Owners Manual

PHOENIX GOLD

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PHOENIX GOLD

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M25 Triple Darlington High Definition Amplifier

BEFORE YOU BEGIN YOUR INSTALLATION

Thank you for choosing a PHOENIX GOLD product. In doing so you've demonstated a desire to own the finest in audio reproduction. PHOENIX GOLD strives to provide you, the customer, with the finest products possible.

Properly installed, your PHOENIX GOLD amplifier will provide years of high quality sonic reproduction. Before installing the M25 in your vehicle, please READ the entire manual carefully. It is required reading for the protection of your vehicle AND for the maximum performance of your car audio system.

The M25 utilizes THE fastest output devices in the industry. Where most manufacturers use 3 to 5 MHz output devices, PHOENIX GOLD utilizes 25 MHz high temperature devices. These devices are not only faster, but more costly... and much more reliable. At PHOENIX GOLD, we don't just use run-of-the-mill capacitors in our circuitry, but rather low ESL/ESR type capacitors. And we use them extensively in our amplifier. This helps reduce one of the major failure modes of all car audio amplifiers - HEAT. The M25 amplifier has been extensively tested and "burned-in" for maximum reliability. If you, the consumer, install this amplifier we provide a "limited" warranty for 30 days. If your authorized PHOENIX GOLD retailer installs your M25 power amplifier the warranty period extends to 18 months from the date of purchase.

Remember, at PHOENIX GOLD, we don't just manufacture mobile electronics. We also manufacture cables, "PowerFlow" distribution systems, alternators, batteries & accessories for the PROFESSIONAL.

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M25 POWER AMPLIFIER FEATURES

- 2 X 25 watts per channel
- Bridgeable Outputs
- TRI-LINEAR™ output capability, simultaneous stereo & bridged mono set up is possible
- Adjustable Bass EQ (0 to +12dB) @ 45Hz
- Pulse Width Modulated (PWM) MOS-FET Switching Power Supply
- Stable into 2 ohm loads
- High-Current / High-Voltage Triple-Darlington Output Design
- 2 layer 20 mil thick GOLD-PLATED G-10 Glass-Epoxy Printed Circuit Board
- Variable input sensitivity (200mV to 2V)
- Thermal Overload Protection
- Fully muted turn-on / turn-off circuitry
- Optically isolated input design
- 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

M25 POWER AMPLIFIER SPECIFICATIONS

- Output Power per Channel- Both Channels Driven
  - Into 4 ohms @ 12V DC .....25 WRMS
  - Into 2 ohms @ 12V DC .....50 WRMS
  - Bridged Power into 4 ohms .....80 WRMS
- THD at rated power 4 ohms.....0.02%
- SMPTE at rated power 4 ohms.....0.05%
- DIM at rated power 4 ohms 0.01%
- Frequency response.....10Hz to 30KHz +/-1dB
- Signal to Noise Ratio ..... > 100dB (20 to 20kHz)
- Input Sensitivity.....200mV to 2V
- Output Impedance .....2 to 16 ohms
- Input Impedance .....10K ohms
- Idle Current.....750 mA
- Current Consumption
  - @ 4 ohms stereo..... 9 Amps
  - @ 2 ohms stereo.....18 Amps
  - @ 2 ohms stereo, 4 ohms mono .....18 Amps
- Efficiency ..... > 80% (Power Supply)
- Damping Factor @ (20 to 10Khz).....250 to 1
- Min to Max Voltage requirements .....10.2 to 15.5V DC
- Dimensions.....10.625" L X 8.25" W X 2.0" H

Updated Specifications for M25 series II amplifier

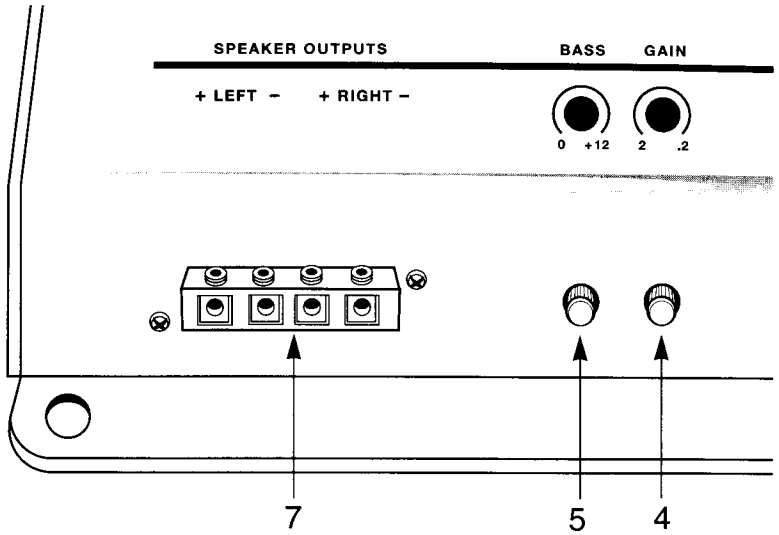
Series II amplifiers have a terminal strip for the B+, B-, and Remote connections.

Output Power per Channel (all channels driven)*

Into 4 ohms @ 12.0 (IASCA & USAC rating)	25 watts x 2
Into 4 ohms @ 14.4 VDC	65 watts x 2
Into 2 ohms @ 14.4 VDC	70 watts x 2
Into 1 ohm @ 14.4 VDC (current limited)	70 watts x 2*
Bridged into 4 ohms @ 14.4 VDC	140 watts x 1
Bridged into 2 ohms @ 14.4 VDC (current limited)	140 watts x 1*
Frequency Response	± 1dB from 20Hz to 20kHz
Signal to Noise Ratio	>100dB
Input Sensitivity	200 millivolts to 2 volts
Input Impedance	>10k ohms
Input Voltage Range	10.5 volts to 15.0 volts
Typical current draw at idle	750 milli amps
Recommended Fuse Size	30 amps
Dimensions	10.63"L x 8.25"W x 2.0"H

* 2 ohms bridged or 1 ohm stereo operation REQUIRES cooling fans.

AMPLIFIER CONTROLS AND FUNCTIONS



1. POWER ON - GREEN LED INDICATOR

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

2. OVERLOAD - RED LED INDICATOR

When this LED lights up it is an indication that the amplifier has:

A. Passed more than 8 amps of current in the output stage, or....

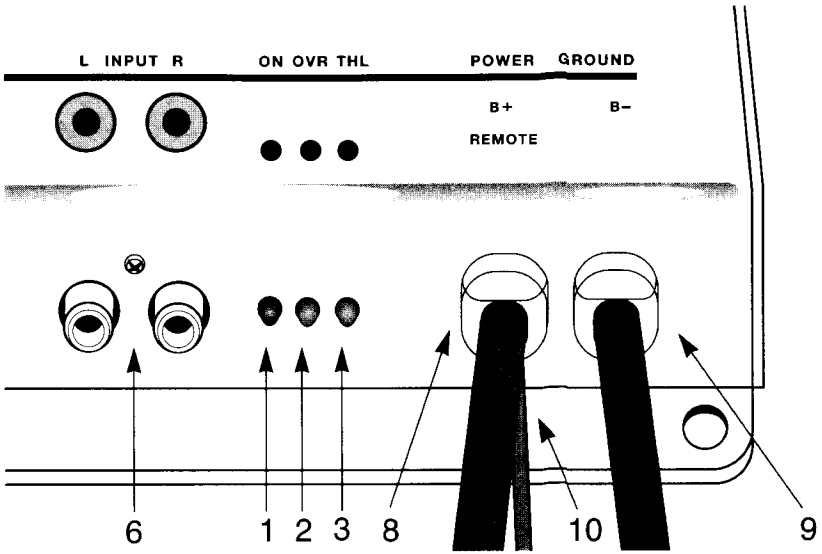
B. Passed more than 250 total watts total RMS! Obviously a bit more power than the amplifier is rated at.

3. THL - AMBER LED INDICATOR

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!

4. GAIN ADJUSTMENT

Allows for the correct matching of any signal source (CD player, AM/FM cassette deck, etc.) from its pre-amp output into the M25. Adjustments range from 200 mV (.2 volts) to 2 Volts (AC/Audio).



5. BASS ADJUSTMENT

This bass equalizer circuit allows for matching of the subwoofer enclosure to any vehicle.

6. RCA INPUTS

The M25 is set-up for Pre-amp inputs. Typically all CD players and AM/FM cassette decks with RCA outputs should operate.

7. SPEAKER OUTPUT

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

8. POWER INPUT (B+ POSITIVE 12 VOLTS DC)

This is a Red 9 gauge Phoenix Gold power cable. We recommend the you "Powerflow" and properly fuse (20 Amp maximum) your M25. See page 8.

9. POWER GROUND (B- CHASSIS GROUND)

This is a Black 9 gauge Phoenix Gold cable.

10. REMOTE TURN-ON

Connect the automatic antenna lead or "remote" switched 12V DC lead from CD player (or radio) to this Blue wire. This connection allows the M25 to be turned ON and OFF by the Volume-ON/OFF control on your head unit.

AMPLIFIER LOCATION / MOUNTING

AMPLIFIER LOCATION:

The M25 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. Regardless of where you decide to mount the M25 make sure that there is at least a 2-inch clearance above and around the amplifier.

The amplifier may be mounted either upright (Figure 1) or horizontally (Figure 2), but if possible NEVER upside down (Figure 3) -a position which causes the rising heat to "feed-back" into the amplifier causing a premature system shut down.

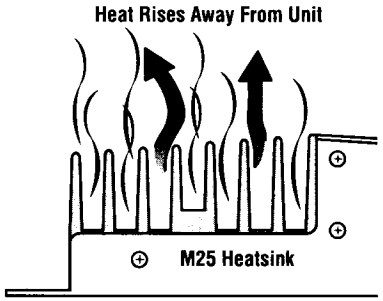


Figure 1 - Upright Mount

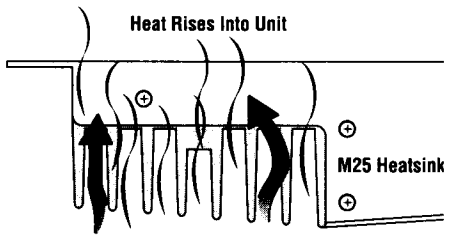


Figure 3 - Inverted Mount

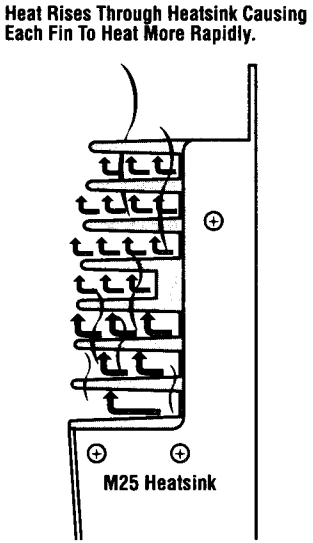


Figure 2 - Horizontal Mount

The M25 should be protected from exposure to moisture and 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.

Place amplifier in the position that you wish to use and check for clearances around the amplifier.

AMPLIFIER LOCATION / MOUNTING CONT.

AMPLIFIER MOUNTING

Mounting considerations: Is there enough space for the signal input plugs? Will the speaker cables be able to enter the terminal connectors straight? Will your mounting position allow easy viewing of indicator LED's and amplifier controls?

1. Use the M25 as the template. Mark the mounting surface with a felt pen or pencil. (Placing masking tape on the surface first will make these marks more visible).
2. Drill 1/8 inch pilot holes.
3. Mount the amplifier with the four (4) 24kt Gold plated #10 by 3/4 inch panhead philips screws provided.

The optimum mounting configuration is shown below in Figure 4. This mount allows the heat sink fins to act as a chimney thus keeping the amplifier cool over longer periods on time.

Do not drill any holes while using the amplifier as a template. It is very easy to damage the amplifier's powder coated surface in this manner.

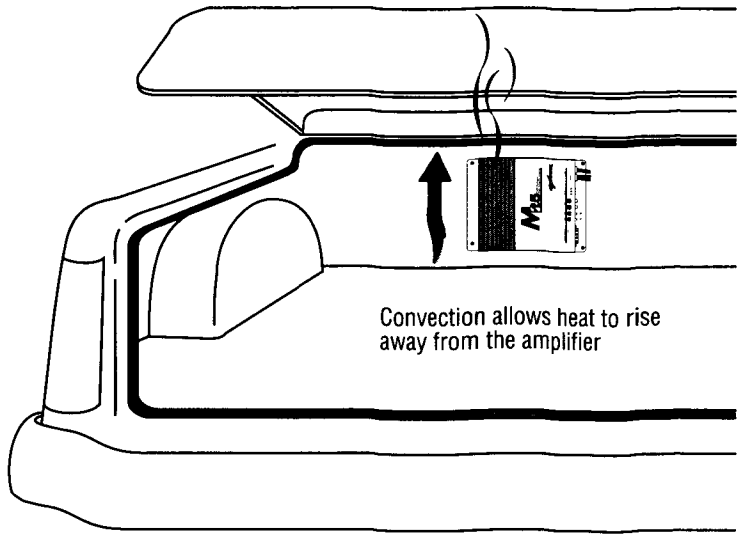


Figure 4 - Trunk Mount

ELECTRICAL INSTALLATION

REMEMBER TO ALWAYS DISCONNECT BATTERY GROUND BEFORE WORKING ON A VEHICLE'S ELECTRICAL SYSTEM

1. Always use the largest gauge power / ground cable available. The M25 comes with 9 gauge wire (Phoenix Gold numbers PS9R /PS9B).
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 stereo and should be no greater than 15-20 amps per amplifier. (See Figure 5)

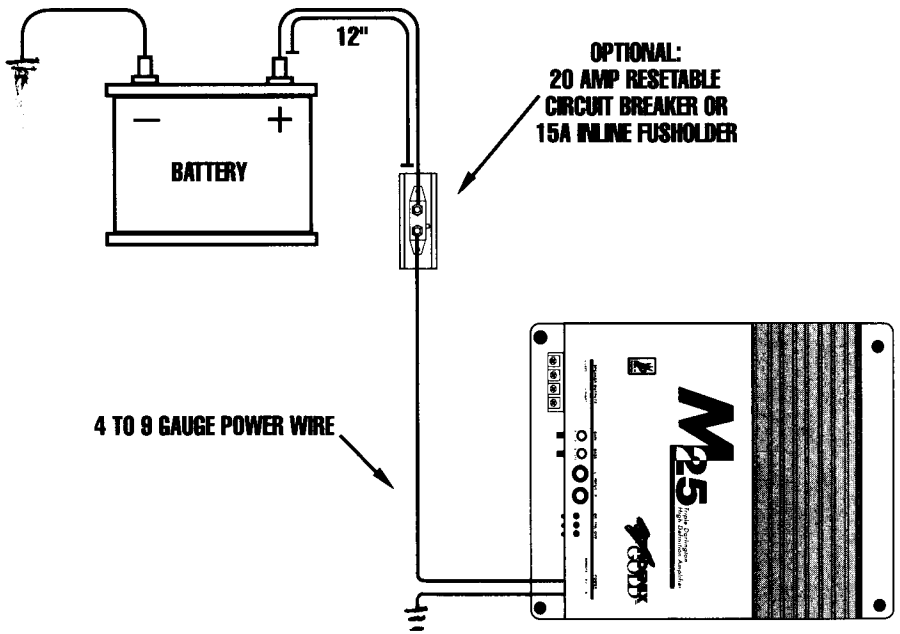


Figure 5 - PowerFlow System

3. For audio connections, we recommend using high-quality audio interconnects like the Phoenix Gold STS (Super-TRIPLE-Shielded) or our compact CSI cables. The Triple-Shielded cables are the ultimate in sound quality and reducing or eliminating unwanted "radiated noise" from your system. 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.
4. Based on the current draw of your system, always use the largest gauge power wire possible . The M25 power terminal comes with 12 inches of 9 gauge cable. Utilizing the largest gauge wire will give you the highest "damping factor" thereby the tightest and most accurate bass. Connecting these wires to the rest of your system via a M25 PDB (not included) allows amplifier to be removed easily (See Figure 6). One alternative is to use a butt connector (not included), however, this method is a permanent solution and doesn't allow quick removal of the amplifier (See Figure 7).

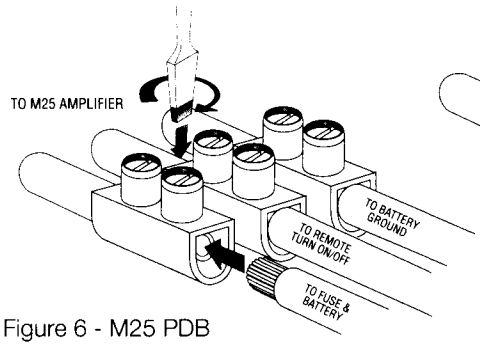


Figure 6 - M25 PDB

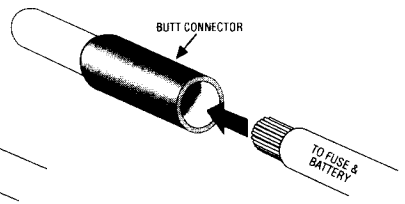


Figure 7 - M25 Butt connector

5. If the "green" LED is ON the amplifier is "ON". If the Amber 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 3/4 of an ohm or less.

   Make sure that none of the speakers are shorted. Having a shorted output will not damage your Phoenix Gold M25, 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 flash. This may recycle several times.

AUDIO SYSTEM DESIGN

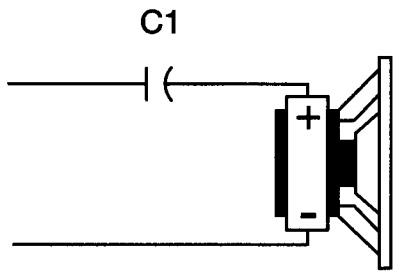
With the extreme flexibility of the PHOENIX GOLD M25, we highly recommend that you carefully design the entire system BEFORE its installation. The following system diagrams should be used as ideas towards designing a truly awesome car audio system. Remember that THIS amplifier likes to be driven hard. Whenever possible ALWAYS choose the TRI-LINEAR mode (i.e.,stereo & bridged mono simultaneously). Passive crossover networks must be utilized in order to protect drivers. 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.

Fortunately, PHOENIX GOLD amplifiers are designed to withstand this type of treatment. Generally, most amplifiers DO NOT like to see this condition. We recommend 6 dB or 18 dB per octave type crossovers, especially in automobiles. These crossover slopes are "In-Phase" and tend to sound better.

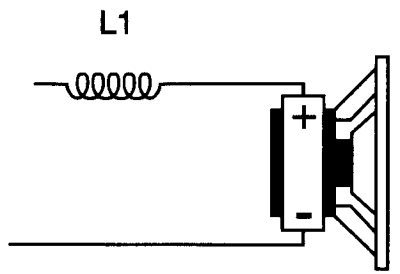
The following Crossover Slope charts are for your reference. Obviously, we cannot take into account crossover component values for the system you have chosen, since those values will be determined by the frequency you select for your crossover point and the impedance of the speakers at the crossover point selected for your system.

CROSSOVER SLOPES / 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	300 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	80 uH	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	.1 mH	1.6 uF



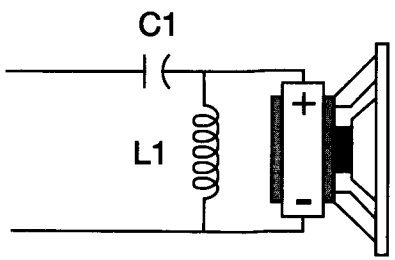
6 dB Per Octave High-Pass Filter



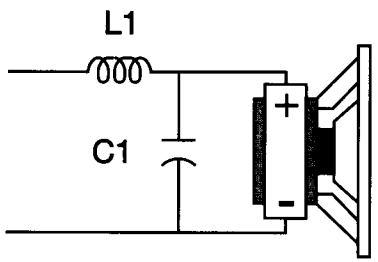
6 dB Per Octave Low-Pass Filter

CROSSOVER SLOPES / COMPONENT VALUES

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	.23 mH	1.5 uF
12000	39 uH	4.7 uF	75 uH	2.2 uF	.15 mH	1.0 uF



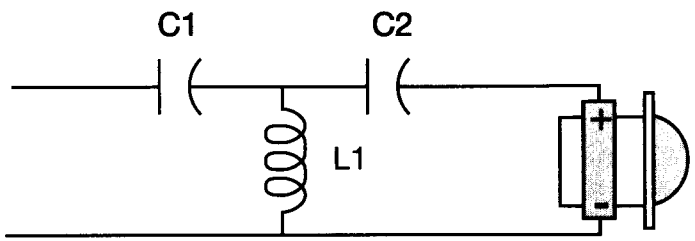
12 dB Per Octave High-Pass Filter



12 dB Per Octave Low-Pass Filter

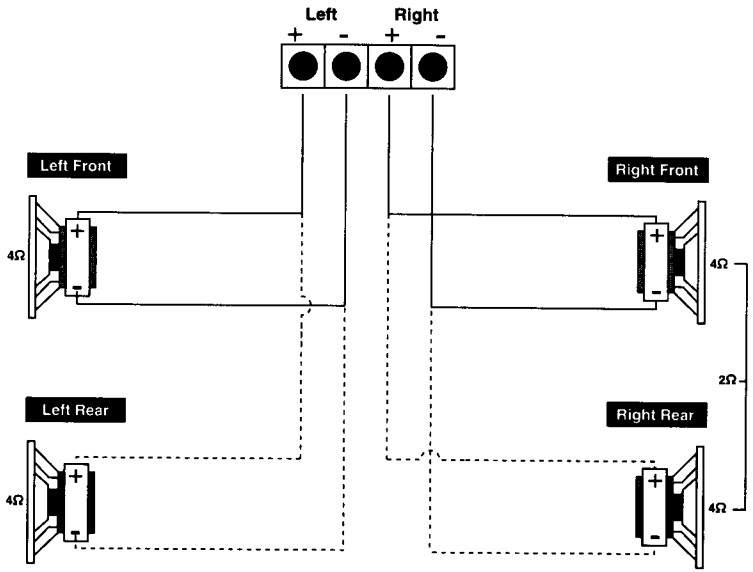
CROSSOVER SLOPES / COMPONENT VALUES

FREQUENCY HERTZ	SPEAKER IMPEDANCE					
	4 Ohm			8 Ohm		
	C1	L1	C2	C1	L1	C2
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



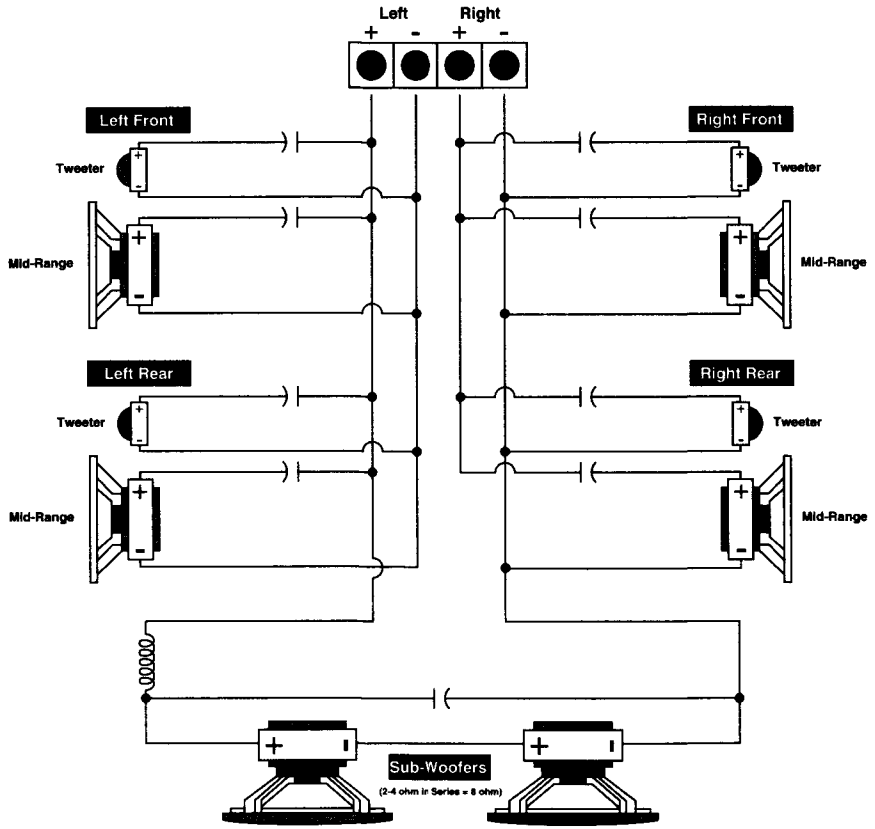
18 dB Per Octave High-Pass Filter

PHOENIX GOLD SYSTEM 1



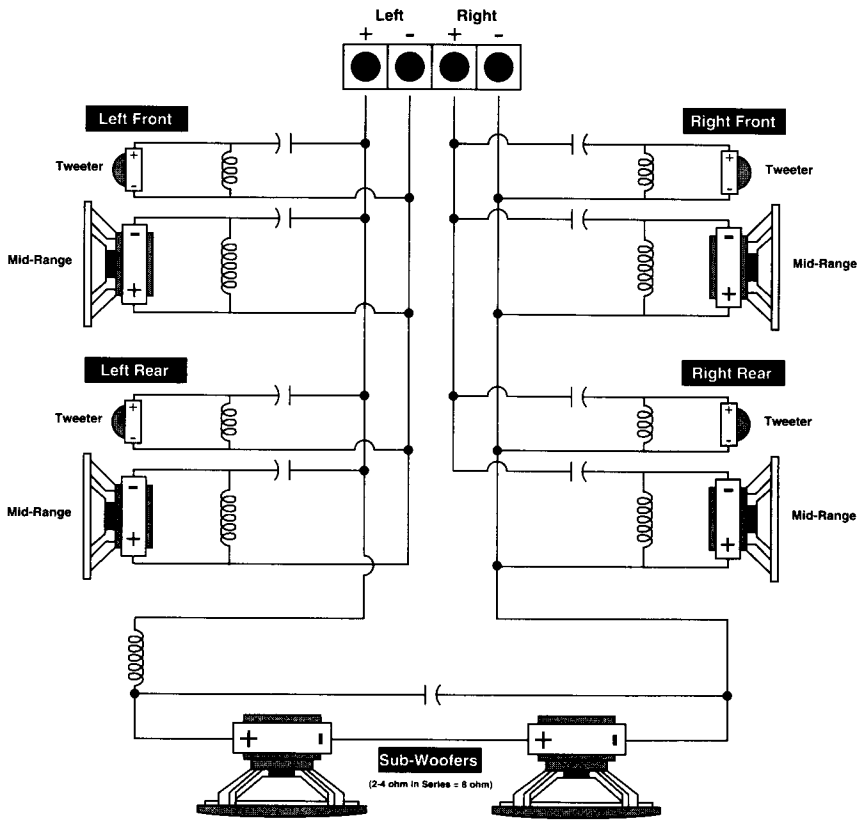
The Phoenix Gold system #1 uses only stereo output into 2 (or 4) speakers.

PHOENIX GOLD SYSTEM 2



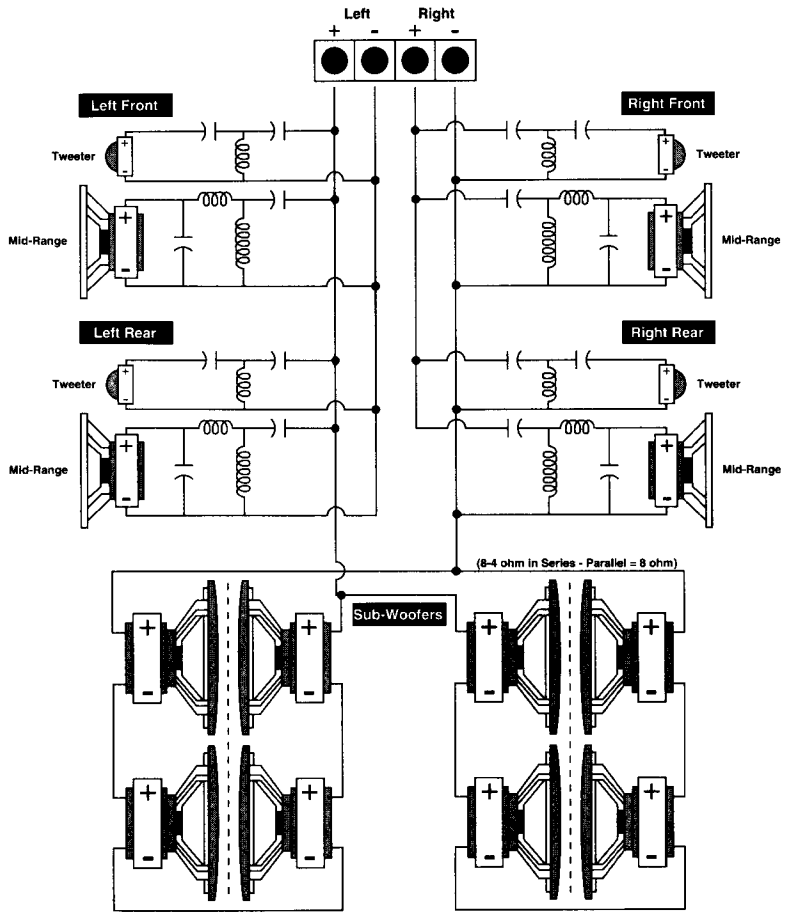
The Phoenix Gold system #2 utilizes Tri-Linear output™ - Front and rear speakers are parallel with 6dB per octave passive crossovers. The sub-woofer is connected across the bridged output of M25 amplifier with 12dB per octave passive crossover.

PHOENIX GOLD SYSTEM 3



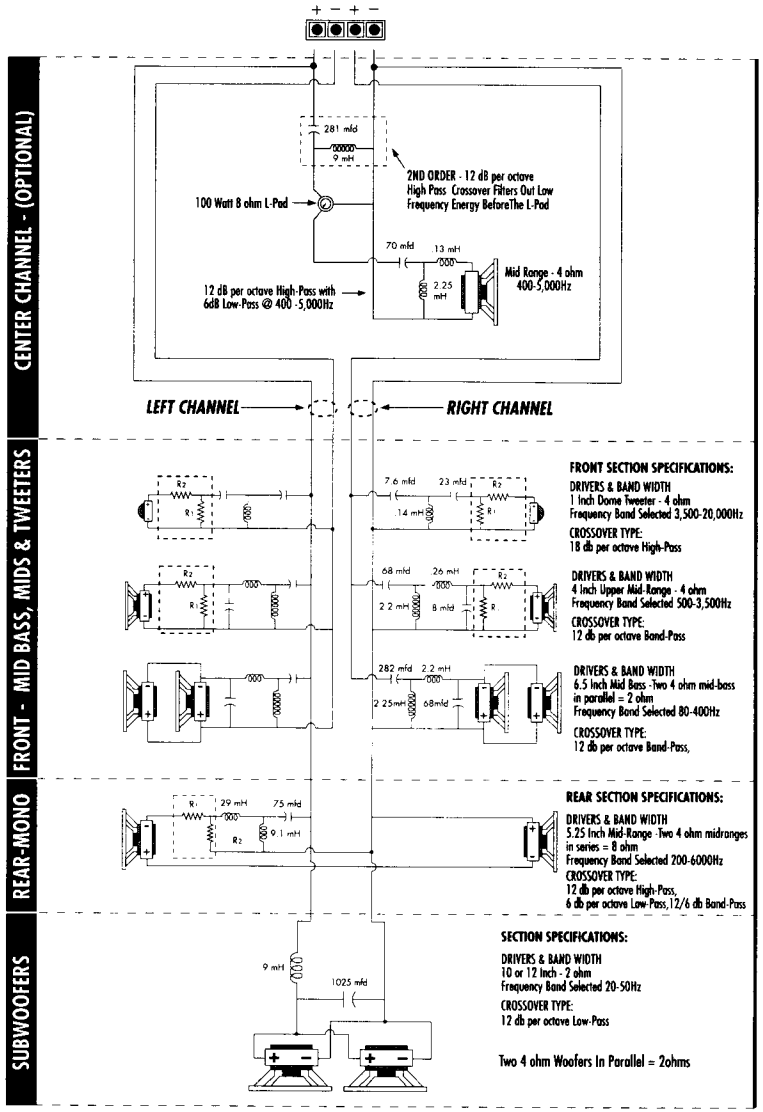
The Phoenix Gold system #3 utilizes Tri-Linear output™ - Front and rear speakers are parallel with 12dB per octave passive crossovers. The sub-woofer is connected across the bridged output of M25 amplifier with 12dB per octave passive crossover. NOTE: Midrange is "out-of-phase" to the woofer and tweeter so that the entire speaker system will be acoustically "in-phase". This is very typical of 3-way 12 dB per octave networks.

PHOENIX GOLD SYSTEM 4



The Phoenix Gold system #4 utilizes Tri-Linear output™ - Front and rear speakers in parallel with 12 dB bandpass midrange crossovers and 18 dB per octave high-pass tweeter crossover. The Sub-woofer is connected across the bridged output of M25 amplifier. NOTE: The 8 woofers are connected series parallel with out-side 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.

PHOENIX GOLD SYSTEM 5



This system utilizes 4 mid-bass drivers to create the illusion that bass is coming from the front of the vehicle-not the rear! Also note that the rear channel is MONO! And check out the optional center channel. This is a IASCA (International Auto Sound Challenge) type system. When your going for best sound quality, use this system!

AMPLIFIER ADJUSTMENTS

The M25 has both an input sensitivity adjustment and a Bass EQ adjustment. Care should be taken to adjust these properly as they affect each other.

1. Start both adjustments at "0" or at minimum sensitivity, a counter-clockwise setting for Bass EQ and Gain (See Figure 8).

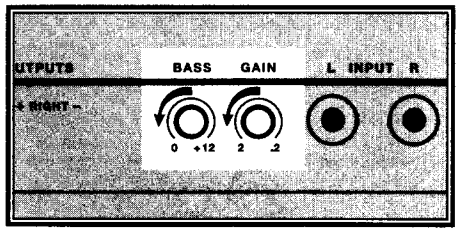


Figure 8 - Bass & Gain Controls

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 9)

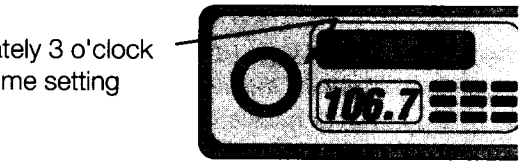


Figure 9 - Head Unit

3. Turn the "Gain" setting adjustment on the M25 clock-wise (i.e. to the right) until you hear the amplifier distort. The M25 "clips" very softly so this can sometimes be a difficult adjustment. Please listen carefully! (see Figure 10)

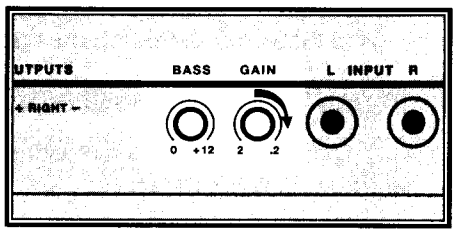


Figure 10 - Gain Control

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. Adding any "EQ" into the system either through an external equalizer or the built-in one provided with the M25 can cause the amplifier to:

   A. Distort easier, 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 45Hz requires the amplifier to work 16 times harder! (see figure 11)

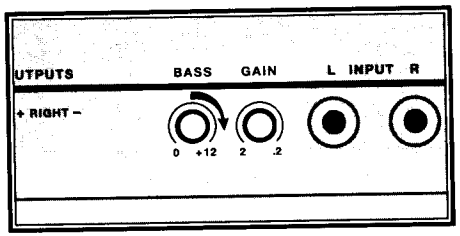


Figure 11 - Bass Control

6. 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.

Your Installation Is Now Complete!
Relax and Enjoy...

If you experience any problems with your M25 amplifier, do not hesitate to contact us at (503) 288-2008. We are here to help.

Phoenix Gold is a proud member of IASCA (International Autosound Challenge Association). If you would like to know more about sound off competitions in your area contact IASCA at (714) 688-8051.