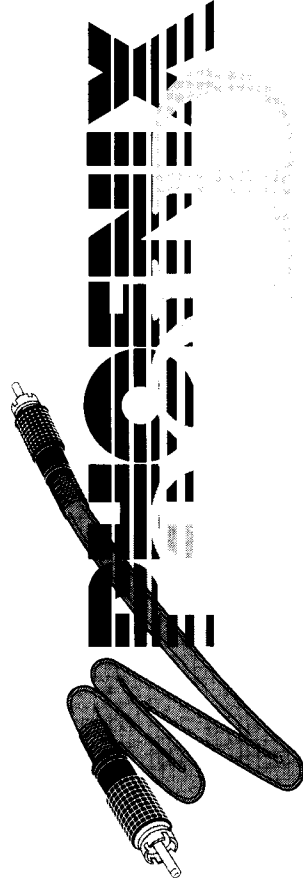




1170 N. E. 63rd Street Portland, OR 97213
TEL: (503) 288-2008 FAX: (503) 281-1449



Owners Manual

MQ430

Power Amplifier

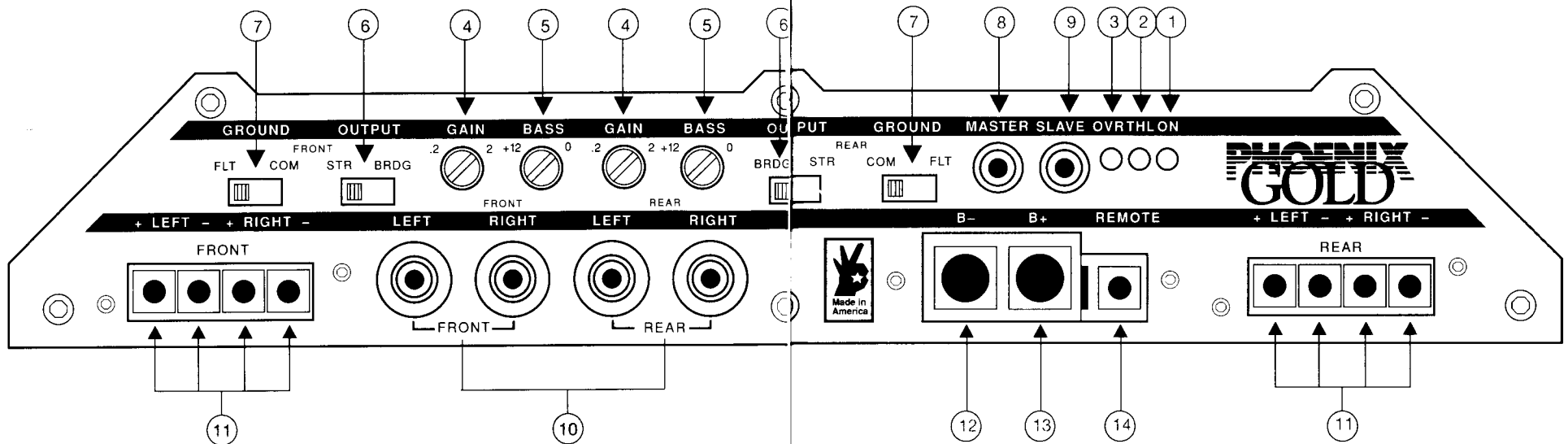
MQ-430 AMPLIFIER FEATURES

- ❑ 4 X 30 watts per channel
- ❑ Bridgeable
- ❑ TRI-LINEAR™ output configuration allows simultaneous stereo and bridged mono operation.
- ❑ Adjustable Bass EQ 0 to +12dB at 40 Hz
- ❑ Pulse Width Modulated (PWM) MOS-FET Switching Power Supply
- ❑ RIBBON-WINDING™ of Power Toroid
- ❑ Stable into 2 ohm loads
- ❑ High-Current / High-Voltage Triple-Darlington Output Design
- ❑ 2-layer 20 mil thick GOLD-PLATED G10 Glass-Epoxy Printed Circuit Board
- ❑ Variable input sensitivity 200mV to 2V
- ❑ Fully muted turn-on / turn-off circuitry
- ❑ Optically isolated design
- ❑ Master / Slave “sync” connection
- ❑ VI limiting circuitry with overcurrent LED
- ❑ Extensive burn-in and QC testing for the ultimate in reliability
- ❑ Low RFI / EMI design
- ❑ MADE IN THE GOOD OL' USA

SPECIFICATIONS

- ❑ Output Power per Channel-
 - Four Channels Driven:
 - Into 4 ohms @ 12V DC- 30 WRMS
 - Into 2 ohms @ 12V DC- 60 WRMS
 - Two Channels Bridged Power
 - into 4 ohms-100 WRMS Per Channel
- ❑ THD at rated power into 4 ohms- 0.01%
- ❑ SMPTE at rated power into 4 ohms- 0.05%
- ❑ DIM at rated power into 4 ohms- 0.07%
- ❑ Frequency response- 15Hz to 20KHz +/-1dB
- ❑ Signal to Noise Ratio- > 100dB (20 to 20kHz)
- ❑ Input Sensitivity- 200mV to 2V
- ❑ Load Impedance- 2 to 16 ohms
- ❑ Input Impedance- 10K ohms
- ❑ Idle Current- 2 Amps
- ❑ Current Consumption (Full Power Hard Clip)
 - @ 4 ohms stereo-16 amps
 - @ 2 ohms stereo- 32 amps
 - @ 2 ohms stereo, 4 ohms mono- 35 amps
- ❑ Efficiency- > 80% (Power Supply)
- ❑ Damping Factor @ (20 to 10Khz) - 1000 to 1
- ❑ Min to Max Voltage requirements- 10.2 to 15.5V DC
- ❑ Dimensions- 11" L X 11.4" W X 2.4" H

END PANEL: MQ-430 POWER AMPLIFIER



1. ON - Power on LED

Indicates 12 volts at B+, B- and remote terminals. Amplifier is "ON".

2. THL - Thermal Protection LED

When this LED lights up it is an indication that the amplifier has "shut-off" as the temperature of the heatsink has reached 90° C or approximately 200° F. In simple terms, the amplifier is EXTREMELY HOT and has gone into protection!

3. OVR - OVERLOAD LED

Indicates that the amplifier has either:

- Passed more than 35 amps of current in the output stage, or...
- Passed more than 350 total watts total RMS! Obviously a bit more than rated power. Again this is normal, as it is part of the amplifier's protection system.

4. GAIN ADJUSTMENT (Front & Rear)

Allows for the correct matching of any signal source (CD player, AM/FM cassette deck, etc.) from its pre-amp output into the MQ-430. Adjustments range from 200 mV (.2 volts) to 2 Volts to drive amplifier to full output power.

5. BASS ADJUSTMENT (Front & Rear)

This bass equalizer circuit allows for matching of the sub-woofer/enclosure in any vehicle. It has very narrow bass boost (Q of 6) that is continuously variable from 0 to +12 dB at 40Hz.

6. OUTPUT (STR/BRDG) SWITCH (Front & Rear)

Position of the switch indicates that the MQ-430 is in the stereo "STR" or bridged "BRDG" mode. In the bridged mode, ONLY the left input jack operates. If you desire to operate the amplifier in the "TriLinear™" mode, leave the switch in the stereo "STR" mode.

7. FLOATING/Common GROUND SWITCH (Front & Rear)

Use this switch to get the lowest "potential ground" and thereby the lowest alternator noise. This switch should normally be in the "common" position.

INSTALLATION

A. LOCATION

The MQ-430 has been designed to dissipate heat more efficiently than any other amplifier manufactured today. However, prolonged operation at high volumes or extremely low impedances without the aid of a FAN SHROUD can cause the unit to overheat and protect itself by shutting off. Therefore, regardless of where you decide to mount the MQ-430 make sure that there is at least a 2 inch clearance above and around the amplifier.

The amplifier may be mounted either upright or horizontally, but if possible NEVER upside down, a position which causes the rising hot air to "feed back" into the amplifier causing the system to prematurely shut down. The MQ-430 should be protected from exposure to moisture. It is best to mount the amplifier on:

1. The floor of the trunk.
2. The side of the sub-woofer enclosure.
3. Under the seat.

NOTE: DO NOT DRILL THE HOLES WHILE USING THE AMPLIFIER AS A TEMPLATE. IT IS VERY EASY TO DAMAGE THE AMPLIFIER POWDER COATED SURFACE IN THIS MANNER.

B. MOUNTING

1. Use the MQ-430 as the template. Mark the mounting surface with a felt pen or pencil.
2. Drill 3/16 inch holes.
3. Mount the amplifier with the four # 8 x 1 1/4 inch pan-head philips screws provided.

8. MASTER (SLAVE)

This plug-in receptacle is ONLY used when two or more PHOENIX GOLD amplifiers are utilized in the same system. When two or more PHOENIX GOLD amplifiers are used, ONE becomes the "Master" while the other(s) become the "Slave(s)." This configuration totally eliminates what is called "Heterodyne" noise in a car audio system as the PWM power supplies are locked "IN-SYNC" (frequency wise) with each other. See page 20.

9. SLAVE (MASTER)

Same as #8, this receptacle is used ONLY when 2 or more PHOENIX GOLD amplifiers are used. See page 20.

10. RCA INPUTS (Front & Rear) or more

The MQ-430 is set-up for Pre-amp inputs. The amplifier should be compatible with all CD players and AM/FM cassette decks with RCA outputs.

11. SPEAKER OUTPUT(S) (Front & Rear)

This specially tooled connector is designed to accommodate up to 10 gauge speaker cable. Connect speaker leads to this terminal. Be sure to connect the +/- correctly!

12. POWER GROUND INPUT TERMINAL (B- CHASSIS GROUND)

This specially tooled connector is designed to accommodate up to 7 gauge ground cable. Connect to battery terminal.

13. POWER INPUT TERMINAL (B+ POSITIVE 12 VOLTS DC)

This specially tooled connector is designed to accommodate up to 7 gauge power wire. Connect this to vehicles positive + 12 volts DC. We recommend that you "PowerFlow" and fuse (30 amp max) your MQ-430.

14. REMOTE TURN-ON

Connect the automatic antenna lead and/or "remote" switched 12V DC lead from CD player (or radio) to this terminal. This connection allows the MQ-430 to be turned ON and OFF by the Volume-ON/OFF control on your head unit.

ELECTRICAL INSTALLATION

NOTE: DISCONNECT BATTERY GROUND BEFORE INSTALLATION

1. Always use the largest gauge power/ground cable possible. The MQ-430 accepts up to 7 gauge wire (Phoenix Gold model number PS7R RED or PS7B BLACK).
2. Always place a fuse or circuit breaker no more than 12 inches from the battery. This protection is only for the vehicle, not the amp and should be no greater than 30 amps per amplifier. (see Figure 1)

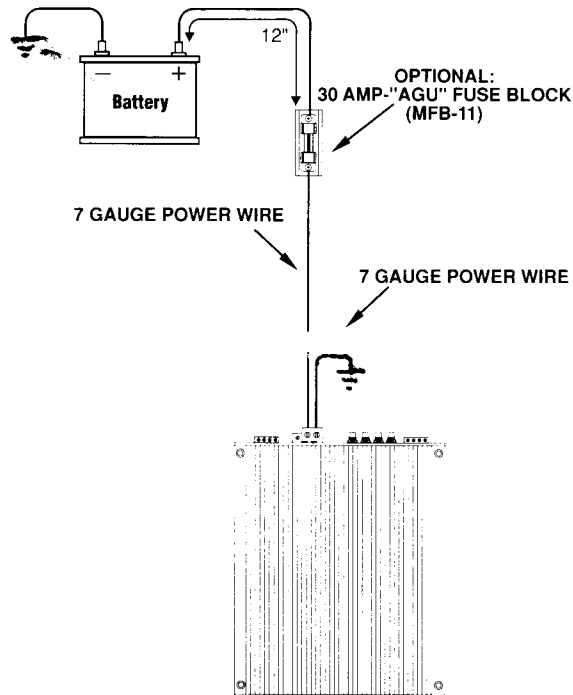
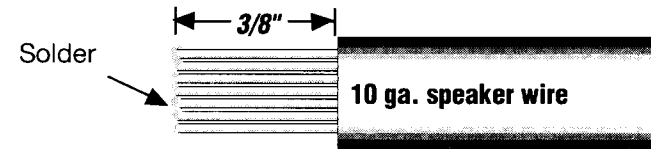


Figure 1

3. Always use the largest gauge speaker wire possible. The MQ-430 speaker terminal will accept up to 10 gauge cable. Utilizing the largest gauge wire will give you the highest "damping factor", thereby the tightest and most accurate bass.

4. After stripping the wires approximately 3/8 of an inch tin the very tip of each of the wires (see Figure 2). **This is VERY IMPORTANT!** If you tin the entire wire, it is possible to have a poor connection. This connection will result in high resistance; causing excessive heat which could **MELT** the connector and void the "limited" warranty.



(Figure 2)

5. Make sure that you run your audio cables AWAY from your power wires. This will help reduce any noise caused by the the power wire radiating into the audio cables.

For audio connections, we STRONGLY recommend using high-quality audio interconnects like our STS or Compact STS (Super-TRIPLE-Shielded) cables. The Triple-Shielded cables are the ultimate in sound quality and reducing or eliminating unwanted "radiated noise" from your system.

6. If the "green" LED is ON the amplifier is "ON". If the "yellow" LED is ON the amplifier has "thermaled" meaning that the heatsink has reached 200°F and the amplifier has protected itself. The "red" LED will only light if the amp reaches full power at 1 ohm or less.

Make sure that none of the speakers are shorted. Having a shorted output will not damage your Phoenix Gold MQ-430, but it will cause the protection circuitry to engage. This situation will be apparent when observing the three LED's on the front panel. The green LED will flash on for a second and then the red LED will stay lit. **Note:** This may recycle several times.

INSTALLATION

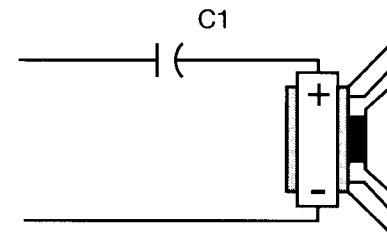
System Design

With the extreme flexibility of the PHOENIX GOLD MQ-430, we highly recommend that you carefully design the entire system BEFORE its installation. The following system diagrams should be used as ideas towards designing a truly awesome car audio system. Remember that THIS amplifier likes to be driven hard. Whenever possible ALWAYS choose the TRI-LINEAR mode (i.e., stereo & bridged mono simultaneously). OBVIOUSLY, passive crossover networks must be utilized. When passive components (capacitors and inductors) are used in multiple-speaker systems the crossover's impedance AND the speaker system combinations MUST be considered especially when determining the amplifier loading. 12dB per octave crossovers are good, but tend to create sonic problems if not utilized correctly. A 12dB per octave crossover (an inductor and capacitor for each speaker) forms a series resonant circuit to ground whose impedance at that resonance frequency is determined by the speakers DYNAMIC impedance. If the speaker, for whatever reason, becomes "open" or disconnected the crossover input impedance is theoretically zero (0). In other words, a direct SHORT to ground.

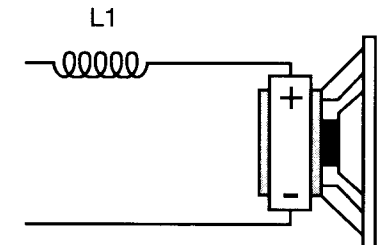
Fortunately ALL PHOENIX GOLD amplifiers are designed to withstand this type of treatment. In general, most amplifiers DO NOT like to see this condition. We recommend 6dB or 18dB per octave type crossovers, especially in automobiles. These crossover slopes are "In-Phase" and tend to sound better. The following Crossover Slope charts are for your reference. Obviously, we cannot take into account the actual impedance of the speaker or speakers you have chosen, since impedance will be determined by the frequency you select as your crossover point.

CROSSOVER SLOPES- TABLE OF COMPONENT VALUES

FREQUENCY HERTZ	SPEAKER IMPEDANCE					
	2 Ohm		4 Ohm		8 Ohm	
	L1	C1	L1	C1	L1	C1
80	4.1 mH	1000 uF	8.2 mH	500 uF	16 mH	250 uF
100	3.1 mH	800 uF	6.2 mH	400 uF	12 mH	200 uF
130	2.4 mH	600 uF	4.7 mH	200 uF	10 mH	150 uF
200	1.6 mH	400 uF	3.3 mH	200 uF	6.8 mH	100 uF
260	1.2 mH	300 uF	2.4 mH	150 uF	4.7 mH	75 uF
400	.8 mH	200 uF	1.6 mH	100 uF	3.3 mH	50 uF
600	.5 mH	136 uF	1.0 mH	68 uF	2.0 mH	33 uF
800	.41 mH	100 uF	.82 mH	50 uF	1.6 mH	25 uF
1000	.31 mH	78 uF	.62 mH	38 uF	1.2 mH	20 uF
1200	.25 mH	66 uF	.51 mH	33 uF	1.0 mH	16 uF
1800	.16 mH	44 uF	.33 mH	22 uF	.68 mH	10 uF
4000	.08 mH	20 uF	.16 mH	10 uF	.33 mH	5 uF
6000	51 uH	14 uF	10 mH	6.8 uF	.29 mH	3.3 uF
9000	34 uH	9.4 uF	68 uH	4.7 uF	.15 mH	2.2 uF
12000	25 uH	6.6 uF	51 uH	3.3 uF	100 uH	1.6 uF



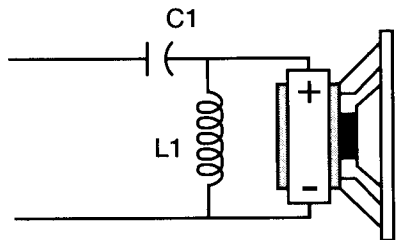
6 dB per Octave High-Pass filter



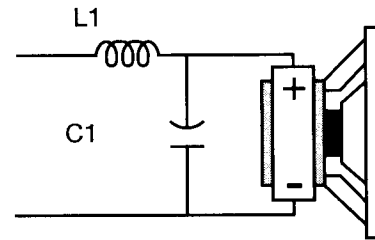
6 dB per Octave Low-Pass filter

CROSSOVER SLOPES- TABLE OF COMPONENT

FREQUENCY HERTZ	SPEAKER IMPEDANCE					
	2 Ohm		4 Ohm		8 Ohm	
	L1	C1	L1	C1	L1	C1
80	5.5 mH	680 uF	11 mH	330 uF	22 mH	180 uF
100	4.7 mH	560 uF	9.1 mH	270 uF	18 mH	150 uF
130	3.3 mH	400 uF	6.8 mH	200 uF	15 mH	100 uF
200	2.2 mH	300 uF	4.7 mH	150 uF	9.1 mH	75 uF
260	1.8 mH	200 uF	3.6 mH	100 uF	6.8 mH	50 uF
400	1.1 mH	150 uF	2.2 mH	68 uF	4.7 mH	33 uF
600	.75 mH	100 uF	1.5 mH	47 uF	3.0 mH	27 uF
800	.50 mH	68 uF	1.0 mH	33 uF	2.0 mH	15 uF
1000	.47 mH	50 uF	.91 mH	27 uF	1.8 mH	13 uF
1200	.33 mH	44 uF	.75 mH	22 uF	1.5 mH	11 uF
1800	.27 mH	30 uF	.50 mH	15 uF	1.0 mH	6.8 uF
4000	.10 mH	15 uF	.22 mH	6.8 uF	.47 mH	3.3 uF
6000	75 uH	10 uF	.15 mH	4.7 uF	.33 mH	2.2 uF
9000	50 uH	6.8 uF	.10 mH	3.3 uF	.225 mH	1.5 uF
12000	39 uH	4.7 uF	75 mH	2.2 uF	.15 mH	1.0 uF

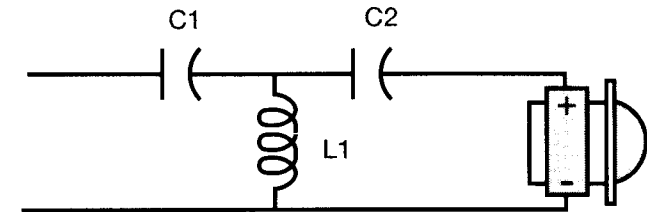


12 dB per Octave High-Pass filter



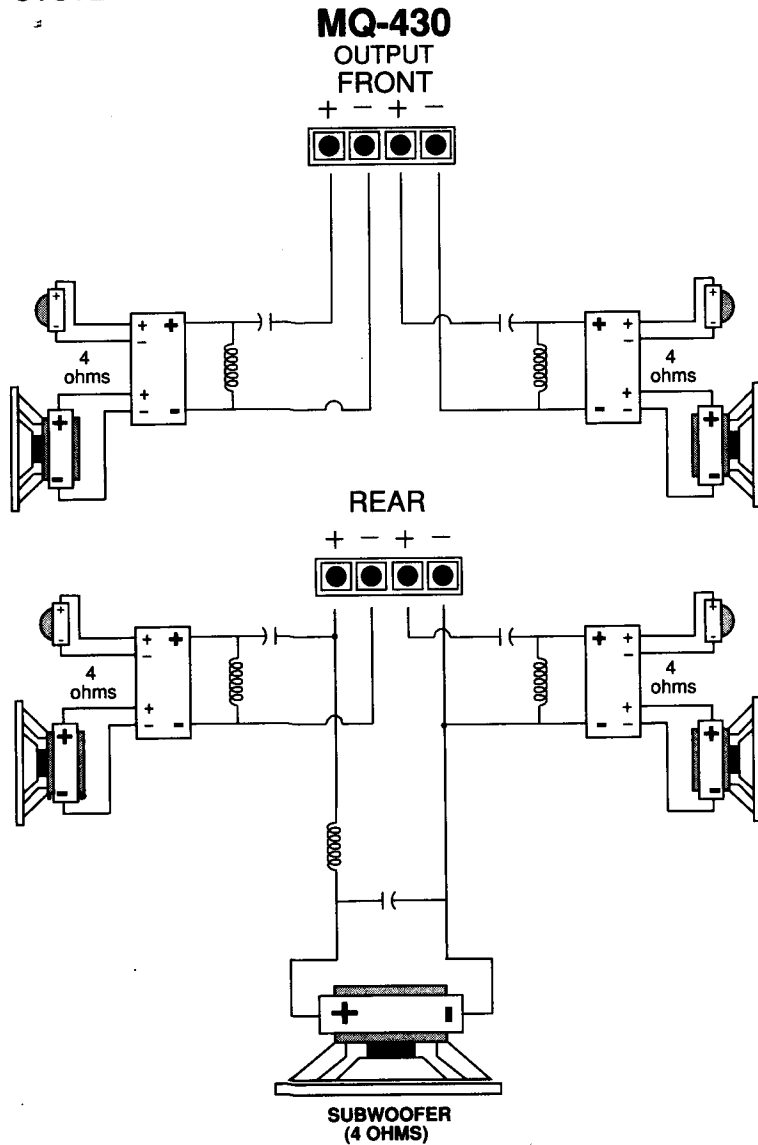
12 dB per Octave Low-Pass filter

FREQUENCY HERTZ	SPEAKER IMPEDANCE					
	4 Ohm			8 Ohm		
	C1	L1	C2	C1	L1	C1
80	330 uF	6.0 mH	1000 uF	160 uF	12 mH	500 uF
100	270 uF	4.7 mH	800 uF	150 uF	10 mH	400 uF
130	200 uF	3.3 mH	600 uF	100 uF	7.5 mH	300 uF
200	150 uF	2.2 mH	400 uF	68 uF	5.4 mH	200 uF
260	100 uF	1.8 mH	300 uF	50 uF	3.3 mH	150 uF
400	68 uF	1.1 mH	200 uF	33 uF	2.4 mH	100 uF
600	47 uF	.80 mH	130 uF	21 uF	1.6 mH	68 uF
800	33 uF	.60 mH	100 uF	16 uF	1.2 mH	50 uF
1000	27 uF	.47 mH	75 uF	13 uF	.90 mH	39 uF
1200	22 uF	.39 mH	68 uF	11 uF	.80 mH	33 uF
1800	15 uF	.27 mH	47 uF	7.5 uF	.50 mH	22 uF
2000	13 uF	.24 mH	40 uF	6.8 uF	.47 mH	20 uF
3000	8.8 uF	.16 mH	27 uF	4.7 uF	.33 mH	14 uF
4000	6.8 uF	.12 mH	20 uF	3.3 uF	.24 mH	10 uF
6000	4.7 uF	82 uH	13 uF	2.2 uF	.21 mH	6.8 uF
8000	3.3 uF	60 uH	10 uF	1.5 uF	.12 mH	5.0 uF
10000	2.7 uF	47 uH	8.2 uF	1.3 uF	.10 mH	3.9 uF
12000	2.2 uF	38 uH	6.8 uF	1.1 uF	82 uH	3.3 uF



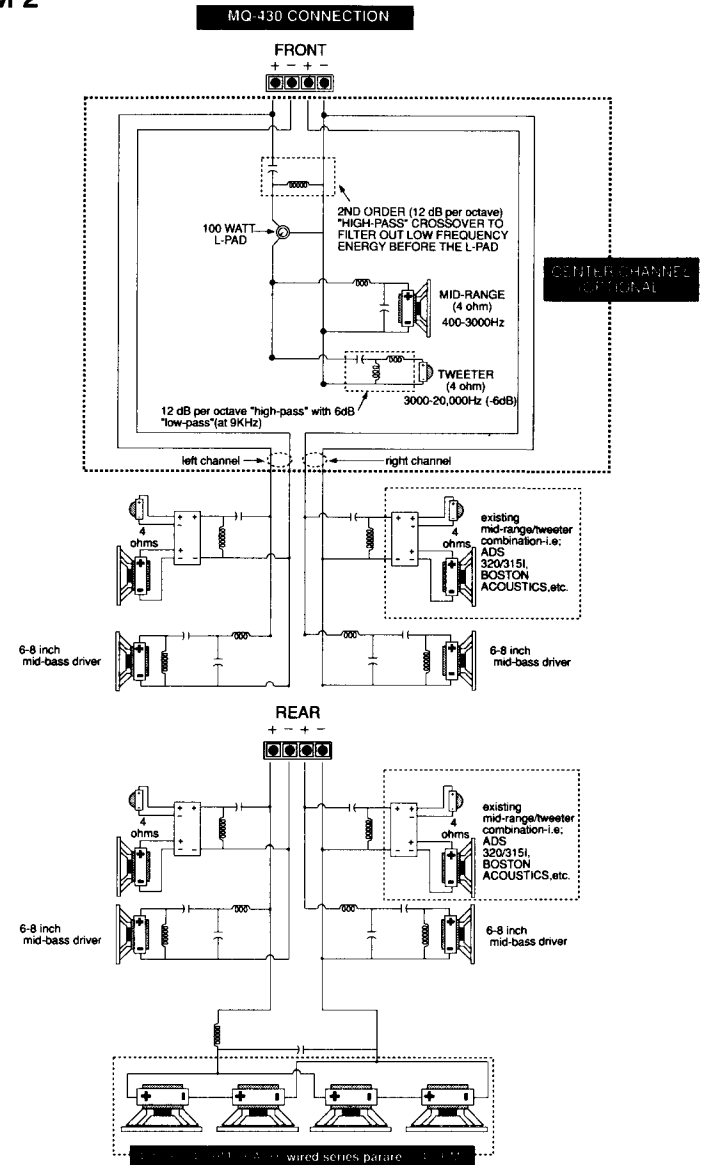
18 dB per Octave High-Pass filter

SYSTEM 1



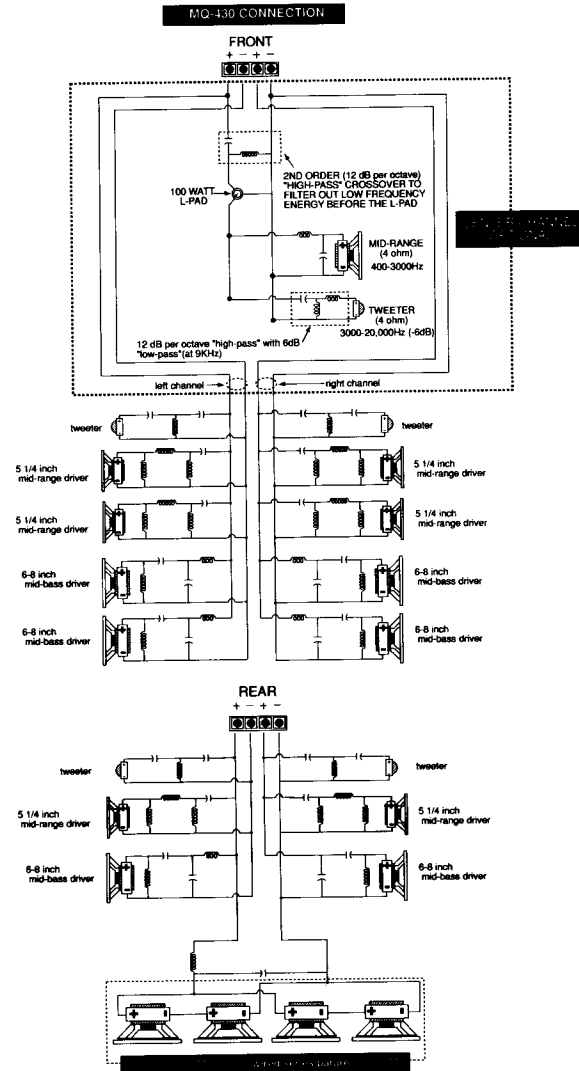
Stereo output into 2 (or 4) speakers with Subwoofer.

SYSTEM 2



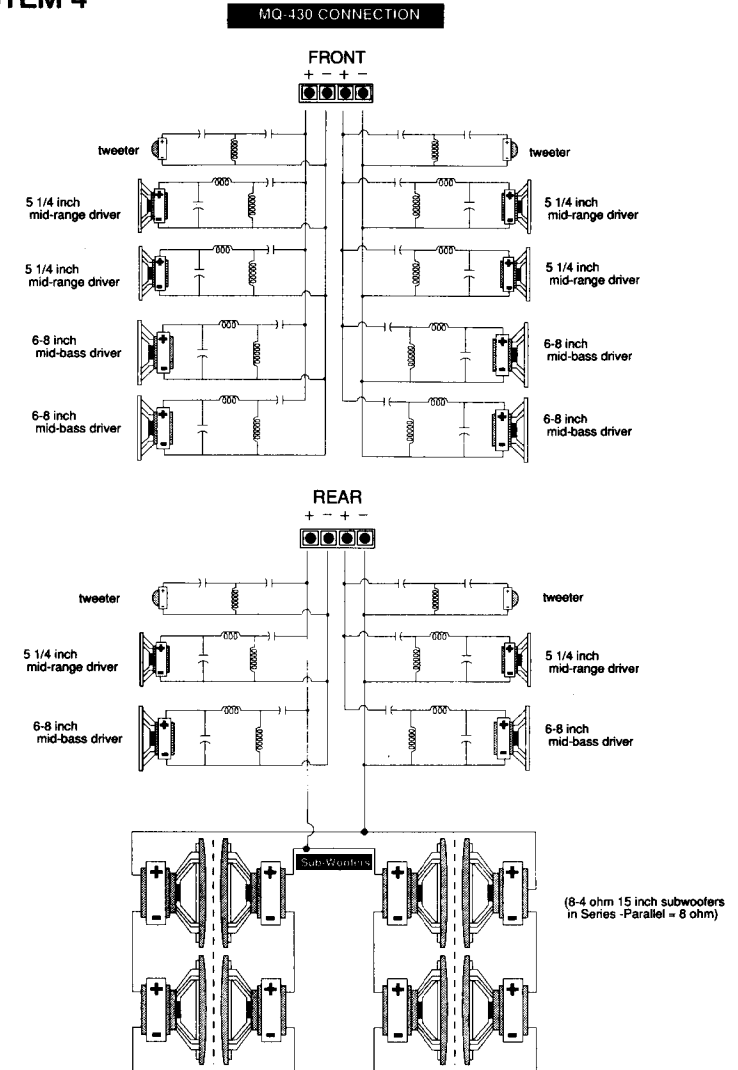
Tri-Linear Output™ - Front and rear speakers are in parallel with 6dB per octave passive crossovers and subwoofer connected across the bridged output of MQ-430 amplifier with 12dB per octave passive crossover.

SYSTEM 3



Tri-Linear Output™ - Front and rear speakers are in parallel with 12dB per octave passive crossovers and subwoofer connected across the bridged output of MQ-430 amplifier with 12dB per octave passive crossover. **NOTE:** Midrange is "out-of-phase" to the woofer and tweeter so that the entire speaker system will be acoustically "in-phase". This is very typical of 3-way 12 dB per octave networks.

SYSTEM 4

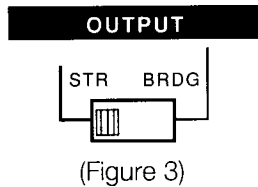


Tri-Linear Output™ - Front and rear speakers are in parallel with 12dB per octave passive crossovers, 12 dB bandpass passive crossovers and 18 dB per octave high-pass tweeter crossover. Subwoofer connected across the bridged output of MQ-430 amplifier with 12dB per octave low-pass crossover. **NOTE:** The 8 woofers are connected series parallel with outside woofers out of phase to inside woofers. This is an "Isobaric" 7th order enclosure. Therefore, NO passive crossover is needed as a 7th order box rolls the high frequency off at 36 db per octave.

ADJUSTMENTS:

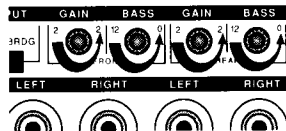
Before doing any adjustments:

- A. Make sure the "STR/BRDG" switch is in the "STR" position. Switch the "STR/BRDG" into "BRDG" ONLY when you are utilizing the amplifier for bridged mono use into subwoofers or as a dedicated left or right channel amplifier. (see Figure 3)



The MQ-430 has both an input sensitivity adjustment and a Bass EQ adjustment. Caution should be taken to adjust these properly as they affect each other.

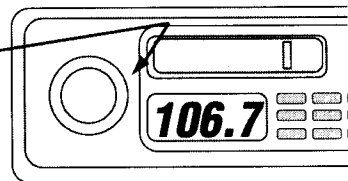
1. Start both adjustments at "0" or at minimum, a counter-clockwise setting for Bass EQ and Gain controls. Minimum gain is 2v input sensitivity (it takes 2 volts to drive the amp into clipping). (see Figure 4).



(Figure 4)

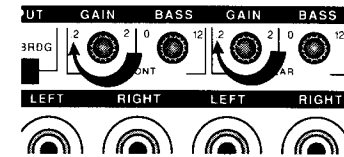
2. Adjust the volume control on your head unit (C/D, Cassette, etc.) to approximately 3 o'clock or 3/4 volume setting. (see Figure 5)

Approx. 3 o'clock or 3/4 volume setting



(Figure 5)

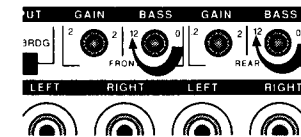
3. Turn the level setting adjustment on the MQ-430 clock-wise (i.e: to the left) until you hear the amplifier distort. The MQ-430 "clips" very softly so this can sometimes be a difficult adjustment. Please listen carefully! (see Figure 6)



(Figure 6)

4. If, after adjusting the "input" level, the bass sound quality is to your liking it would be best to not adjust the "Bass EQ" level control. Remember that adding any bass boost into the system either through an external equalizer OR the built-in one provided with the MQ-430 can cause the amplifier to :
 - A. Distort more often, or...
 - B. Overheat at a much more rapid rate than is normal.

5. If you desire more BASS output, adjust the "BASS EQ" level "clockwise". The adjustment range is from "0" to "+12 dB". We recommend using as little Bass EQ as possible. Remember boosting +12 dB at 45 Hz requires the amplifier to work 16 times harder! (see Figure 7)



(Figure 7)

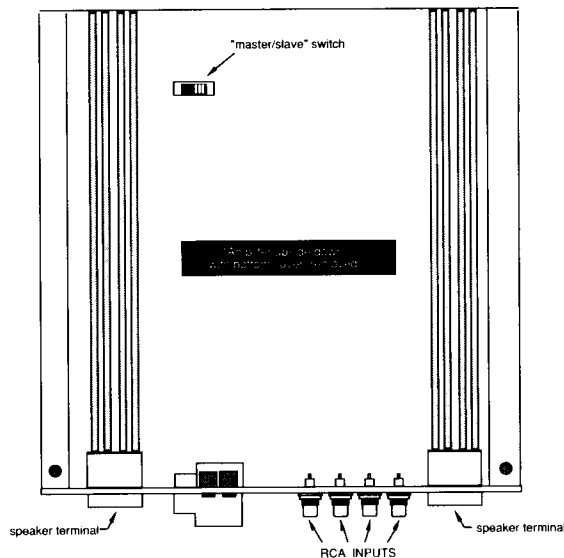
NOTE: If you need to boost the "BASS EQ" to the maximum level +12 dB to obtain the desired bass output-SOMETHING IS VERY WRONG. Check the design notes for your subwoofer enclosure. More than likely the woofer and the enclosure are NOT working together correctly.

MASTER / SLAVE CONNECTION

In single amplifier installations, the "master/slave" connection is never utilized. This connection is only used when two or more PHOENIX GOLD amplifiers are used in the same vehicle. The interface of "master" and "slave" is an exclusive feature to PHOENIX GOLD and in multi-amp systems can greatly reduce RFI-HETERODYNE noise. RFI/HETERODYNE noise is only present when more than one amplifier is present or any other device with DC to DC switching power supplies. The noise has a unique "whooshing" or "birdy" sound that you have probably heard at very low volume levels and/or on AM. This noise is the type you may have heard in a number of otherwise outstanding car audio systems and until now has been impossible to solve!

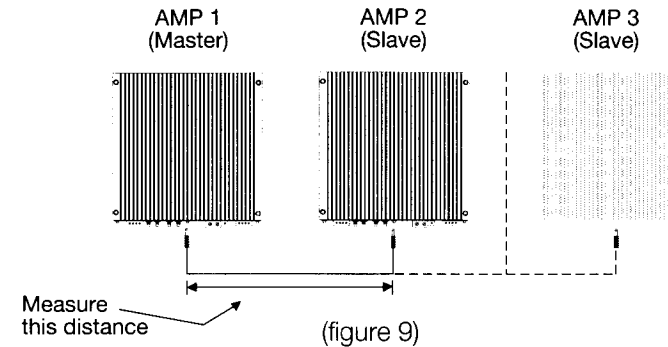
If you plan to use this connection, please follow these instructions carefully.

1. Decide which amplifier is to be the "master" and which is to be the "slave". Unscrew the bottom plates of the master amplifier using a #1 phillips head screwdriver and a 7/64" allen wrench.
2. Inside the amplifier is a PCB mount slide switch which is near the 30A fuse. The blue dot indicates the "Slave" position. Moving the switch away from the blue dot is the "Master" position. Switch the amplifier into the master position. (see figure 8)

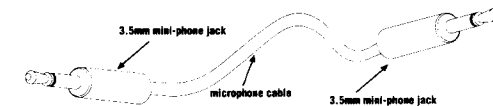


(figure 8)

3. Measure the distance from the first amplifier's "master" output jack to the next amplifier's "slave" input jack (see figure 9). If you use more than 2 Phoenix Gold Amps, connect them "daisy-chain" style. The Master / Slave inputs are paralleled internally, so this makes it easy. There is no wrong way to connect master/slave from one amp to another. (see figure 9)



4. Using a 3.5mm mini-phone plug (NOT SUPPLIED- see figure 10) for both the output and input, SOLDER a small gauge shielded cable to both mini-phone plugs. Make sure that the cable is at least 4 inches longer than the measured distance. This will allow for running the cable with gentle bends to each amplifier. (see figure 10)



(figure 10)

5. Plug the 3.5mm mini-phone plugs in. The amplifier power supplies are now synchronized.

The installation is now complete. Enjoy!

POSTSCRIPT: If you experience ANY problems do not hesitate to contact us at 503-288-2008. We are ready to help.

