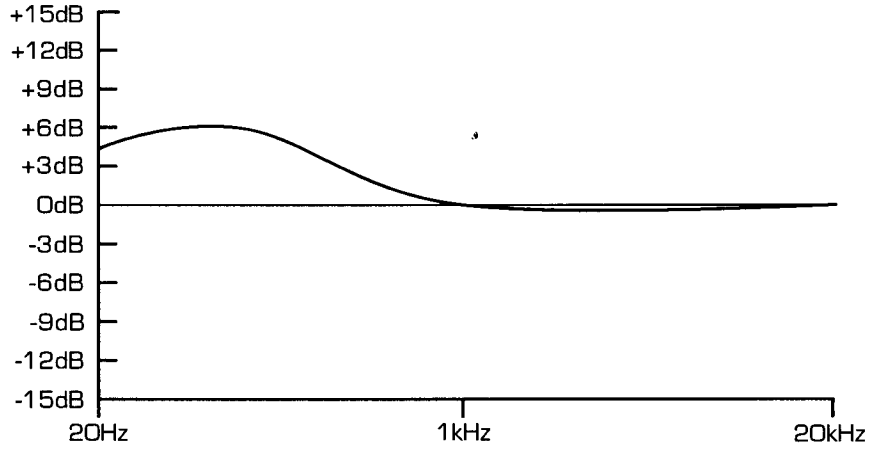
Space limitations do not allow a complete course on all the aspects of using equalization in the mobile environment. This section is intended as a basic guide to setting the equalization controls. Many factors can combine to affect the way sound is perceived in the mobile environment. An understanding of these factors and how they effect the final sound quality of the system is recommended for getting the best possible results.

To properly set the equalization controls, you will need a real time analyzer (RTA) capable of 1/3 octave resolution.

1. Set up the RTA so its display can be seen while adjusting the EQ215i. Set the response time of the RTA's display to a slow setting (updates once every couple of seconds). Attach the RTA microphone to a stand and place it in the driver's seat as shown below. The microphone should be horizontal and pointing forward towards the dash with a height of 26 inches from the seat cushion.



2. Set the system up to analyze the left and right speaker systems independently by disabling one channel.
3. Adjust all Equalization Controls for the left and right channels to their center position (0dB).
4. Set the Equalizer Defeat Switch to (EQ).
5. Play uncorrelated (stereo) pink noise with the headunit's repeat track function turned on and the bass and treble controls set to their flat positions. Turn off any loudness controls or other sound processing effects.
6. Set the volume level for approximately 90 decibels. *Note:* The level must be at least 10 decibels above any ambient noise that could interfere with RTA readings.
7. Observe the RTA and adjust the sensitivity to center the overall curve in the display area.
8. Use the Equalization Controls to achieve a smooth octave to octave curve in the display. There is no single correct response curve for all systems. The example below shows a typical curve for a car audio system.



Note: It is customary to have more output in the base region to overcome low frequency road noise.

Start by cutting the largest peak first and then the next largest peaks in turn. Boost any dips only after smoothing the last peak. *Note:* Apply boost very sparingly. Every 3 decibels of boost requires double the amplifier power at that frequency.

9. Disable the adjusted channel and reconnect the opposite channel.
10. Repeat step 8.
11. After both channels are equalized separately, compare the left and right Equalizer Control settings. They should be similar. If the settings required to achieve a smooth curve are very different from left to right, check for out-of-phase speakers, incorrect crossover points, improper sensitivity settings, etc.
12. Reconnect the disabled channel and observe the RTA with all speakers playing.
13. Fine tune the curve by adjusting both left and right Equalization Controls together.
14. Check the sound quality of the system with various music selections and fine tune the Equalizer Control settings based on what you hear.
15. Check the red LED clipping indicators and readjust if necessary (steps 10 and 12 in the Input Sensitivity and Output Level Setting section).
16. Record the Equalizer Control settings in the back of this manual for future reference.

TROUBLE-SHOOTING

SYMPTOM	PROBABLE CAUSE	SOLUTION
No output and Power-on LED is off	No battery, ground, or remote connection	Connect B+, B-, and Remote Turn On to the Quick Disconnect Power Plug (pages 7 & 12)
	Blown power fuse inside the EQ215i	Check for a short to chassis ground in the B+ cable. Install a new fuse (2 amp GMC)
No output and Power on LED is on	No signal from the headunit	Check the headunit for proper output
	Faulty input or output signal cables	Try substituting different signal cables
Distorted sound in all speakers	Clipped input signal	Make sure the headunit is not providing a clipped signal (pages 13 - 15)
	Input Sensitivity Controls set too high	Set the Input Sensitivity Controls to a lower setting (pages 13 - 15)
Distorted sound in individual channels	Output Level Controls set too high for the next component	Set the Output Level Controls to a lower setting (pages 13 - 15)

EQUALIZATION CONTROL SETTINGS

	Left		Right
25 Hz	_____	25 Hz	_____
40 Hz	_____	40 Hz	_____
63 Hz	_____	63 Hz	_____
100 Hz	_____	100 Hz	_____
160 Hz	_____	160 Hz	_____
250 Hz	_____	250 Hz	_____
400 Hz	_____	400 Hz	_____
630 Hz	_____	630 Hz	_____
1 kHz	_____	1 kHz	_____
1.6 kHz	_____	1.6 kHz	_____
2.5 kHz	_____	2.5 kHz	_____
4 kHz	_____	4 kHz	_____
6.3 kHz	_____	6.3 kHz	_____
10 kHz	_____	10 kHz	_____
16 kHz	_____	16 kHz	_____

	Left		Right
25 Hz	_____	25 Hz	_____
40 Hz	_____	40 Hz	_____
63 Hz	_____	63 Hz	_____
100 Hz	_____	100 Hz	_____
160 Hz	_____	160 Hz	_____
250 Hz	_____	250 Hz	_____
400 Hz	_____	400 Hz	_____
630 Hz	_____	630 Hz	_____
1 kHz	_____	1 kHz	_____
1.6 kHz	_____	1.6 kHz	_____
2.5 kHz	_____	2.5 kHz	_____
4 kHz	_____	4 kHz	_____
6.3 kHz	_____	6.3 kHz	_____
10 kHz	_____	10 kHz	_____
16 kHz	_____	16 kHz	_____

Limited Warranty

Phoenix Gold provides a limited warranty on all electronics (free of manufacturing defects in materials and/or workmanship) to the original consumer/purchaser for a period of eighteen (18) months when installed by an Authorized Phoenix Gold Mobile Electronics Retailer. Returning a copy of the original sales receipt with the warranty registration card extends the period to thirty-six (36) months. The limited warranty period is thirty (30) days if installed by anyone other than an Authorized Phoenix Gold Mobile Electronics Retailer. We will cover parts and labor provided the product was purchased from an Authorized Phoenix Gold Retailer. This Warranty does not apply to any product where the tags and/or serial numbers have been cut, removed, tampered or altered in any manner. This limited warranty is applicable to only the original consumer/purchaser and is not transferable. Electronics that are deemed defective during the warranty period will be repaired or replaced at the discretion of Phoenix Gold. Repaired or replaced product will be covered until the original warranty period expires. Phoenix Gold will not be responsible for any incidental or consequential damages that may result from a defect in the product. Select states may not allow the exclusion or limitation of incidental or consequential damages, so the prior limitations may not apply.

Guarantee Limitée

Phoenix Gold vous procure une garantie limitée sur tout ses electroniques pour une période de 12 mois dans le cas ou ils ont été installés par un revendeur agrée de Phoenix Gold. Si l'installatation a été faite par autrui, la garantie se limite à 30 jours. Les pièces détachées et la main d'oeuvre utilisés pour les réparations seront couverts durant la période de garantie si vous avez acheté le produit chez un revendeur agrée de Phoenix Gold. En cas d'absence du numéro de série, ou un déplacement du numéro de série, la garantie ne sera plus appliquée. La garantie est seulement applicable pour le premier acheteur/consommateur et n'est donc pas transférable. Les électroniques qui sont défectueuses durant la période de garantie peuvent seulement être réparées par des services techniques aprouvés par le distributeur officiel de Phoenix Gold afin que la garantie soit applicable. Phoenix Gold ne sera pas résponsable pour tout endommagements qui peuvent résulter d'un manquement du produit Phoenix Gold.

Dealer's Name _____

Telephone Number _____

Salesperson's Name _____

Model Number EQ215i

Serial Number _____

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