MS-250 / MPS-2220 AMPLIFIER FEATURES

- 2 X 50 watts per channel (MS-250)
  2 X 22 watts per channel (MPS-2220)
- Bridgeable
- TRI-LINEAR™ output capability, stereo and bridged mono simultaneously set up is possible
- Adjustable Bass EQ 0 to +12dB
- Pulse Width Modulated (PWM) MOS-FET Switching Power Supply
- RIBBON-WINDING™ of Power Toroid
- MS-250 is stable into 2 ohm loads
  MPS-2220 is stable into 1 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
- Fully muted turn-on/turn-off circuitry
- Floating/common ground switch
- Optically isolated input 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- Both Channels Driven

  MS-250
  Into 4 ohms @ 12V DC- 50 WRMS
  Into 2 ohms @ 12V DC- 90 WRMS
  Bridged Power into 4 ohms- 180 WRMS

  MPS-2220
  Into 4 ohms @ 12V DC- 22 WRMS
  Into 2 ohms @ 12V DC- 44 WRMS
  Into 1 ohms @ 12V DC- 80 WRMS
  Bridged Power into 4 ohms- 120 WRMS

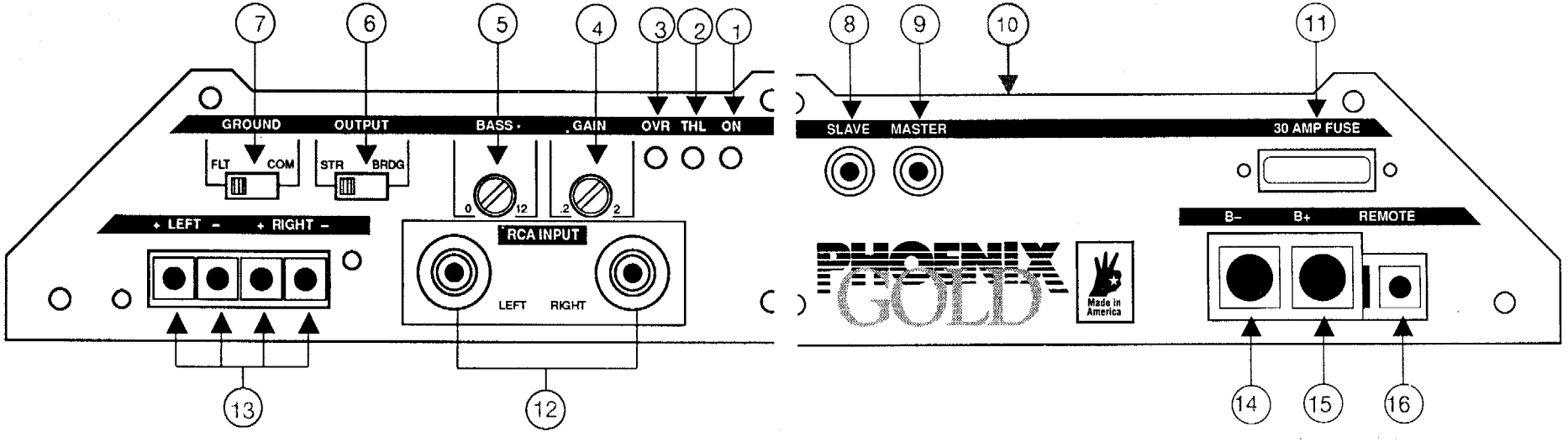
- THD at rated power 4 ohms- 0.01%
- SMPTE at rated power 4 ohms- 0.03%
- DIM at rated power 4 ohms- 0.07%
- Frequency response- 15Hz to 20KHz +/-1dB
- Signal to Noise Ratio- > 100+ dB (20 to 20kHz)
- Input Sensitivity- 200mV to 2V
- Output Impedance- 2 to 16 ohms
- Input Impedance- 10K ohms
- Idle Current- 2 Amps
- Current Consumption MS-250 / **MPS-2220**-

  @ 4 ohms stereo-15 amps / **7.5 amps**
  @ 2 ohms stereo- 30 amps / **15 amps**
  @ 1 ohms stereo- / **30 amps**
  @ 2 ohms stereo, 4 ohms mono- 35 amps / **18 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- 8.5" L X 11.4" W X 2.4" H

END PANEL: MS-250 / MPS-2220 POWER AMPLIFIER

A. Input End



1. **ON - Power on LED**
   Indicates 12 volts at B+, B- and remote terminals. Amplifier is"ON".

2. **THL**
   When this LED lights up it is an indication that the amplifier has "shut-off" as the thermal 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. **OVERLOAD LED**
   When this LED lights up it is an indication that the amplifier has either
   A. passed more than 25 amps of current in the output stage, or....
   B. passed more than 300 total watts total RMS, obviously a bit more power than the amplifier is rated at. Again this is normal, as it is part of the amplifier's protection system.

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 MS-250. Adjustments range from 200 mV (.2 volts) to 2 Volts (A/C-Audio).

5. **BASS ADJUSTMENT**
   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.

6. **OUTPUT (STR/BRDG) SWITCH**
   Position of the switch indicates that the MS-250 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**
   Use this switch to get the lowest "potential ground" and thereby the lowest "alternator" noise. This switch should normally be in the "common position".

8. **MASTER (SLAVE)**
This plug-in receptacle is ONLY used when 2 or more PHOENIX GOLD amplifier's are utilized in the same car audio system . When two PHOENIX GOLD amplifiers are used, ONE (1) becomes the "master" while the second amplifier becomes the "slave." 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. A mini-plug phono cable (not included) must be plugged from the "master" jack of the first amplifier and connected to the second PHOENIX GOLD amplifier's "slave" jack.

9. **SLAVE (MASTER)**
Same as #8, this receptacle is used ONLY when 2 or more PHOENIX GOLD amplifiers are used. Utilizing the "slave" jack means that this amplifier is the second amplifier.

10. **PWM-SYNC (Inside Amplifier – see page 20)**
Use this switch ONLY when when two or more PHOENiX GOLD amplifier's are utilized in the same car audio system . When two PHOENIX GOLD amplifiers are used ONE (1) becomes the "master", the second amplifier becomes the "slave". **NOTE: NEVER ENGAGE THIS SWITCH WITH THE AMPLIFIER "ON." THIS WILL VOID THE "LIMITED" WARRANTY.**

11. **30 AMP FUSE HOLDER**
This fuse protects the vehicle. **DO NOT PUT A LARGER RATED FUSE IN THIS RECEPTACLE, IT WILL VOID THE "LIMITED" WARRANTY**

12. **RCA INPUTS**
The MS-250 is set-up for Pre-amp inputs. Typically all CD players & AM/FM cassette decks with RCA outputs should operate.

13. **SPEAKER OUTPUT**
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!

14. **POWER GROUND INPUT TERMINAL (B- CHASSIS GROUND)**
This specially tooled connector is designed to accommodate up to 7 gauge ground cable.

15. **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" your entire car audio system.

16. **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 MS-250 to be turned ON and OFF by the Volume-ON/OFF control on your head unit.

INSTALLATION

A. LOCATION

The MS-250 has been designed to dissipate heat more efficiently than any other amplifier manufactured today. However, prolonged operation at high volumes or extremely low impedences without the aid of a FAN SHROUD can cause the unit to overheat and cease functioning. Therefore, regardless of where you decide to mount the MS-250, 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 MS-250 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 MS-250 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 x1 1/4 inch philips pan-head screws provided.

ELECTRICAL INSTALLATION

NOTE: DISCONNECT BATTERY GROUND BEFORE INSTALLATION

1. Remove the 30 amp blade type "ATO/ATC" fuse from its receptacle to connect the B+, and B- power cabling.

2. Always use the largest gauge power/ground cable possible. The MS-250 accepts up to 7 gauge (Phoenix Gold model number HCP-7 RED or HCG-7 BLACK).

3. 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 30-40 Amps per amplifier. (see Fig. 1)

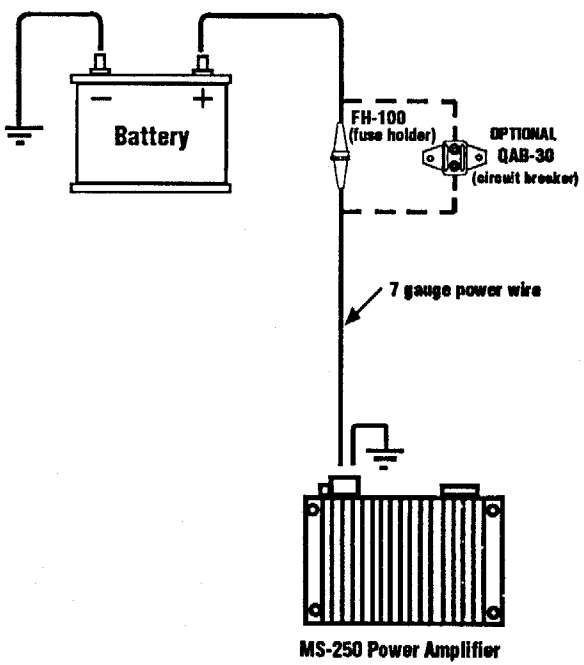


Figure 1

4. Always use the largest gauge speaker wire possible. The MS-250 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.

5. After stripping the wires approximately 3/8" of an inch "tin" the very tip of each of the wires (see Fig.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.

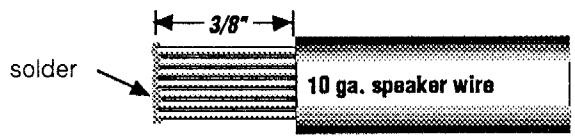


Figure 2

6. 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.

7. 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 25 amperes of current is exceeded in either of the amplifier channels.

   Make sure that none of the speakers are shorted. Having a shorted output will not damage your Phoenix Gold MS-250, 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 lite. Note: This may recycle several times.

ADJUSTMENTS:

Before doing any adjustments:

A. Make sure that the "floating/common" ground switch is in the "common" position. 99% of the time this will have the least noise potential.

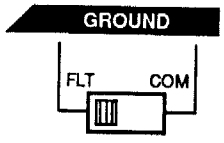


Figure 3

B. Make sure the "STR/BRGD" switch is in the "STR" position, unless you are only planning to install to sub-woofers and "bridge" the amplifier into mono. (see Figure 4)

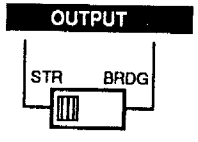


Figure 4

The MS-250 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 Clockwise for Gain (see Figure 5).

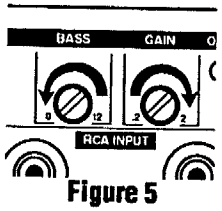


Figure 5

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 6)

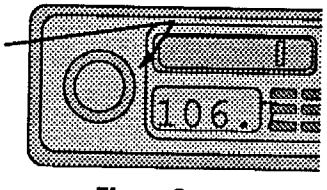


Figure 6

3. Turn the level setting adjustment on the MS-250 counter clockwise (i.e: to the left) until you hear the amplifier distort. The MS-250 "clips" very softly so this can sometimes be a difficult adjustment. Please listen carefully! (see Figure 7.)

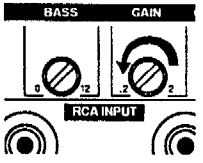


Figure 7

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. Obviously, adding any "EQ" into the system either through an external equalizer OR the built-in one provided with the MS-250 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 45 Hz requires the amplifier to work *16* times harder! (see Figure 8 .)

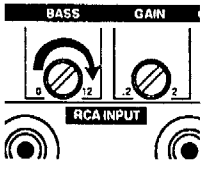


Figure 8

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 enlosure are NOT working together correctly.

MASTER / SLAVE CONNECTION

In normal 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 planning to use this connection, please follow these instructions carefully.

1. Obviously your PHOENIX GOLD amplifiers are installed or being installed, at this point a decision must be made as to which amplifier is to be the "master" and which is to be the "slave". Once that decision is made unscrew the bottom plates using a number 1 phillips-head screwdriver and a " 7/64" allen wrench.

2. Inside the amplifier is a PCB mount slide switch very near to the front panel (see figure 8) and off to the left. Moving the switch to the left, towards the power input connector puts the amplifier into the **"master" mode** of operation. Moving the switch to the right, towards the RCA nput connector's (blue dot) puts that amplifier into the **"slave" mode**.

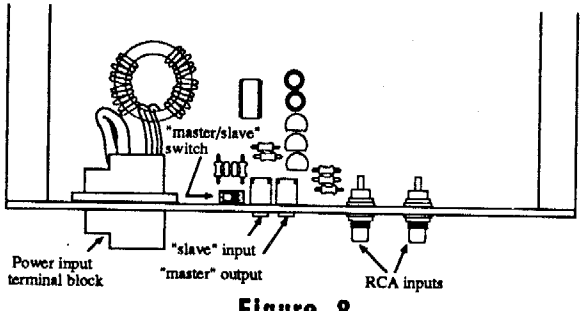


Figure 8

NOTE: DO NOT SWITCH THE "MASTER/SLAVE" SWITCH WHILE THE AMPLIFIER(S) ARE TURNED ON! THIS WILL INSTANTLY VOID THE WARRANTY.

Note: PG recommends NOT using this feature

3. Measure the distance from the first amplifier's "master" output jack to the next amplifier's "slave" input jack (see figure 9). A "Y" connector must be used when three amplifiers are used.

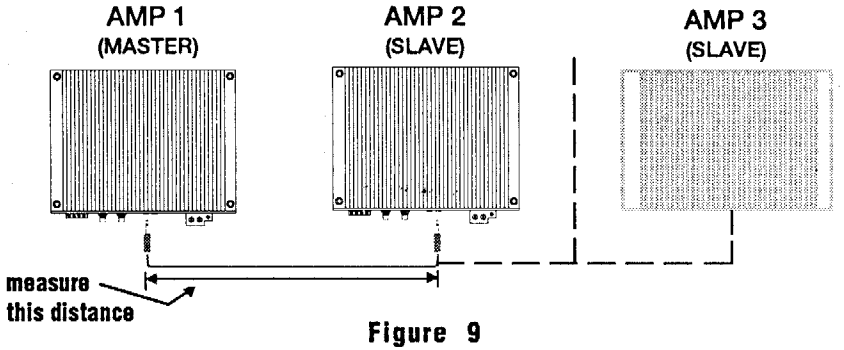


Figure 9

4. Using a 3.5mm mini-phone jack (NOT SUPPLIED- see figure 10) for both the output and input, SOLDER a small gauge microphone cable to both mini-phone jacks. 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.

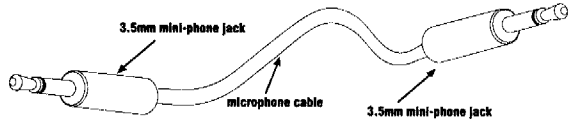


Figure 10

5. Plug the 3.5mm mini-phone jacks in, the amplifiers are now in "sync".

The installation is now complete. Enjoy!

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