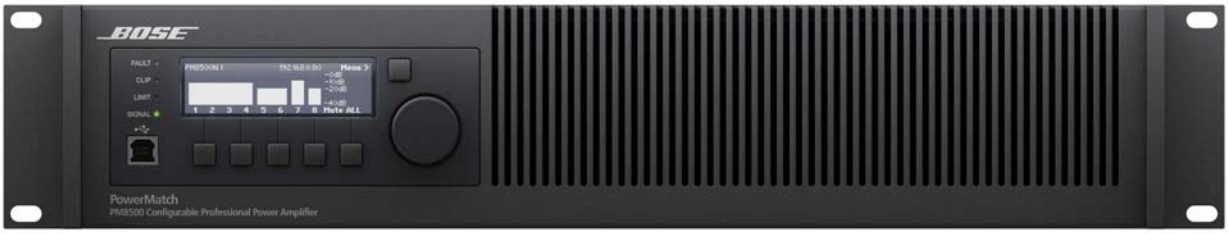
BOSE®
Better sound through research®

PowerMatch® PM8500(N), PM8250(N), PM4500(N) and PM4250(N)

Configurable Professional Power Amplifiers

Networked and Non-networked versions



Service Manual

Reference Number 326114-SM Rev. 02
Electronic Copy Only

CONTENTS

SAFETY INFORMATION

1. Parts that have special safety characteristics are identified by the ⚠ symbol on schematics or by special notes on the parts list. Use only replacement parts that have critical characteristics recommended by the manufacturer.

2. Refer to the Hi-Pot and Ground Bond test information located on pages 39 and 40 of this service manual.

The Hi-Pot test MUST be performed on any unit where the repair required removal of the amplifier's top cover.

The ground bond test MUST be performed on any unit where the repair affects the ground wire connection inside the chassis.

These tests MUST be performed to ensure that the product is safe to return to the customer after a repair.

Important Note: Repairs are to be performed at the Bose repair facility ONLY. No repairs are authorized to be performed at any other locations globally. A dedicated light-up-and-play and burn-in test station is required to verify proper operation of repaired units. This station allows semi-automated testing of all performance parameters to factory specifications.

CAUTION: The Bose® PowerMatch® Configurable Professional Power Amplifiers contain no user serviceable parts. To prevent warranty infractions, refer servicing to Bose factory service.

WARRANTY

The Bose PowerMatch Configurable Professional Power Amplifiers are covered by a 5-year limited warranty.

SPECIFICATIONS

Power Rating (20-20k Hz)	**2 Ω**	**4 Ω**	**8 Ω**	**70 V**	**100 V**
THD For Power Rating	**<0.1% THD**			**1% THD**	
Mono Mode: 8 or 4 channels (per channel)	500 W	500 W	300 W	not rated	not rated
Bridge Mode: 4 or 2 channels (per channel)	not rated	1000 W	1000 W	800 W	1000 W
Current Share Mode: 4 or 2 channels (per channel)	1000 W	not rated	not rated	not rated	not rated
Quad Bridge Mode: 2 channels (per channel)	not rated	2000 W	not rated	1600 W	2000 W
Maximum Rated Power, Total All Channels	4000 W				
Peak Output Voltage (mono/bridge/quad modes)	71 / 142 / 142 V				
Voltage Gain (mono/bridge/current share/quad modes)	33 / 36 / 33 / 36 dB				
Audio Performance Specifications					
Frequency Response (@1W and + / -0.5 dB)	20 Hz -20 kHz				
Signal-to-Noise Ratio (below rated power)	>104 dBA				
THD @ 1W, 20 Hz to 20k Hz	<0.1%				
Intermod Distortion -SMPTE (60 Hz, 7 kHz)	<0.4%				
Channel Seperation (crosstalk) at 1 kHz	> 75 dB				
Damping Factor (10 -100 Hz), 8 ohms	>1000				
Inputs -Analog					
Input Channels, Analog	4 or 8 (balanced line level)				
Input Impedance	20 kΩ				
Input Sensitivity	0 to 24 dBU, selectable in 1 dB steps				
Maximum Input Level	+24 dBu				
Connectors, Analog Inputs	3-pin Phoenix® (green color; part # 1776168)				
Inputs -Digital (Optional Card)					
Digital Input Channels	8 (ESPLink or Cobranet)				
Connectors, Digital Inputs	Toslink (ESPLink) or Ethernet RJ45 (Cobranet)				
Outputs					
Output Channels	2 to 8 configurable (model dependent)				
Connectors, Outputs (accepts 10 to 22 AWG)	8-pin Phoenix® (part # 1718436)				
Connectors, Fault-Notification Output	3-pin Phoenix (orange color; part # 1976010)				
Integrated Loudspeaker DSP (per channel)					
A/D and D/A conversion	24-bit / 48 kHz				
Total Latency (Analog in -Amp out)	0.8 mSec				
Input to Output Signal Routing	8 x 8 matrix				
Loudspeaker Presets	Bose® Professional				
Input EQ	5-band PEQ, +/-10 dB, or shelving				
Crossover Filters	Butterworth, Bessel, or Linkwitz-Riley, up to 48 dB/octave				
Output EQ	7-band PEQ, +/-10 dB, or shelving				
Array EQ Filters	2-band RoomMatch array EQ				
Maximum Output Time Delay	2 sec				
Output Limiter	Peak and RMS voltage				

SPECIFICATIONS (CONTINUED)

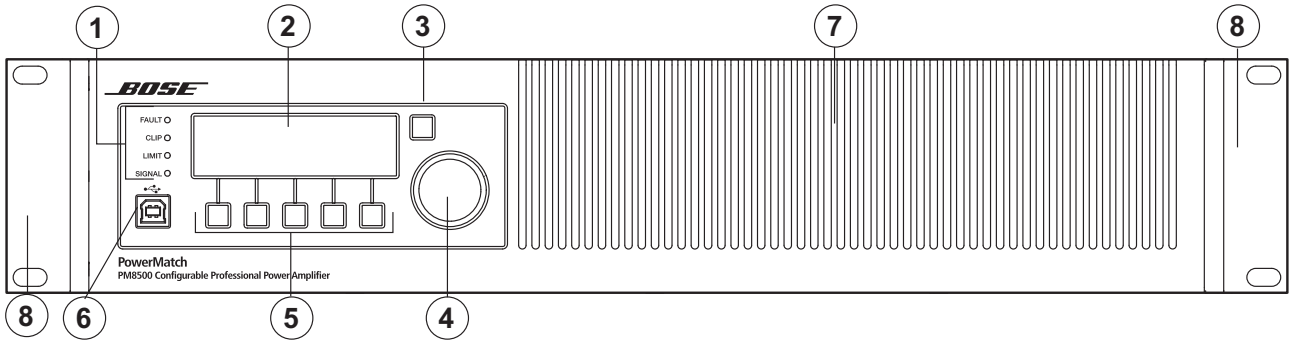
Front Panel Controls and Indicators	
Primay Display Type	240 x 64 LCD
LED Common Indicators (all inputs and outputs)	signal, limit, clip, fault
User Interface Controls (front panel)	Mute, input sensitivity, output attenuation, EQ on/off, preset select
PC Interface Connection	USB (network capable (N) adds Ethernet RJ45)
Setup and Configuration Software	ControlSpace V3.0 or greater
Electrical Specifications	
AC Line Voltage requirement (+/-10%)	100-240V (50/60 Hz)
Minimum AC Line Voltage for Power Up	80 V (reduced output power)
Maximum Inrush Current	15.4 A @ 230 VAC
Maximum Long-Term Average (RMS) Current Draw	15 A
Typical Current Draw, 1/3 Power	15 A @ 120 VAC / 7.5 A @ 230 VAC
Output Stage Topology	Class-D Switch-Mode
Protection	high temperature, DC, HF, short,
	voltage limiter, current limiter, inrush
	current, mains circuit breaker protection
Fault Notification Output (GPIO)	NC/NO Relay Contact (1 A, 30VDC)
Physical	
Rack Space Units	2 RU
Cooling System	microprocessor-controlled, variable-speed fans, front to rear airflow
Operating Temperature Range	0° C to 40° C
Dimensions (H x W x D)	3.5 x 19 x 20.7 inches (88 x 483 x 525 mm)
Unpackaged Weight	28 lbs (12.7 kg)
Shipping Weight	35 lbs (15.9 kg)

Product Description

The Bose® PowerMatch® PM8500(N), PM8250(N), PM4500(N) and PM4250(N) amplifiers are configurable professional audio amplifiers. There are eight PowerMatch amplifier versions in total. The differences are related to channel count, power output levels and networked or non-networked versions. There are two versions in each category, i.e. PM8500 and PM8500N, which are identical except that the network capable (N) version adds an RJ45 connector on the rear panel to allow network control and monitoring of multiple units, using Bose ControlSpace® software and standard Ethernet network equipment. This is also true of the PM8250(N), PM4500(N) and PM4250(N) amplifiers in the product family.

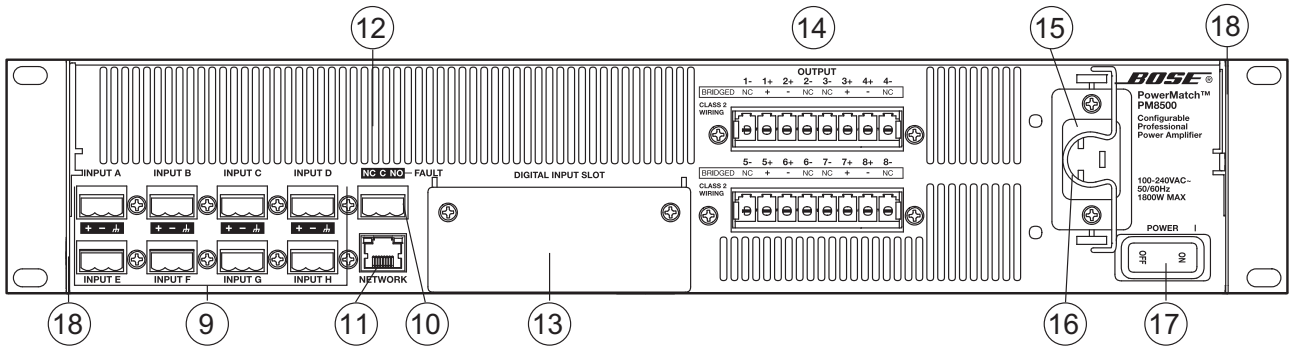
Controls, Displays and Connectors

PM8500 and PM8500N Front Panel View (other versions similar)



1. LED Indicators
2. LCD Display
3. Navigation Soft Key
4. Rotary Encoder
5. Menu Soft Keys (1-5)
6. USB connector
7. Front airflow vents
8. Front rack-mount ears

PM8500N Front Panel View (PM8500 identical except no RJ-45 network connector)



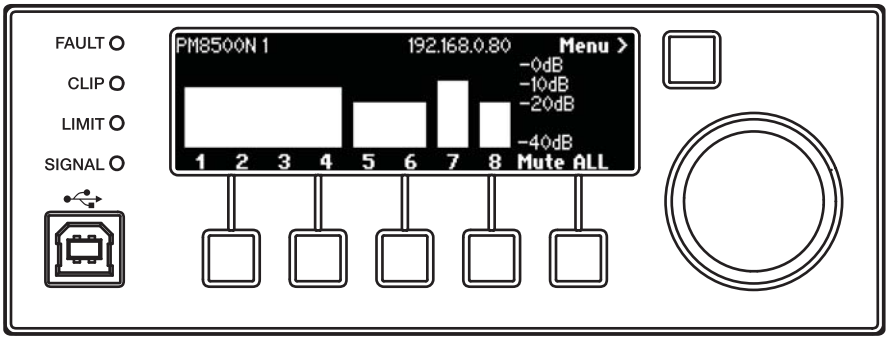
9. Analog Input connectors (A-H)
10. Fault-Notification Output
11. Ethernet RJ-45 network connector*
12. Rear airflow vents
13. Digital input card slot cover
14. Output connectors (1-4 and 5-8)
15. AC Mains receptacle
16. AC Mains retention clip
17. Power Switch
18. Rear rack-mount support tabs

(*PM8500N model only)

Front-Panel Controls and Menu Structure

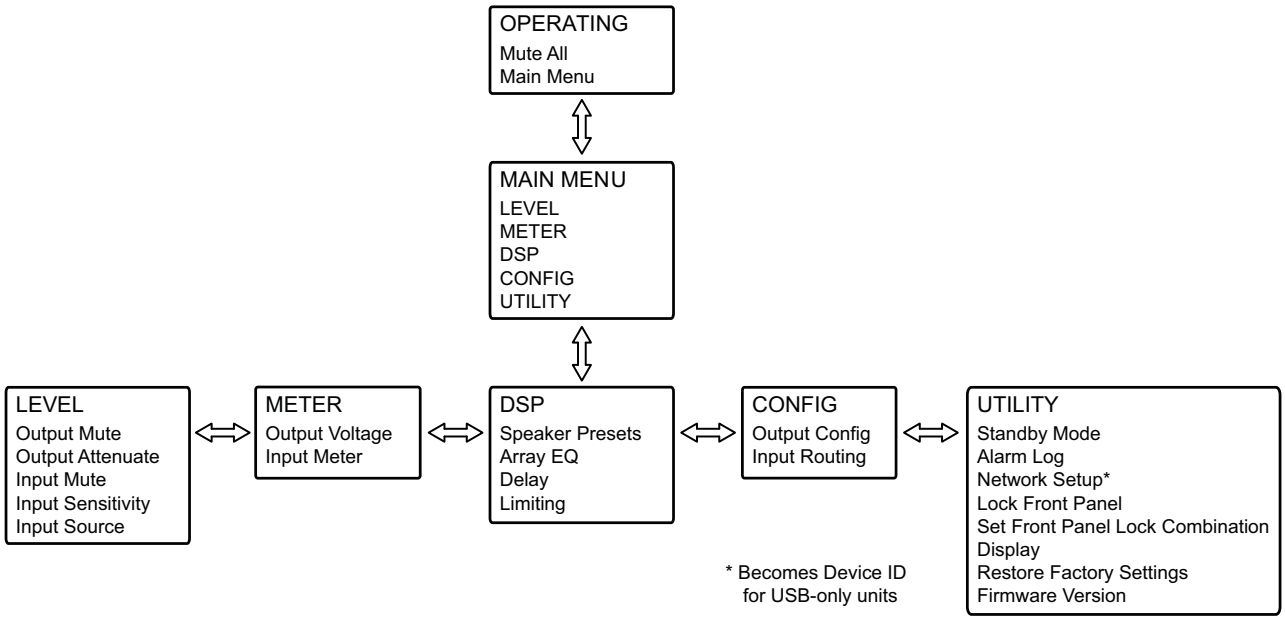
The amplifier front-panel LCD and user-interface controls allow all basic setup functions to be performed directly on the amplifier. The LCD screen provides output metering and status information during normal operation. Additionally, the LCD provides context-sensitive menu displays during setup and configuration using the front-panel controls.

Front-Panel Controls shown with “Operation Screen” in Mixed-Mode Configuration (with signal)



The displays and user controls accessible by the front panel are presented in the following menu structure illustration:

Front-Panel Control Menu Structure



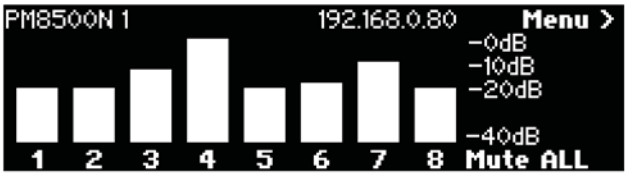
Output Power Conflgurations

The amplifier allows output power to be allocated between 2 to 8 (or 4, depending on model) output channels and allows for both low-impedance and high-impedance (70V and 100V) loudspeaker loads. To illustrate the possible output configurations, the menu display for CH 1 output configurations are presented below:

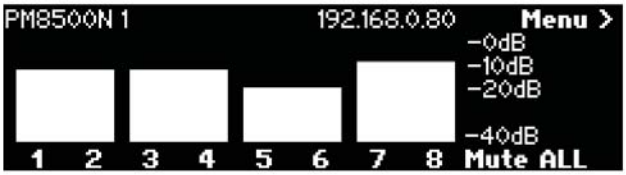
CH 1Menu Display	Channels Affected	Power Rating	Intended Loudspeaker Load	Max Channels
MONO	CH 1	500W @ 4Ω	2 to 16 ohms	8
CH1+2 V-Bridge (Low-Z)	CH 1 and CH 2	1000W @ 8Ω	4 to 8 ohms	4
CH1+2 V-Bridge (70V)	CH 1 and CH 2	800W @ 70V	70-V "constant voltage" lines	4
CH1+2 V-Bridge (100V)	CH 1 and CH 2	1000W @ 100V	100-V "constant voltage" lines	4
CH1+2 I-Share (Low-Z)	CH 1 and CH 2	1000W @ 2Ω	2 ohms	4
CH1+2+3+4 Quad (Low-Z)	CH 1, CH 2, CH 3, CH 4	2000W @ 4Ω	4 ohms	2
CH1+2+3+4 Quad (70V)	CH 1, CH 2, CH 3, CH 4	1600W @ 70V	70-V "constant voltage" lines	2
CH1+2+3+4 Quad (100V)	CH 1, CH 2, CH 3, CH 4	2000W @ 100V	100-V "constant voltage" lines	2

Note: For I-Share and Quad Bridge Modes, changing the output configuration will automatically place the unit in Standby Mode to allow different loudspeaker cable connections to the rear-panel output terminal blocks. Additionally, the menu displays are context-sensitive; not all combinations are possible for all channels. The front-panel output meters automatically change display width to identify the various output configurations during normal operation. The 4 possible output configuration meter displays are presented below (note the mixed mode display has many other possible combinations):

Front-Panel Output Meters by Configuration



Mono (8 x 500 W)



V-Bridge or I-Share (4 x 1000 W

Quad Bridge (2 x 2000 W)

Mixed Mode (varies by configuration)

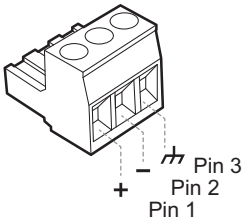
AC Mains Outlet Requirements

The PowerMatch® amplifiers feature a highly-efficient, universal switch-mode power supply with Power Factor Correction and can operate with AC Mains line voltages from 100 to 240 volts at 50/60 Hz. With typical music program material, these amplifiers will provide full rated power from a single 20-amp, 120V (common in USA) or 100V (Japan) AC mains outlet, or single 16-amp, 230V (common in Europe) mains outlet (PM8500(N)) or a single 15-amp, 120V or 100V AC mains outlet or single 10-amp 230V mains outlet (PM8250(N), PM4500(N) and PM4250(N).
Note: The PM8500 requires a dedicated 20 Amp AC line (for 100V or 120V units) or 16 Amp (for 230V units) to be able to operate properly during test.

Basic Wiring - Inputs

The balanced line-level analog inputs utilize 3-pin terminal block connectors (Phoenix #1776168 supplied in Connector Accessory Pack, Bose part number 343511-0010). For balanced inputs, strip the wire ¼ inch (6mm) and connect the respective positive, negative, and ground terminals as indicated on the unit and as shown below. For unbalanced inputs, the connector should be wired with Pin 1 = positive, with Pin 2 and Pin 3 connected with a jumper wire and then connected to the input cable shield.

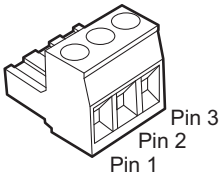
Analog Input Connector



Basic Wiring – Fault Notification Output (Watchdog)

The PowerMatch® amplifiers feature a fault-notification circuit which outputs an electrical signal to a 3-pin terminal block connector (orange-color Phoenix #1976010 supplied).
Pin assignments are: Pin-1 = Normally Closed; Pin-2 = Common; and Pin-3 = Normally Open.

Fault Notification Output Connector



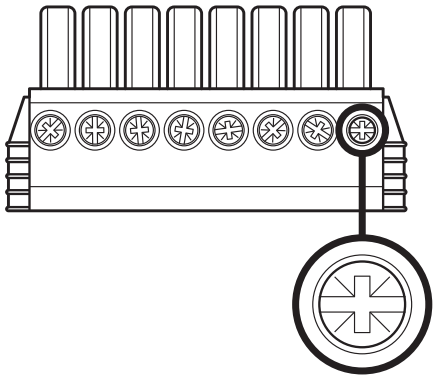
Basic Wiring - Outputs

The loudspeaker outputs utilize two (2) high-current, 8-pin locking terminal block connectors (Phoenix COMBICON #1778120) that accept cables from 10 to 24 AWG in diameter.
Note: The terminal block utilizes a +/- screw head (see Figure 8) and should be tightened using either a +/- head or flat-bade screw driver; a Philips-head screwdriver is not recommended.

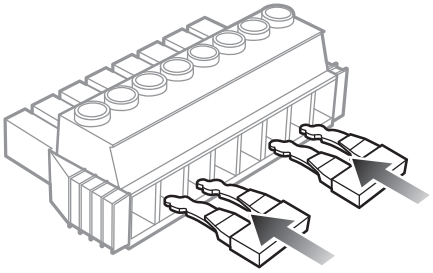
The wiring of the connector varies by amplifier output configuration. The output connector wiring for mono (single channel) and voltage-bridge configurations are printed on the rear panel of each unit. The I-Share and Quad-Bridge configurations require installing a shorting jumper (supplied in Connector Accessory Pack, Bose part number 343511-0010). See Figure 9 for placement of shorting jumper pins in output connector. When both jumpers are correctly placed, the first and last position of the connector should be empty. Placement of the shorting jumper is identical for I-Share and Quad Bridge modes. For connection of loudspeaker wiring, refer to the figures on the next page for I-Share and Quad Bridge configurations.

For the I-SHARE and QUAD-BRIDGE configuration pin assignments, please refer to the Output Power Configuration section of this document.

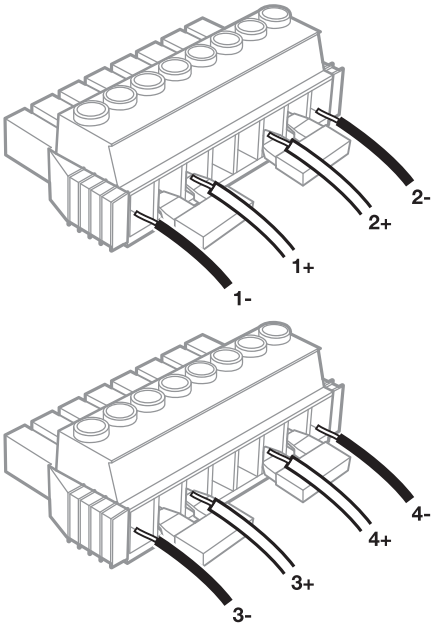
Screw Head for 8-Pin Output Connectors



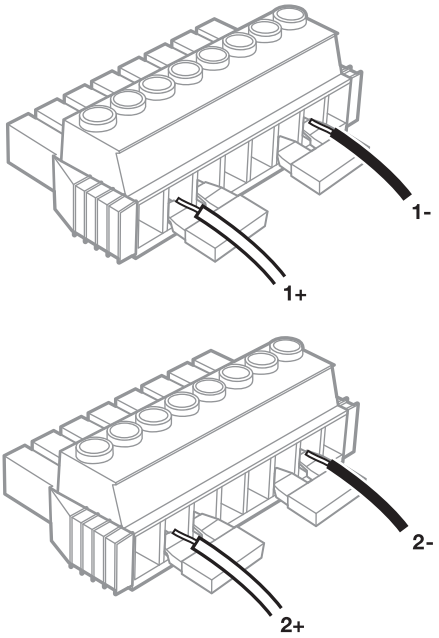
Shorting Jumper Positions for I-Share and Quad Bridge Configurations



Loudspeaker Wiring for I-Share configurations



Loudspeaker Wiring for Quad Bridge Configurations



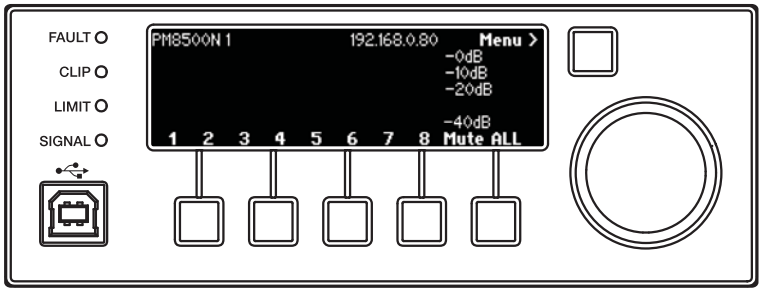
Methods for Setup Configuration

The PowerMatch® amplifiers allow setup and configuration via the front-panel controls for all basic functions and recall of presets for Bose® Professional loudspeakers. Advanced features, such as custom loudspeaker PEQ filters, may be accessed using the front-panel USB connection to any PC running Bose ControlSpace® V3.0 (or greater) software. Additionally, network capable (N) models add the flexibility of remote setup and configuration using standard Ethernet network equipment.

Basic Setup Using Front Panel Controls

Upon initial power-up of the unit, all front panel LED indicators will illuminate during firmware loading and testing. After about 20 seconds, the LCD will display the default screen from which the Main Menu may be accessed to make changes to the Factory Default Settings.

LCD Operation Screen (no signal) - 4 channel units are similar



Front Panel Menus and Default Configuration

The following table shows the front-panel menu structure and factory default settings:

Factory Default Settings with Default Input-Output Matrix Mixer Attenuation (note: -0 dB is full signal)

LEVEL	
Output Mutes	Off
Output Attenuate	- 0.0 dB
Input Mute	Off
Input sensitivity	+12 dBu
Input Source	Analog
Meters	
Output	dB scale
Input	dB scale
DSP	
Speaker presets	none
Array EQ	Off
Input PEQ	On - flat
Output PEQ	On - flat
Delay	0 mSec
Limiting - Peak	89.0 V
Limiting - RMS	45.0 V
Limiting RMS - Attack	1000 mS
Limiting RMS - Release	2000 mS
CONFIGURATION	
Output Config	mono
Input Routing CH 1	see table

UTILITY	
Standby Mode	not in standby
Fault log	empty
Lock Front Panel	off
Set Front Panel Lock	0-0-0-0-0
Display	Normal (bright)
Network setup (N)	Fixed IP
Network address (N)	192.168.0.80

	CH 1	CH 2	CH 3	CH 4	CH 5	CH 6	CH 7	CH 8
IN A	**- 0 dB**	off	off	off	off	off	off	off
IN B	off	**- 0 dB**	off	off	off	off	off	off
IN C	off	off	**- 0 dB**	off	off	off	off	off
IN D	off	off	off	**- 0 dB**	off	off	off	off
IN E	off	off	off	off	**- 0 dB**	off	off	off
IN F	off	off	off	off	off	**- 0 dB**	off	off
IN G	off	off	off	off	off	off	**- 0 dB**	off
IN H	off	off	off	off	off	off	off	**- 0 dB**

Configuration Changes Using Front Panel Controls

Navigation using the front-panel interface is intuitive with context-sensitive menus displayed above the soft-key buttons. Soft keys are pressed to navigate to menu options. Data values are scrolled using the encoder knob, which is pressed to input a selected value. As an example, the following steps outline how to change the default settings for several key functions.

Changing Default Output Attenuation

1. Starting from the default power up screen, press the MENU navigation key to access the MAIN MENU.

2. Press the LEVEL soft key.

3. Rotate the knob to highlight OUTPUT ATTENUATE then press the knob to navigate to the LEVEL<OUTPUT ATTEN screen.

4. Press the CHANNEL soft key and rotate encoder to highlight channel pairs for which change is desired.

5. Press CH (1 to 8) soft key to highlight current value of channel for which change is desired.

6. Rotate the knob to change the value of the highlighted channel in 0.5 dB increments and set to the desired value.

7. If change is desired for CH 2, press CH 2 soft key to highlight the current value. Turn knob to set the desired value.

8. If change in other channels is desired, Press the CHANNEL soft key and turn the knob to display desired channels. Repeat 5 and 6.

9. If no additional change is required, press the BACK navigation key to return to the MAIN MENU <LEVEL screen.

10. Press the BACK navigation key to return to the MAIN MENU.

11. Press the BACK navigation key to return to the OPERATION screen.

12. Resume normal operation or make additional configuration changes using the menu.

Changing Output Configuration

1. Starting from the Operating Display, press the MENU navigation key to access the MAIN MENU.

2. Press the CONFIG soft key to access the CONFIGURE menu.

3. Rotate the knob to highlight Output Config and press knob to access CONFIG OUTPUTS menu.

Changing Output Configuration (continued)

4. Press CHANNEL soft key and rotate knob to display channel for which to change output configuration.

5. Press SELECT soft key and rotate knob to display desired output configuration.

6. Press knob to select desired configuration.

For changes to or from Mono, or any Voltage Bridge configurations, follow steps 7A to 10A. For changes to or from I-Share or Quad Bridge configurations, follow steps 7B to 15B:

7A. Continue steps 4-6 until all output channel configurations have been changed to desired settings.

8A. Press BACK navigation key to return to CONFIGURE menu.

9A. Press BACK navigation key to return to MAIN menu.

10A. Press BACK navigation key to return to Operating Display.

For Change to or from I-Share or Quad Bridge Configurations:

7B. A warning message will be displayed to check output wiring. Make any required changes to output loudspeaker wiring and insert shorting jumpers in output connectors as outlined on Page 14 in Figures 9 -11.

8B. Press CONFIRM soft key to set the configuration change. Note: When changing to I-Share or Quad Bridge Modes, the amplifier will be placed in automatically in STANDBY Mode and will display “IN STANDBY”

9B. Continue steps 4-6, then 7B-8B until all output channel configurations have been changed to desired settings.

10B. Press BACK navigation key to return to CONFIGURE menu.

11B. Press BACK navigation key to return to MAIN menu.

12B. Press UTILITY soft key to access Utility menu.

13B. Rotate knob to highlight Standby Mode and press knob to access Standby Menu.

14B. Press EXIT STANDBY soft key to enable the outputs and resume normal operation.

15B. Unit will automatically return to the Operating Display.

Note: When using ControlSpace® Designer Software for setup and configuration, you may select if the front-panel controls are persistent (they over-write any stored settings in the ControlSpace Design file), or if changes from the front panel are ignored after the next power off/on cycle (the settings stored in the ControlSpace Design file over-write any front panel changes after power cycling). For additional information, please refer to the ControlSpace Designer V3.0 User Manual. All other front-panel interface menus use a similar navigation and data entry structure.

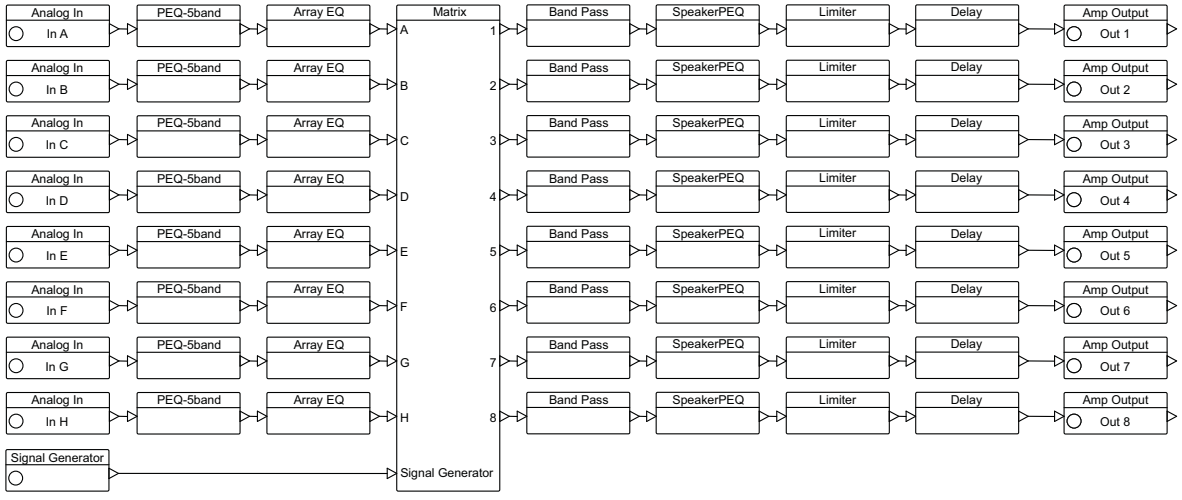
Basic and Advanced Configuration Changes Using Bose® ControlSpace® Software
Bose ControlSpace V3.0 (or later) software provides complete setup, configuration, control, and monitoring for the amplifier. Refer to the ControlSpace software documentation for the steps to install this application on your personal computer (Windows XP, Vista, or Windows 7). The installation of the ControlSpace software will install any USB drivers that may be required on your PC.

USB Connection with ControlSpace Software
After ControlSpace software is loaded on your PC, launch the application and connect your PC to the front-panel USB connector on the amplifier. A single amplifier may be connected to ControlSpace using the front panel USB port. Once connected, you may use ControlSpace to setup, configure, change parameters, and monitor the performance of the connected amplifier. If more than one amplifier is installed for your system, changes to each amplifier using ControlSpace must be made one at a time as the USB connection is “one-to-one” and does not allow control of multiple units from a single USB connection.

PowerMatch® Amplifiers and Ethernet Connection
The PowerMatch network capable (N) amplifiers allow ControlSpace software to be connected to multiple units using standard Ethernet network equipment and cables. The amplifier allows a standard Ethernet RJ45 cable to be connected directly from the PC’s RJ45 Ethernet port to the RJ45 connector on the rear panel of the amplifier (without the need for a special “crossover” cable that reverses pin connections on each end). Multiple units may be connected to standard Ethernet networking equipment and controlled from a single PC running ControlSpace software. DCHP or static IP addressing are both supported with the PowerMatch amplifiers.

Each network capable version unit ships from the factory with a default IP address of 192.168.0.80 for 8-channel amps and 192.168.0.40 for 4-channel amps, which may be changed using ControlSpace software. For additional information on using the network control and monitoring features of the amplifier, please refer to the detailed PowerMatch Operation Manual and ControlSpace software User Guide (both available to download from pro.bose.com).

Figure 14. Signal Flow and User Controls in ControlSpace Designer



Optional Digital Input Cards
All PowerMatch amplifiers are shipped from the factory with a blank panel covering the rear panel digital input interface slot. Optional digital audio input cards may be purchased separately.
To install the optional digital input cards, refer to the instruction included with each input card accessory.

Bose® PowerMatch® PMESPLink Digital Input Card

CAUTION: Electro-Static Discharge (ESD) sensitive device. Handle with care.

To install the PMESPLink card in the PowerMatch amplifier, follow these instructions:

1. Turn off and unplug the amplifier.

2. Detach the rear expansion slot cover plate by removing the 2 screws. (see figure below left)

3. Align the PMESPLink in the card slots; insert until the rear panel is flush with the rear of the amplifier. (see figure below right)

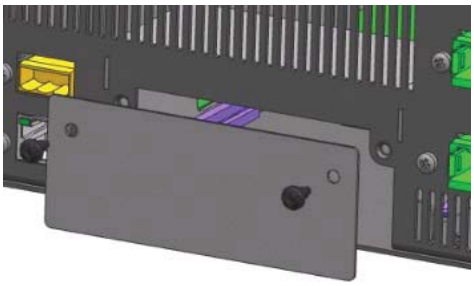
4. Screw the card into place.

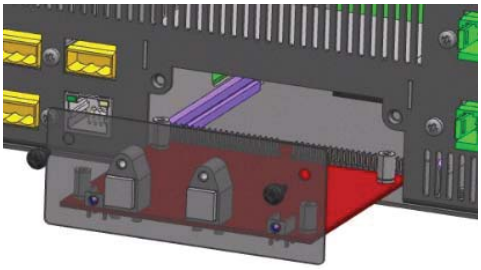
5. Plug in the power cord and turn on the amplifier.

6. Use ControlSpace® Designer® software to verify the card was inserted correctly:

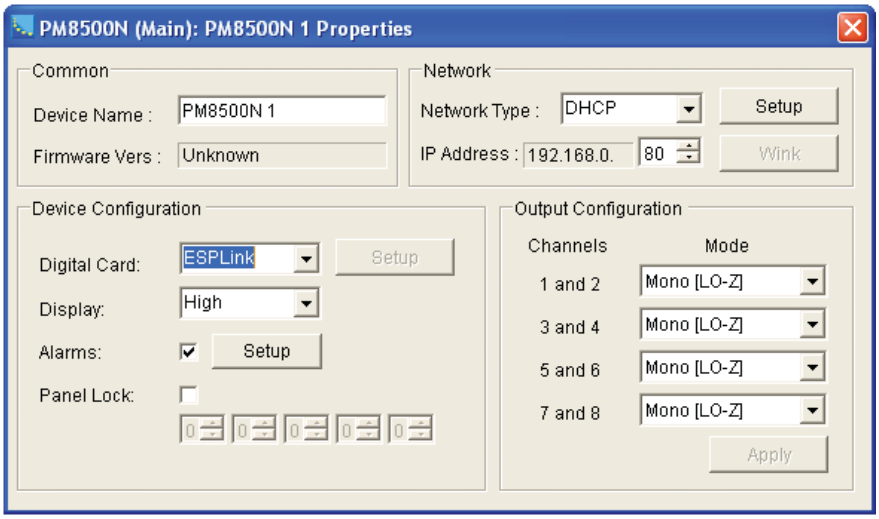
   a) Press Scan and confirm that the software detects the card.

   b) If the card was installed correctly, right-clicking the PowerMatch amplifier and displaying its properties will show ESPLink in the Digital Card slot. (see figure at bottom of page)





7. If an error message appears, or the software does not properly detect the PMESPLink Input Card, repeat the installation instructions. Be sure that the card is completely pushed into the slot, and that the card is properly aligned in the card guides.



ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICE HANDLING

This unit contains ESDS devices. We recommend the following precautions when repairing, replacing or transporting ESDS devices:

- Perform work at an electrically grounded work station.
- Wear wrist straps that connect to the station or heel straps that connect to conductive floor mats.
- Avoid touching the leads or contacts of ESDS devices or PC boards even if properly grounded. Handle boards by the edges only.
- Transport or store ESDS devices in ESD protective bags, bins, or totes. Do not insert unprotected devices into materials such as plastic, polystyrene foam, clear plastic bags, bubble wrap or plastic trays.

PART LIST NOTES

1. The individual parts located on the PCBs are listed in the Electrical Part List.

2. This part is referenced for informational purposes only. It is not stocked as a repair part. Refer to the next higher assembly for a replacement part.

3. ⚠ This part is critical for safety purposes. Failure to use a substitute replacement with the same safety characteristics as the recommended replacement part might create shock, fire and/or other hazards.

Note: Electrical Part Lists are not included in this service manual. This is because this product is to be repaired at the board level only, due to circuit complexity and safety concerns. Do not attempt to repair this product at the component level.

PACKAGING PART LIST

PowerMatch® Amplifier (refer to Figure 1)

Item Number	Description	Part Number	Qty.	Note
1	PACKING, FOAM, PE, F, TOP ASSY	343459-0010	1	
2	PACKING, FOAM, PE, F, BOTTOM REAR	343458-0010	1	
3	PACKING, FOAM, PE, BOTTOM, FRT	343457-0010	1	
4	CARTON, RSC, 26X21.38X7.75, DW, K	343456-0010	1	
5	BAG, FILM, PE 24.00 X 30.00 X 3MIL	344095-0010	1	
6	GUIDE, SETUP, CONFIG PRO AMP	344846-0010	1	
-	AC LINE CORD, US/CAN, PM8500(N) ONLY AC LINE CORD, EURO, PM8500(N) ONLY AC LINE CORD, JAPAN, PM8500(N) ONLY AC LINE CORD, UK, PM8500(N) ONLY AC LINE CORD, AUS, PM8500(N) ONLY AC LINE CORD, CHINA, PM8500(N) ONLY	330379-0010 343537-0010 343538-0010 343539-0010 343540-0010 345431-0010	1	3 ⚠
-	AC LINE CORD, IEC C13, US/CAN AC LINE CORD, IEC C13, EURO AC LINE CORD, IEC C13, JAPAN AC LINE CORD, IEC C13, UK AC LINE CORD, IEC C13, AUS	363478-0010 363477-0010 363475-0010 363476-0010 363474-0010		3 ⚠
-	KIT, ACCESSORY, CONNECTOR, 8 CHANNEL AMPS KIT, ACCESSORY, CONNECTOR, 4 CHANNEL AMPS	343511-0010 343511-0020	1 1	3 ⚠
-	FERRITE KIT, ETHERNET CABLE (4 CH AMPS ONLY)	374156-0010	1	

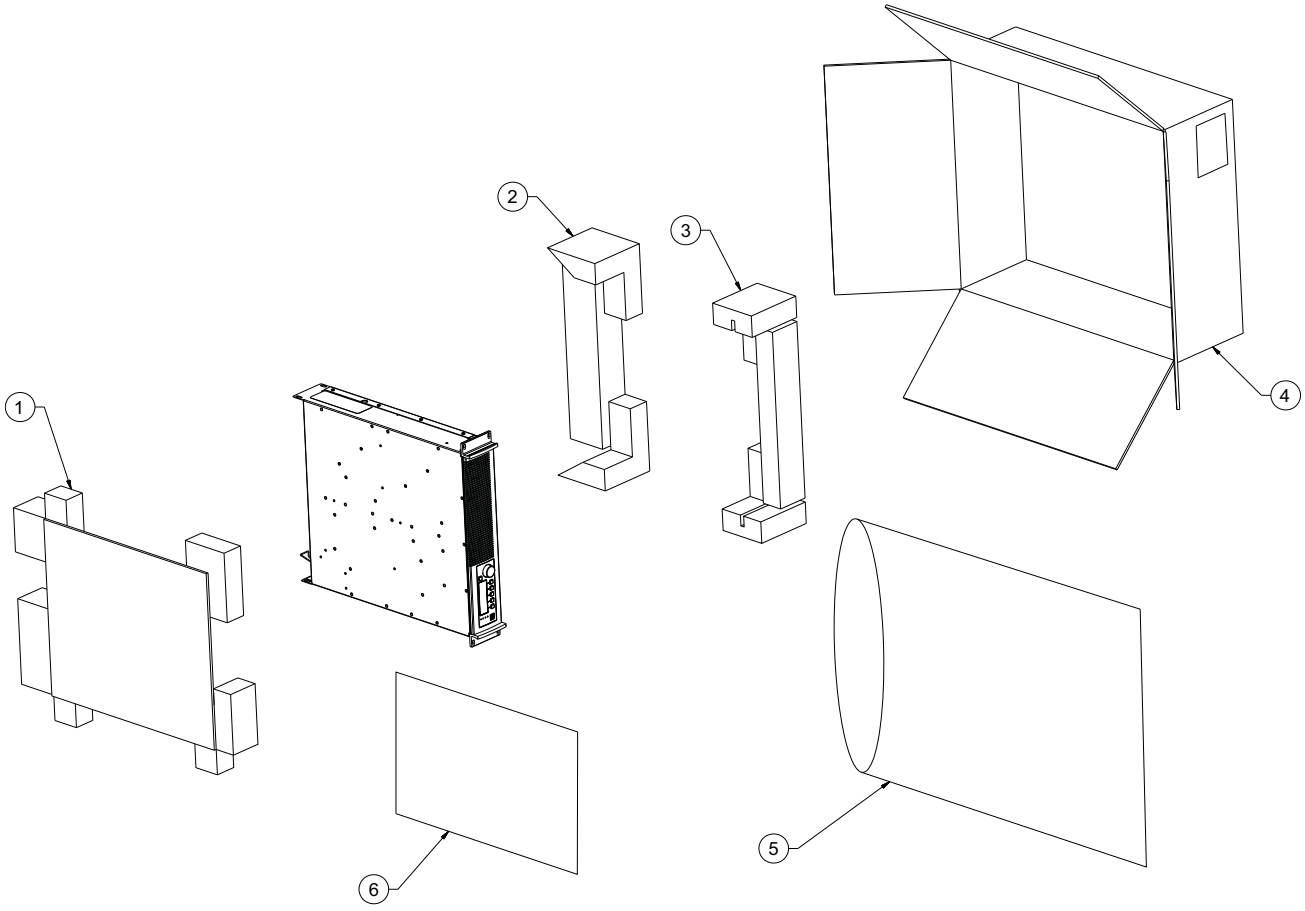


Figure 1. PowerMatch Amplifier Packing View

MAIN PART LIST

PowerMatch® Amplifier (refer to Figure 2)

Item Number	Description	Part Number	Qty.	Note
1	BEZEL/LENS ASSY, POWERMATCH, BLK	353105-0110	1	
2	KNOB, LEXAN, 28mm, BLK	330387-0110	1	
3	SHIELD, ESD, DISPLAY	347386-0010	1	
4	BUTTON, SILICONE, RECT, BLK	330382-0110	1	
5	KEYPAD, SILICONE, 5BTN, BLK	330386-0110	1	
6	SCREW, M3-0.5X8, DOME WASHER	292505-001	38/28	
7	MODULE, LCD DISPLAY	327970-0010	1	
8	DISPLAY BOARD SUBASSY, SERV (INCLUDES ITEMS 3,4,5,6,7)	348575-001S	1	
9	PANEL, FRONT, PM8500(N), BLK PANEL, FRONT, PM8250(N), BLK PANEL, FRONT, PM4500(N), BLK PANEL, FRONT, PM4250(N), BLK	360269-0110 360269-0120 360269-0130 360269-0140	1	
10	SCREW, 6-13x.44, PAN, XREC/SQ.	288374-007	4	2
11	BRACKET, RACK EAR, FRONT RACK, BLACK	330383-0110	2	
12	SCREW, 8-32X.75, RLX, PN, QDRX, BLK	289392-012	6	2
13	CHASSIS	REF	1	2
14	FOAM, NEOPRENE W/PSA, 0.125X3X12IN	330396-0010	1	2
15	COVER, CHASSIS, BLK (INCLUDES ITEM 14)	360267-0110	1	
16	SCREW, TAPP, 6-32X0.3125, FLAT, XREC	331028-0020	16	
17	PLUG, PLASTIC, TAP ACCESS CONN, BLK, 10.3X1.6mm	347574-0010	1	
18	SCREW, 6-32X5/16, THREAD ROLLING	289391-005	15	

Note: When you see more than one number in the Qty column, i.e. 38/28, the first number is for 8-channel units and the second number is for 4-channel units.

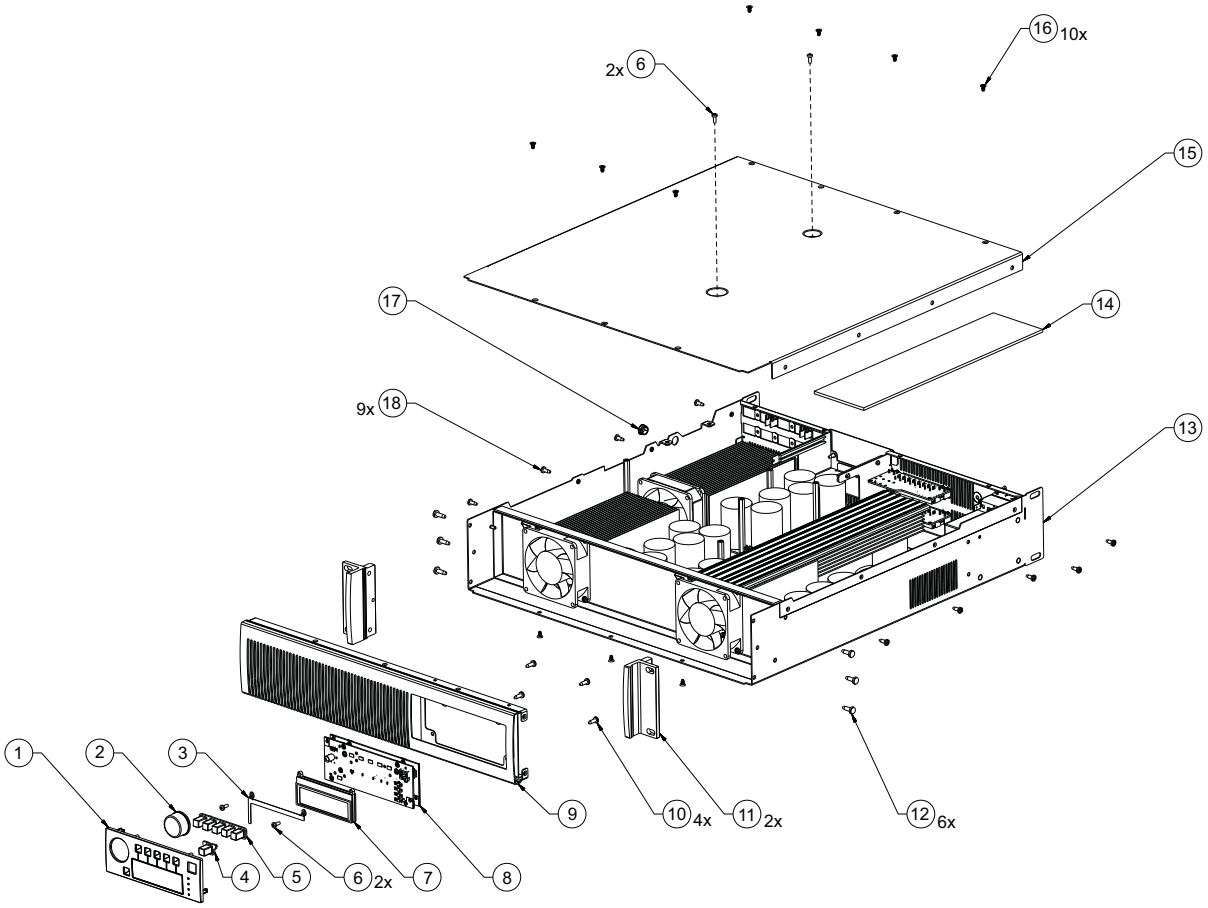


Figure 2. PowerMatch Amplifier Exploded View

MAIN PART LIST

PowerMatch® Amplifier (refer to Figure 3)

Item Number	Description	Part Number	Qty.	Note
18	SCREW, 6-32X5/16, THREAD ROLLING	289391-005	15	
19	FOAM, NEOPRENE W/PSA, 0.063X0.5X40IN	327100-0010	1	2
20	BULKHEAD, FAN MOUNT, BLK	360758-0110	1	2
21	FAN, AXIAL, 12VDC, 80x80x25.4mm, 54.57CFM	326358-0010	3/2	3 ⚠
22	INSULATOR, ELECTRICAL, MYLAR	331735-0010	1	3 ⚠
23	PCB ASSY, AC INLET	345293-0020	1	3 ⚠
24	CONN, AC INLET, IEC60320-C20, 16A, 250V (PM8500N, PM8500) CONN, AC INLET, IEC60320-C14, 10A, 250V (PM8250N, PM8250, PM4500N, PM4500, PM4250N, PM4250)	329595-BR1606BB 329595-BR1006BB	1	3 ⚠
25	RETAINER, CABLE	330388-0010	1	
26	AC SWITCH, CKT BKR, 1 POLE, 16A, 240V, BLACK	347102-0010	1	3 ⚠
27	COVER, MODULE, DIGITAL INPUT, BLK	360268-0110	1	
28	GUIDE, CARD, SNAP-IN, 3.0IN	331022-0010	2	2
29	NUT, HEX, M3.5	346369-0010	3/1	2
-	HARDWARE KIT, SERVICE (includes 2 pcs standoff, ALUM, P/N: 327110-0010; 10 pcs screw, M3, internal, P/N: 292505-001; 5 pcs screw, 6-32, top cover, P/N: 331028-0020; 4 pcs screw, 6-32, chassis side, P/N: 289391-005; 2 pcs standoff, nylon, P/N: 350307-0010)	348571-001S	1	

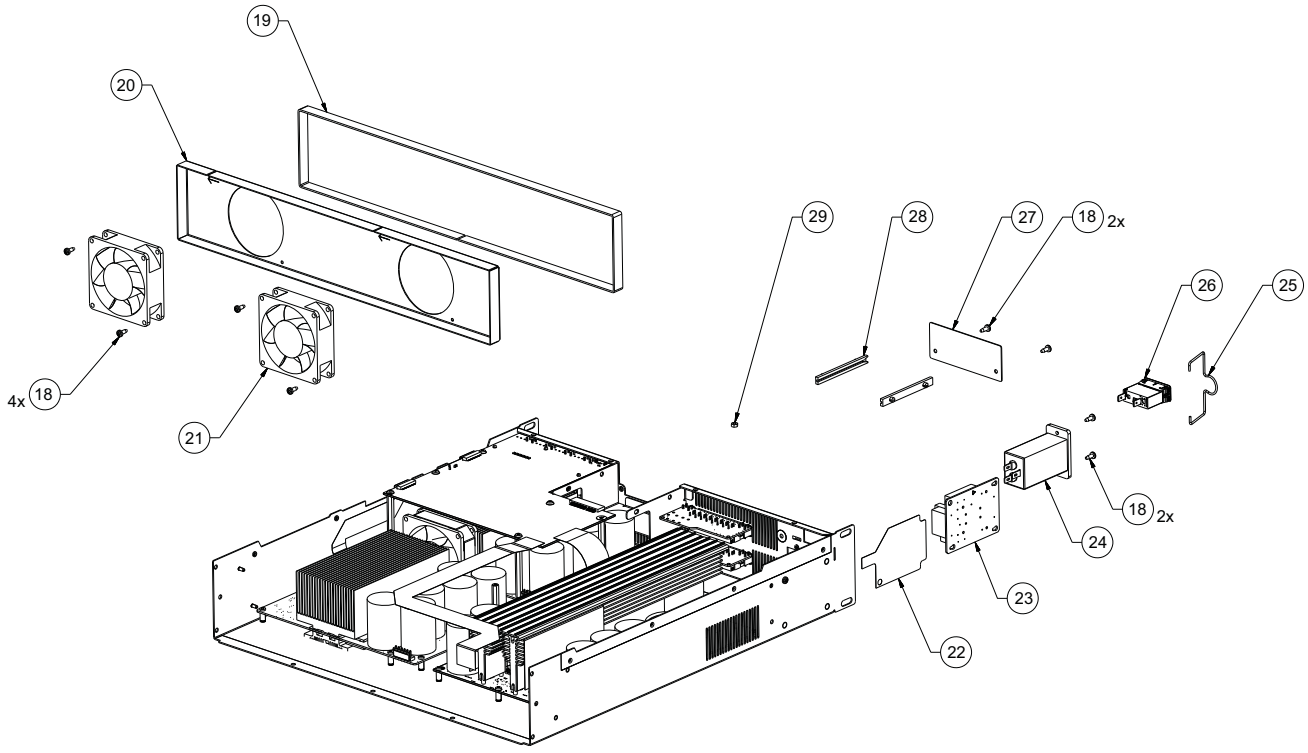


Figure 3. PowerMatch Amplifier Exploded View

MAIN PART LIST

PowerMatch® Amplifier (refer to Figure 4)

Item Number	Description	Part Number	Qty.	Note
6	SCREW, M3-0.5X8, DOME WASHER	292505-001	38/28	
21	FAN, AXIAL, 12VDC, 80x80x25.4mm, 54.57CFM	326358-0010	3/2	3 ⚠
29	NUT, HEX, M3.5	346369-0010	3/1	2
30	CABLE FFC DIG PCB - DISPLAY PCB	328403-0010	1	
31	FOAM, NEOPRENE W/PSA, 0.125X3X1.5IN (PM8500, PM8250 ONLY)	327101-0010	1	2
32	STRAP, FAN MOUNT (PM8500N, PM8500, PM8250N, PM8250)	327096-0010	1	2
33	CABLE FFC DIG PCB - AMP 1-4 (PM8500, PM8250 ONLY)	328401-0010	1	
34	CABLE FFC DIG PCB - AMP 5-8	328402-0010	1	
35	CABLE FFC PWR SPLY - DIG PCB	328400-0010	1	
36	PCB ASSY, PROGRAMMED, PM8500N, DIGITAL PCB ASSY, PROGRAMMED, PM8500, DIGITAL PCB ASSY, PROGRAMMED, PM8250N, DIGITAL PCB ASSY, PROGRAMMED, PM8250, DIGITAL PCB ASSY, PROGRAMMED, PM4500N, DIGITAL PCB ASSY, PROGRAMMED, PM4500, DIGITAL PCB ASSY, PROGRAMMED, PM4250N, DIGITAL PCB ASSY, PROGRAMMED, PM4250, DIGITAL	345330-009S 345330-109S 345330-209S 345330-309S 345330-409S 345330-509S 345330-609S 345330-709S	1	
37	STANDOFF, NYLON, SNAP FIT, 0.75IN	350307-0010	3	
38	PCB ASSY, ANALOG INPUT, 8 CHANNEL, SERV (PM8500N, PM8500, PM8250N, PM8250) PCB ASSY, ANALOG INPUT, 4 CHANNEL, SERV (PM4500N, PM4500, PM4250N, PM4250)	345299-002S 345299-102S	1	
39	PCB ASSY, SPEAKER OUTPUT LONG, 8CH (PM8500N, PM8500, PM8250N, PM8250)	345294-0010	1	
40	PCB ASSY, SPEAKER OUTPUT SHORT, 4CH (ALL VERSIONS)	345295-0010	1	

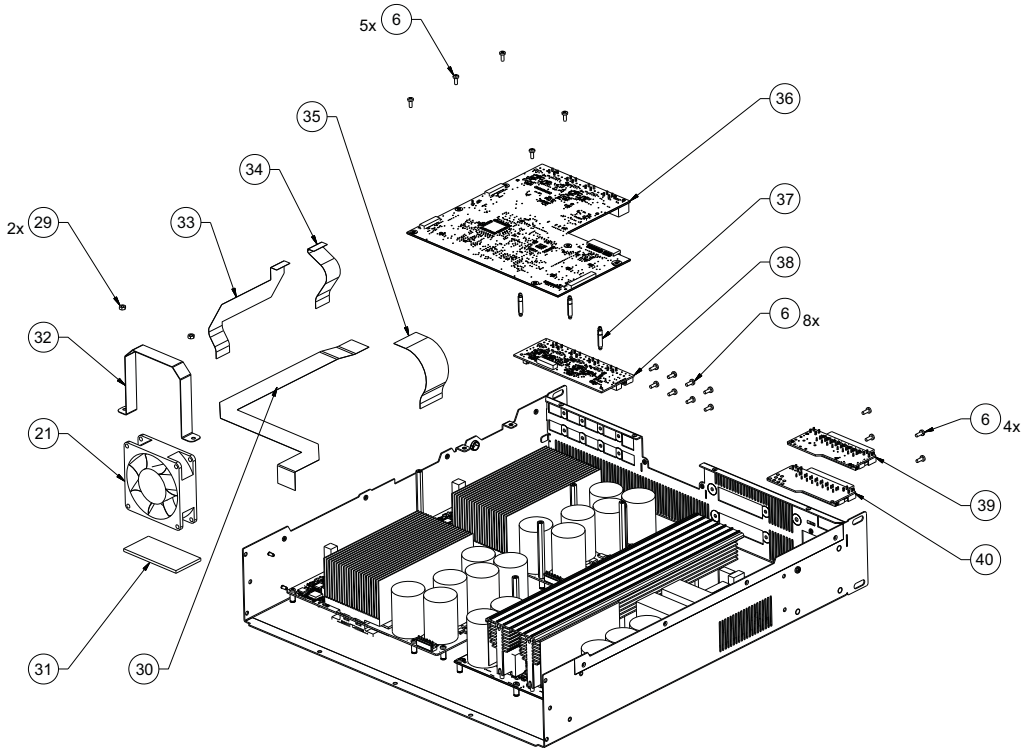


Figure 4. PowerMatch Amplifier Exploded View

MAIN PART LIST

PowerMatch® Amplifier (refer to Figure 5)

Item Number	Description	Part Number	Qty.	Note
6	SCREW, M3-0.5X8, DOME WASHER	292505-001	38/28	
16	SCREW, TAPP, 6-32X0.3125, FLAT, XREC	331028-0020	16	
41	FOAM, NEOPRENE W/PSA, 0.125X3X2.5IN	327102-0010	1	2
42	PCB ASSY, AMP	345290-001S	2/1	
43	STANDOFF, M/F M3 66MM LG HEX	327110-0010	5	
44	BRACKET, PLASTIC, SUPPORT, HEAT SINK	330393-0010	1	
45	INSULATOR, HEAT SINK	344665-0010	1	2
46	BRACKET, TRANSFORMER MOUNT	360761-0010	1	2
47	PCB ASSY, POWER SUPPLY, SERVICE, WITH DAUGHTERBOARD	345305-001S	1	
48	STANDOFF, NYLON, 0.25HEX, 6-32X0.4375IN	330389-0100	1	2
-	PCB ASSY, POWER SUPPLY DAUGHTERBOARD (INCLUDED WITH POWER SUPPLY, ITEM 47)	345309-0010	1	2
-	COVER, PC, w/PSA, NETWORK CONNECTION (PM8500, PM8250, PM4500, PM4250)	347589-0010	1	
-	CABLE, AC SWITCH TO IEC FILTER	330636-0010	1	2,3 ⚠
-	CABLE, GROUND INLET	328411-0010	1	2,3 ⚠
-	ASSY, HARNESS, POWER SUPPLY	328398-0010	2/1	3 ⚠

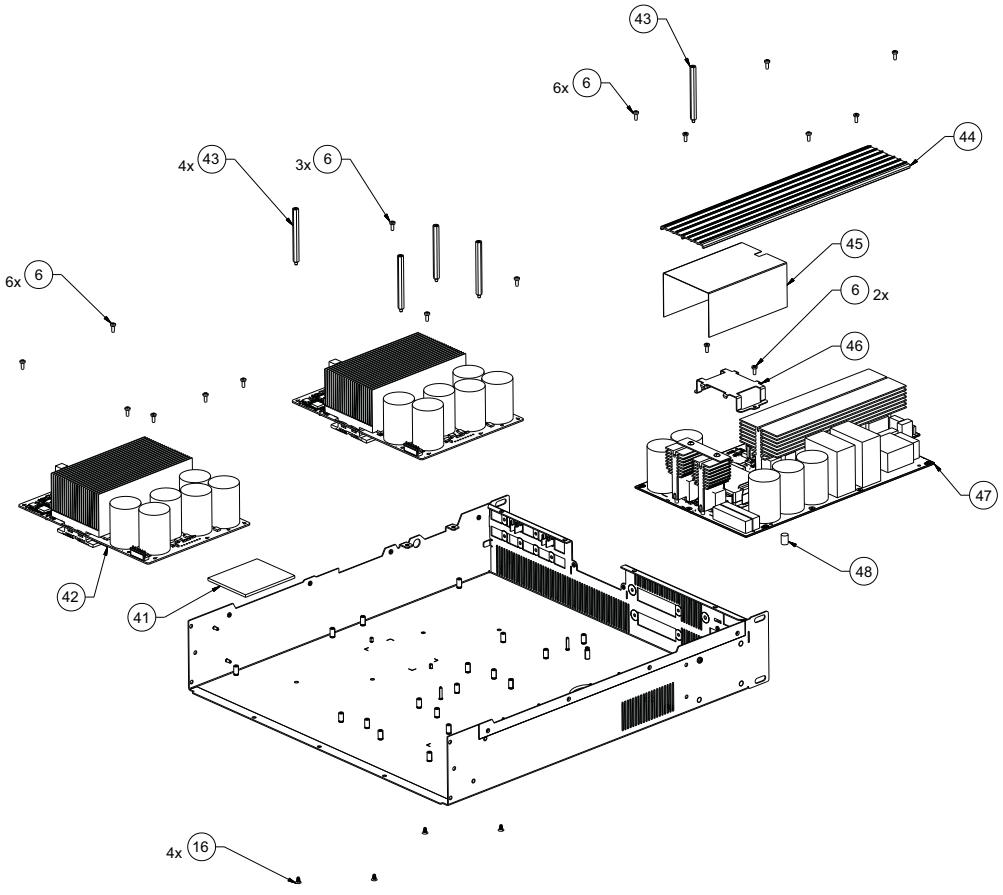


Figure 5. PowerMatch Amplifier Exploded View

Figure 6. PM8500N Amplifier with the cover removed

DISASSEMBLY PROCEDURES

DANGER: SHOCK HAZARD

The PowerMatch® amplifiers have high voltage (up to 400 VDC) on the heatsink and much of the circuitry on the power supply PCB during operation. In addition, the power amplifier PCBs have a large amount of capacitance on the boards that retain a dangerous charge for a significant period of time.

- **DO NOT** touch the power supply heatsink when the amplifier is operating.
- **DO NOT** use the power supply heatsink as a ground point for test equipment. Damage to your equipment could result.
- Allow at least five (5) minutes after operation before removing the cover or attempting to replace a PCB assembly.

Note: The PowerMatch amplifiers are constructed differently than a typical amplifier chassis. What would normally be the top cover is on the bottom of the chassis. To remove this cover, you must place the unit upside-down on your bench.

1. Cover Removal

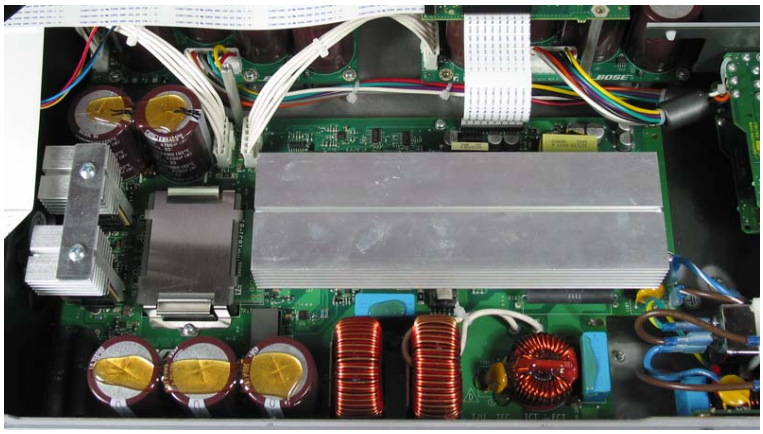
1.1 Remove the 17 screws that secure the cover to the chassis. Be sure to use the correct screwdriver size to avoid stripping the screw heads. Be sure to remove the 2 screws located in the middle of the cover. Lift off the cover.

2. Power Supply PCB Removal

2.1 Disconnect the chassis from AC mains.

2.2 Wait at least five (5) minutes to allow the power supply capacitors to discharge. Perform procedure 1.

2.3 Unplug the Faston connectors at locations P1 and P2 that run from the AC inlet PCB. Unplug the connectors that connect to the amplifier PCBs at connectors PL1 and PL2. Unplug the ribbon cable that runs to the digital PCB at connector SK1.



2.4 Lift off the plastic shield that covers the power supply heatsink. Lift off the plastic heatsink tunnel located at the front of the board. Retain for re-use on the replacement board.

2.5. Remove the six screws and one standoff that secure the power supply PCB to the chassis. Slide the board off of the slotted head standoffs and carefully lift the board out of the chassis. Take care to not flex the board during removal.

DISASSEMBLY PROCEDURES

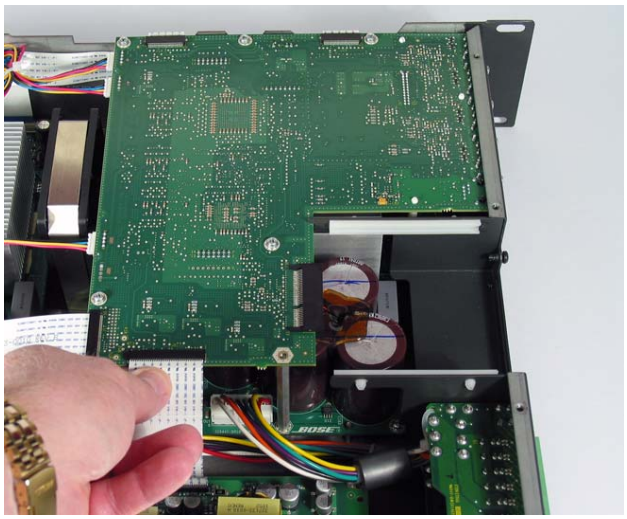
3. Digital PCB Removal

3.1 Disconnect the chassis from AC mains.

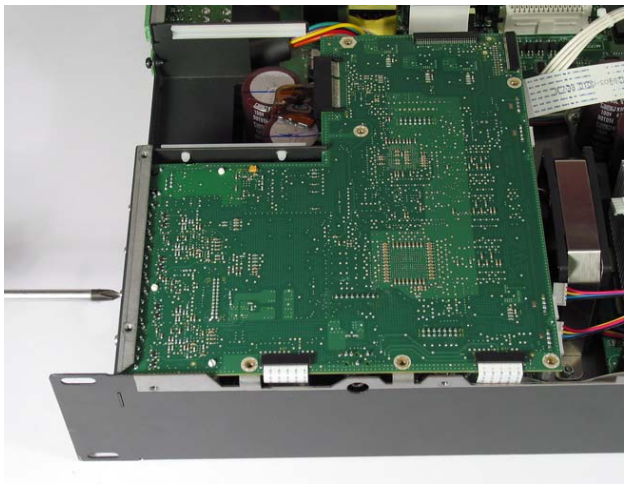
3.2 Wait at least five (5) minutes to allow the power supply capacitors to discharge. Perform procedure 1.

3.3 If the unit is a network capable unit (i.e. PM8500N) and has a digital audio card installed, remove the two screws at the rear of the chassis that secure it and slide out the digital audio card.

3.4 Unplug the ribbon cable to the power supply PCB at connector J8. Unplug the two ribbon cables to the amplifier PCBs at J13 and J14. Unplug the wiring harnesses to the three fans at J9, J10 and J11. Unplug the ribbon cable to the display board at J17.



3.5 On the back of the chassis, remove the eight screws that secure the digital PCB and the analog input PCBs to the chassis.



3.6 Remove the five screws on the top of the digital board that secure the digital / analog input PCB subassembly to the chassis. Slide them forward off of the chassis locating tab and lift out the boards.
Re-assembly Note: When mounting the digital / analog board subassembly back in the chassis, do not install a screw in the location nearest the output boards. This is where the screw that goes through the cover is installed.

4. Analog Input Board Removal

4.1 Perform procedure 3.

4.2 Compress the ends of the three plastic standoffs that secure the analog board to the digital board. Slide the analog board off of the connector to the digital board.

DISASSEMBLY PROCEDURES

5. Amplifier Board Removal

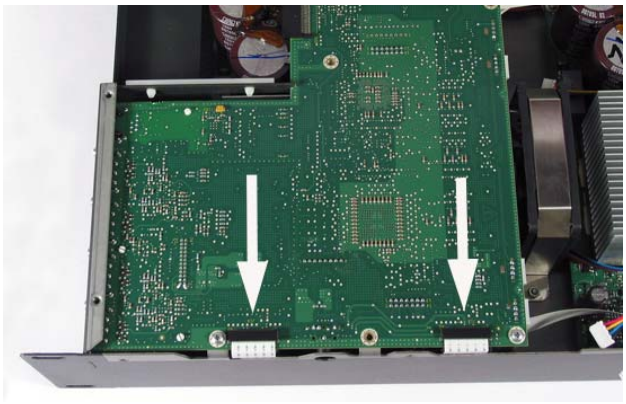
Note: On 8 channel amplifiers, there are 2 amplifier boards located in the chassis. Amp 1 is located at the front of the chassis and Amp 2 is located directly behind it. It is not necessary to remove the digital board to remove Amp 1. 4-channel amplifiers use only one amplifier board.

5.1 Disconnect the chassis from AC mains.

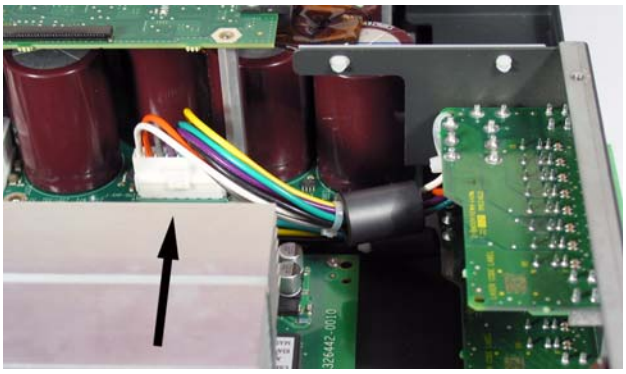
5.2 Wait at least five (5) minutes to allow the power supply capacitors to discharge. Perform procedure 1.

5.3 If removing Amp 2, perform procedure 3 first to remove the digital board and to allow access to the Amp 2 board.

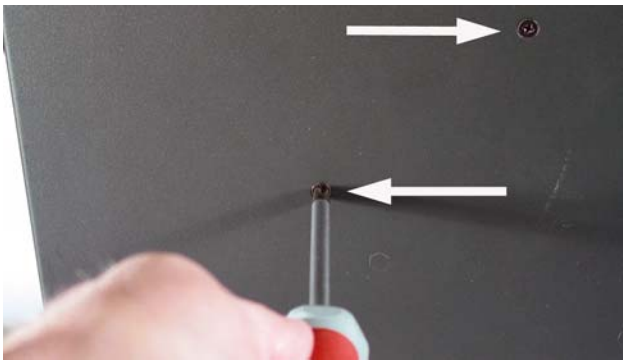
5.4 Unplug the ribbon cable to the digital board at J-IN-1



and the wiring harness from the power supply PCB at J-HV.



5.5 On the outside of the unit remove the two screws that secure the amplifier PCB / heatsink assembly to the chassis.



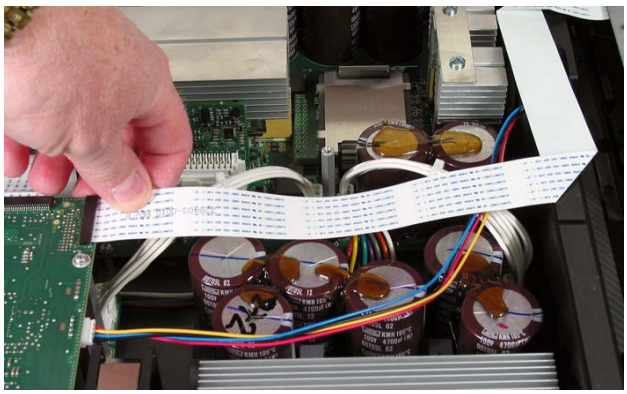
5.6 Inside the chassis, remove the six screws (Amp 1) or two screws and four standoffs (Amp 2) that secure the amplifier PCB. Lift out the PCB with the heatsink.

DISASSEMBLY PROCEDURES

6. Display PCB Removal

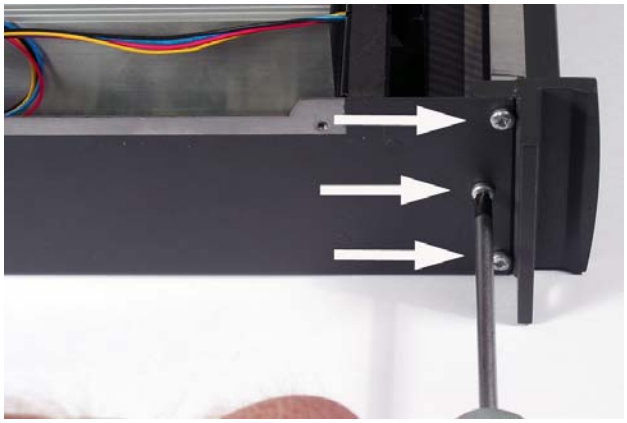
6.1 Disconnect the chassis from AC mains.

6.2 Wait at least five (5) minutes to allow the power supply capacitors to discharge. Perform procedure 1.



6.3 Unplug the ribbon cable on the digital PCB at J17.

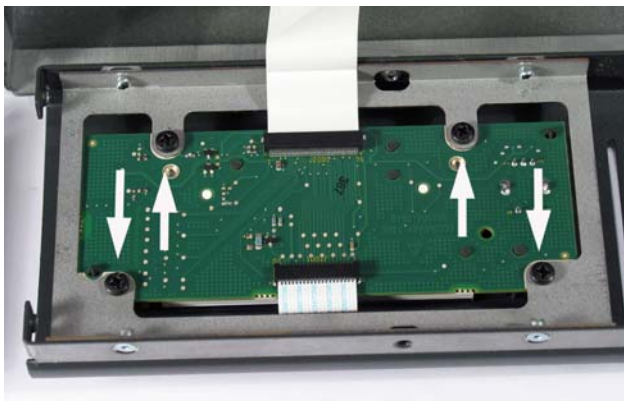
6.4 On the outside top front edge of the chassis, remove the three screws that secure the front panel to the chassis.



6.5 Remove the six screws that secure the front panel assembly to the chassis at the front rack ears.

Lift off the front panel assembly.

6.6 Remove the four screws that secure the keypad / display subassembly to the front of the chassis. Lift out the display subassembly through the front panel.



DISASSEMBLY PROCEDURES

7. Output PCB Removal

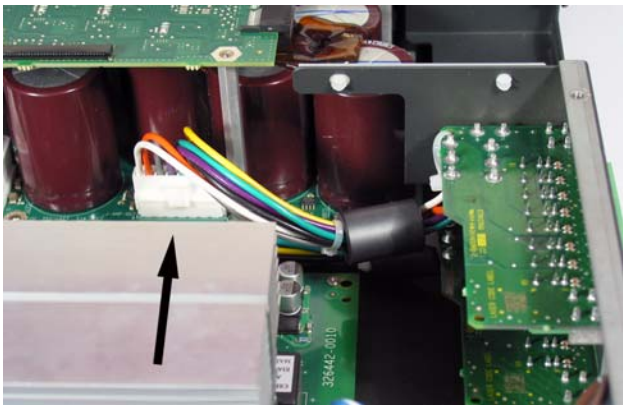
Note: There are 2 different versions of the output PCB, one with a long wiring harness to Amp 1 and one with a short wiring harness to Amp 2. Be sure to order the correct version when ordering a replacement PCB assembly. 4-channel amplifiers use only the short harness board.

7.1 Disconnect the chassis from AC mains.

7.2 Wait at least five (5) minutes to allow the power supply capacitors to discharge. Perform procedure 1.

7.3 Unplug the wiring harness from the amplifier PCB at J-AMP-OUT.

7.4 On the back of the amplifier, remove the two screws that secure the output PCB to the chassis. Lift out the output PCB.



8. AC Inlet PCB Removal

8.1 Disconnect the amplifier from AC mains.

8.2 Wait at least five (5) minutes to allow the power supply capacitors to discharge. Perform procedure 1.

8.3 Disconnect the two wires at the power supply PCB at Faston connectors P1 and P2.

8.4 Remove the nut, lock washer and washer that secure the green ground wire to the chassis.

8.5 On the side of the chassis, remove the one screw that secures the AC inlet PCB assembly to the chassis. Slide the AC inlet PCB off of the slotted standoffs. Lift out the board.

DISASSEMBLY PROCEDURES

9. Amp 1 / Power Supply Fan Removal

Note: The fans located on the mounting plate at the front of the chassis cool both Amp 1 and the Power Supply PCB.

9.1 Perform procedure 1.

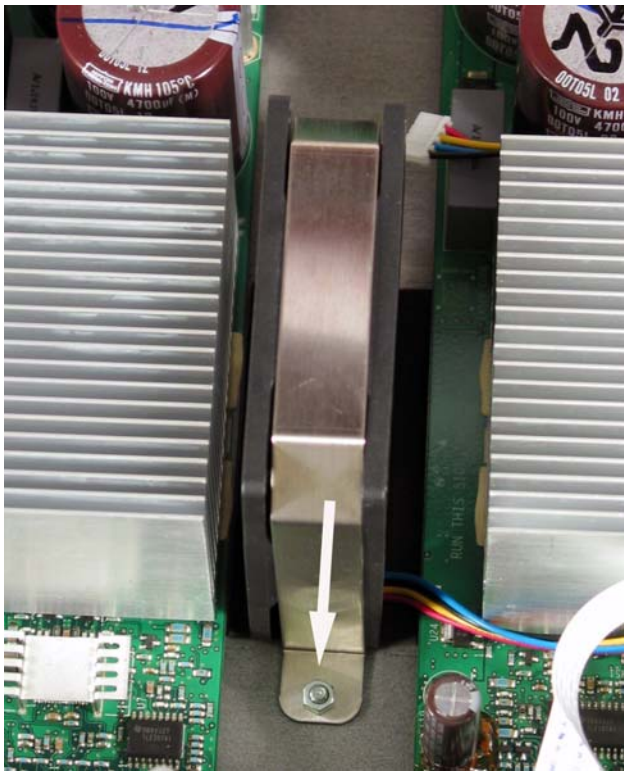
9.2 Unplug the wiring harnesses at J9 and J11 on the digital board. J9 powers the Amp1 fan and J11 powers the power supply fan.

9.3 Lift out the mounting plate with the fans mounted to it. Remove the two screws that secure the fan to the mounting plate. Lift off the fan.
Re-assembly Note: Be sure to install the replacement fan so that it blows air from the front of the chassis to the rear.

10. Amplifier 2 Fan Removal

10.1 Perform procedure 1.

10.2 Unplug the fan wiring harness from the digital PCB at J10.



10.3 Remove the two nuts that secure the fan to the chassis. Lift off the metal bracket that surrounds the fan. Lift out the fan.
Note: Be sure to install the replacement fan so that it blows air from the front of the chassis to the rear.

TEST PROCEDURES

Important Note: The PowerMatch® amplifiers can only be tested using a dedicated burn-in / light-up-and-play test station that fully excercises the unit under test and subjects it to the proper loading conditions to ensure the unit is working to factory specifications before being returned to the customer.

DO NOT attempt to repair and test a unit without using the proper test station, or you could induce a follow-on failure.

Test software for the test station is administered by the Bose® Corporate Test Engineering group. Any new versions of software will be pushed to the test station over the Bose network.

Test Sequence:

1. Initial Evaluation - When a failed unit is first received on the tech bench, the first step is to attempt to verify the customer complaint. If the unit will power up, connect the unit to a Windows® PC that has the Bose ControlSpace® Designer software installed. Check the Alarm Log on the amplifier to verify the customer complaint.

2. Light-up-and-Play Test - Once you have viewed the Alarm Log on the unit, connect it to the PowerMatch® test station. Run the LUAP test to see if the unit fails. If it fails, replace the board indicated and repeat the LUAP test. If the unit passes LUAP test, proceed to the Burn-In test. The LUAP test duration is ~ 9 minutes.

3. Burn-In Test - Connect the unit to the burn-in loads that are dedicated for this test. Burn-in test duration is 1 1/2 hours.

4. On/Off Pop and Pass Audio Test - Once all of the other tests have passed, connect the unit to 8 Doubleshot array loudspeakers, one per channel. Perform test 3, the On/Off Pop and Pass Audio test to verify there are no objectionable pops or obvious audio distortion during this test. If the unit passes this test, it may be returned to the customer.

5. Hi-Pot and Ground Bond Test
The Hi-Pot test must be performed on all repairs that require removal of the top cover and/or any internal electrical components.

Note: The ground bond test does not need to be performed unless the ground connection from the AC Input PCB to the chassis has been removed or replaced as part of the repair of the unit.

1. Chassis Light-up-and-Play Test

1.1 Place the unit under test onto the LUAP test station.

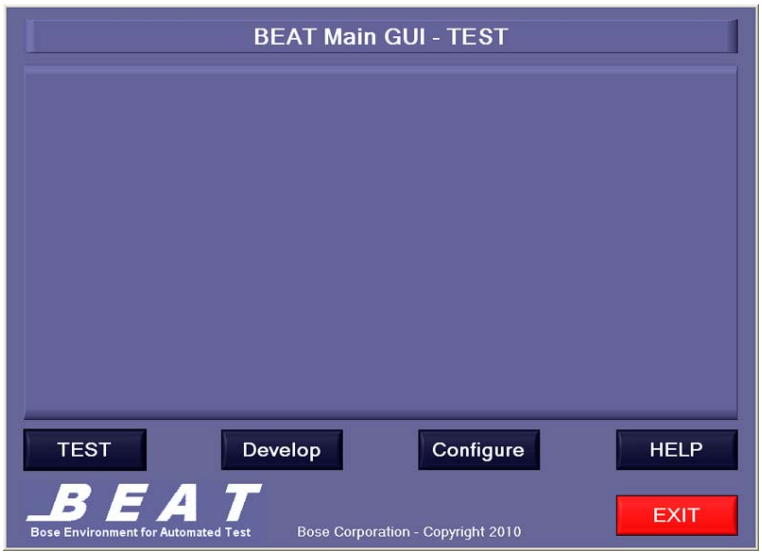
1.2 If the unit under test is a network capable (N) version amplifier, remove the cover over the digital input card slot located on the rear of the chassis. Plug in the test CobraNet card located with the test station. This will allow testing of the digital input section of the amplifier.

1.3 Connect the test station cable harnesses to the analog input connectors A - H or A - D, as applicable, the LUAP load connectors, the ethernet connection (if testing a network capable amplifier), the CobraNet card ethernet connection, the USB connection on the amplifier's front panel and the TAP cable connection located under the plastic plug connector cover on the right side of the unit. This is located near the analog input connectors. Do not connect the AC line cord at this time.

Important Note: Be sure to use the correct loads for the LUAP test. Failure to do so will result in a test failure for the noise measurements. There are 2 different sets of test loads on the station. The LUAP loads are located in the bottom section of the station, and are mounted on the heatsinks located on the back of the station.

TEST PROCEDURES

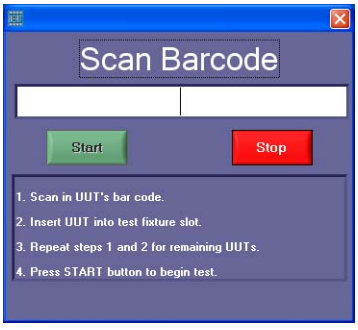
1.4 Log into the test station. Double-click the icon for the BEAT test program. Once that opens, click on the TEST button located at the lower left of the box.

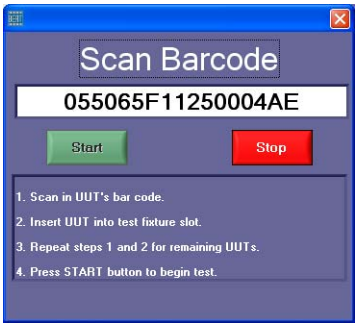


A pull-down menu will appear in the middle of the dialog box. Click on the pull down menu and select the LUAP (Light-up-and-Play) test.

The SCAN BARCODE dialog box will open.

1.5 Using the hand-held scanner on the test station, scan the amplifier's serial number. The unit's serial number is located on the inside of the left rear rack ear. The unit serial number will appear in the SCAN BARCODE dialog box.





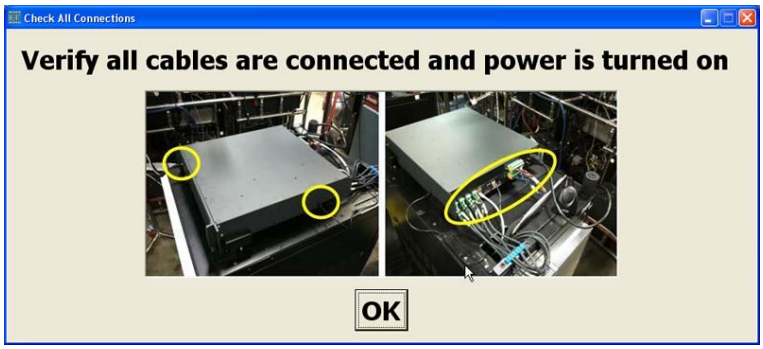
Note: This is a semi-automated test, requiring operator input at various points during the test. Once the test is completed, the station will display either a PASS or FAIL test result. The test information for the unit under test will be saved in an Excel file on the test station.

TEST PROCEDURES

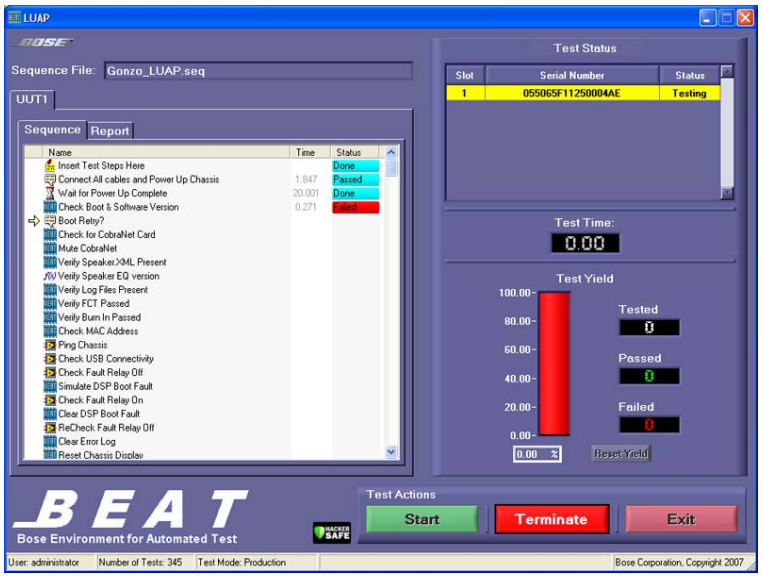
1.6 Connect the AC line cord to the back of the amplifier and the AC source. Turn on the amplifier at the AC power switch, located at the back corner of the amplifier near the AC power cord connection. Click START twice in the SCAN BARCODE dialog box. This will begin the LUAP test on the station. **Note:** There will be several dialog boxes that will open during the course of the test. The test operator will need to perform the action in the dialog box to keep the test running.

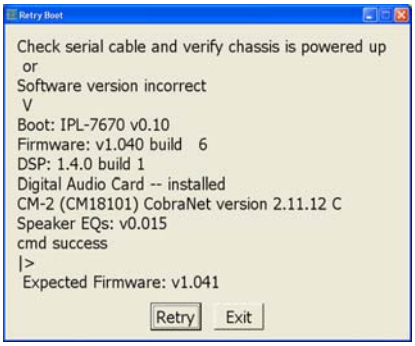
Important Note: The PM8500 amplifiers require a dedicated 20 Amp AC line to power the unit during test. Failure to connect the unit to a dedicated 20 Amp line could result in LUAP test failures due to line voltage sag.

1.7 During the test, the VERIFY ALL CABLES ARE CONNECTED AND POWER IS TURNED ON dialog box will open, as shown at right. Check that all of the cables are properly connected and that the AC power switch on the unit are on. Click OK. The test will resume.



Next the unit's firmware and speaker EQ versions will be checked. If they need to be updated, the test will fail, as shown at right and below right, and you will need to update the firmware and speaker EQ's using the ControlSpace® Designer software, using the procedure on the next page.

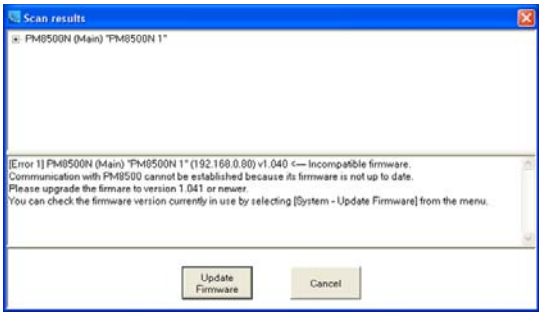




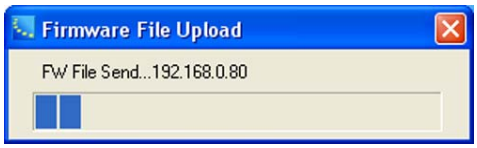
TEST PROCEDURES

Firmware and Speaker EQ update - Double-click on the icon for ControlSpace® Designer. The program will open and scan the connected unit for the installed firmware and EQ levels.

If they are not correct, you will get the dialog box shown at right. Click UPDATE FIRMWARE. If the speaker EQ's also need to be updated, you will get a similar box prompting you to update them as well.

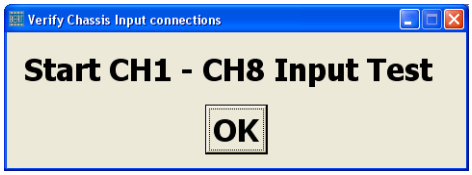


The update will begin and you will see the progress bar shown. Once the firmware and speaker EQ's have been updated, you will need to restart the test for the unit from the beginning.

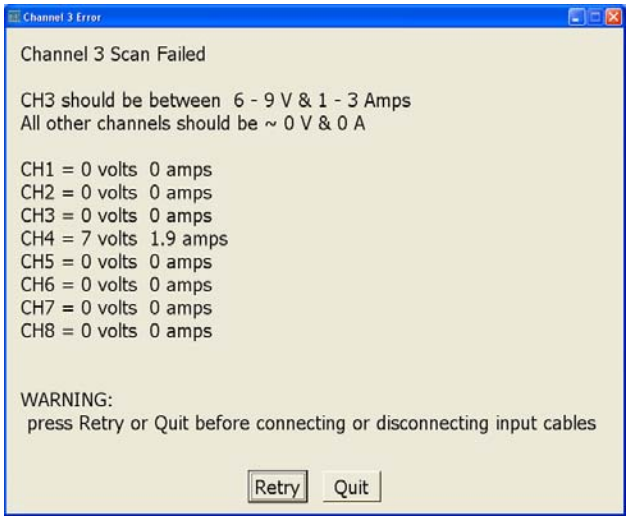


If the firmware and speaker EQ's are at the correct level, you will proceed to step 1.8 below.

1.8 The START CH1 - CH8 INPUT TEST dialog box will open. Click OK. The input tests will begin.



If one of the connectors is reversed, you will get a dialog box similar to the ones shown here. This will tell you which connector(s) are plugged in wrong. The output connectors are scanned first, followed by the analog input connectors. In the first dialog box, the output connectors are reversed, causing the channel 1 output scan to fail. In the second dialog box, the channel 3 and 4 analog input connectors are reversed, causing the channel 3 analog input scan to fail, showing an output on channel 4 instead of channel 3. Once the connectors are re-connected properly, click RETRY. The test will resume.



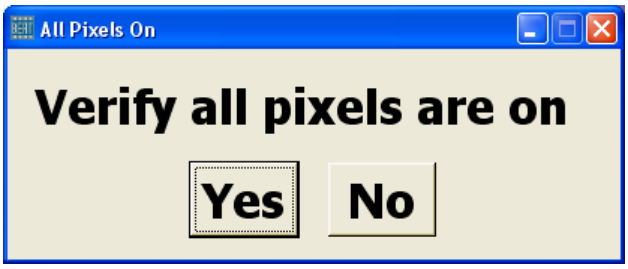
CAUTION: Before unplugging the affected connector, click RETRY on the box to remove the input signal from the unit. The amplifier will still be putting out a signal until the RETRY button is clicked, potentially causing a hardware failure.

TEST PROCEDURES

1.9 Once the input tests are completed, the OBSERVE THE DISPLAY FOR THE FOLLOWING TESTS dialog box opens.

The next several tests will require the operator to view the unit's front panel display and to respond to the prompt.

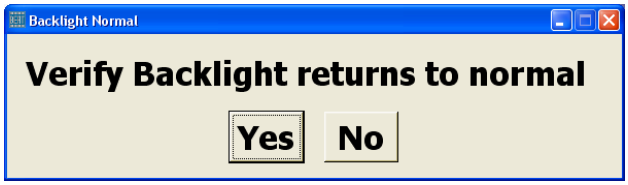
VERIFY ALL PIXELS ARE ON - If all are on, click YES.



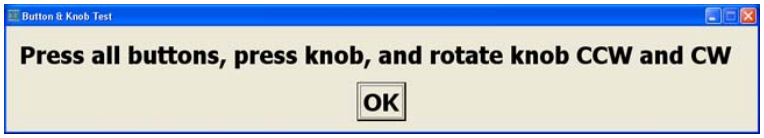
VERIFY DISPLAY RETURNS TO NORMAL - If normal, click OK.

VERIFY DISPLAY BACKLIGHT IS DIMMED - If dimmed, click YES.

VERIFY BACKLIGHT RETURNS TO NORMAL - If normal, click YES.



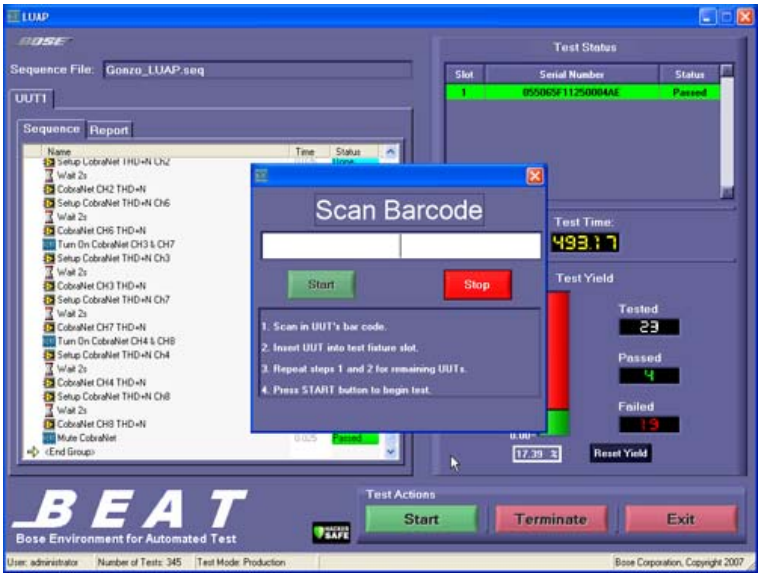
1.10 Once the display tests are completed, the PRESS ALL BUTTONS, PRESS KNOB, AND ROTATE KNOB CCW AND CW dialog box will open. Once you click OK, you will have 15 seconds to perform these actions. This test verifies that all front panel controls are working. Once you have completed them, the test will resume.



If you have missed one of these actions, you will get the dialog box shown, telling you which one you missed. If you get this box, click RETRY and you will be able to repeat the test.

TEST PROCEDURES

1.11 Once the button tests are done, the testing will resume and the station will perform THD+N, noise, phase, sweep and high power tests on all channels. Once these tests are completed and passed, the test window will display PASS or FAIL test at the top right of the test window, and the SCAN BARCODE dialog box will re-open for the next uint.



If testing is completed, click STOP in the SCAN BARCODE window to end testing. Click EXIT in the main test window to go back to the test selection screen. If you will not be testing further, proceed to step 1.12. If you need to perform burn-in, proceed to procedure 2 below.

1.12 Turn off the power switch on the back of the unit under test. Disconnect the AC line cord and all of the other connectors on the back of the unit. Remove the CobraNet card, if applicable, and replace the digital input card slot cover using the two screws. Remove the unit from the test station.

2. Chassis Burn-in Procedure

Important Note: the unit under test MUST have a dedicated 20Amp AC line to avoid burn-in test failures due to AC line voltage sag.

CAUTION: If you are performing the Burn-in test immediately after the LUAP test, you MUST be sure to disconnect the LUAP loads and to connect the burn-in load box on the test station. If you use the LUAP loads for this test, and not the dedicated burn-in load box, you **WILL** damage the LUAP loads. Ensure that the fans located on the burn-in load box are operating during the burn-in test. The burn-in loads reach temperatures in excess of 500F if the fans are not on.

2.1 Place the unit under test onto the PM8500 test station, connect the burn-in load box wiring harnesses and the serial communications (TAP) cable. Do not connect the AC line cord to the unit at this time.

2.2 Double-click on the test station's BEAT (Bose Environment for Automated Test) icon. The Main GUI - Test window will open. Click on the TEST button.

TEST PROCEDURES

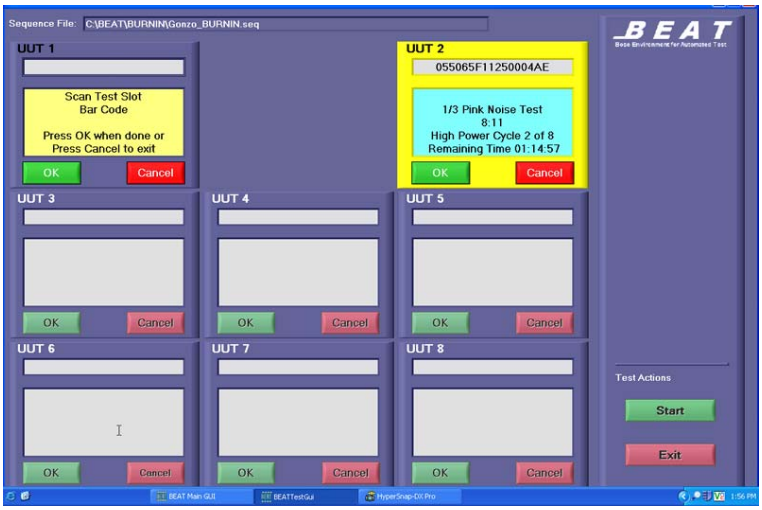
You will see a pull-down menu. Click on the heading and select BURNIN.

2.3 Next the Burn-In test window will open as shown at right. Click START in the lower right corner of the test box. You will be prompted to scan the UUT test slot number. The reason this software shows eight test locations is because it was originally created for the burn-in rack at the Bose Tijuana manufacturing facility, which uses eight burn-in locations. The UUT test slot number is located at the back of the test station, on a label mounted directly under the holder for the hand-held scanner. Scan the UUT number. The test will resume.

2.4 Next you will scan the unit's serial number using the hand-held 1D barcode scanner located on the test station. The serial number is located on the inside of the left rear rack ear on the unit. Once the serial number is scanned into the test software, connect the AC line cord to the back of the unit and turn on the power switch. Click OK in the UUT 2 test window. Total test time is 1-1/2 hours.

TEST PROCEDURES

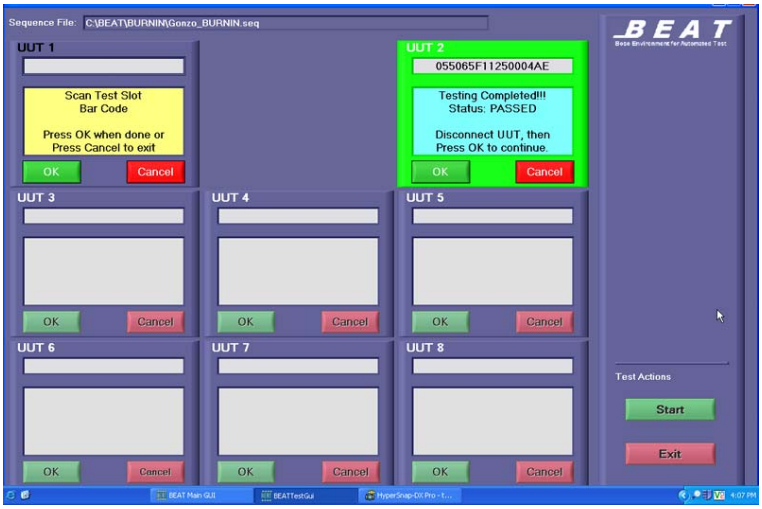
The test will start running, as shown at right.



The below tests will be performed over the 1 1/2 hour test period:

- The software will then issue the serial command to place the unit in 1/8 power mode (pink noise).
- The next command will query for the output current on each channel to verify the loads are connected.
- The thermal reporting command will then be sent to get the thermal/fan status from the unit.
- The test software will then initialize a timer and run the chassis at 1/8 power for 5 minutes. During this time, the test sequence will monitor the debug port looking for reported errors.
- The current check and thermal data check will be run at regular intervals during this burn in period. Any errors will cause the test sequence to exit and save the chassis serial number and test status (Failed) to the chassis's file system.
- If no errors occur during the 5 minute interval, then the serial command to place the unit in 1/3 power mode will be sent and the timer will be reinitialize.
- The sequence will repeat the serial port monitoring and current/thermal check for the remainder of the burn-in test, reporting and exiting on any error condition.
- After a successful 1 hour and 30 minutes total test time, the test sequence will send the serial command to reset the chassis back to factory defaults, and log the chassis serial number and test status (Passed).

2.5 At the end of the test, the test window will indicate a PASS or FAIL test for the unit, as shown.



If you have another unit to run the burn-in test on, click OK in the UUT 2 test box and repeat the steps in this process. If testing is completed, click CANCEL in both the UUT 2 and UUT 1 test boxes, and then click EXIT at the bottom right of the test box to exit the test program.

Once testing is completed, power off the unit, disconnect the AC line cord, the serial data TAP cable and the burn-in load box wiring harnesses and proceed to the On/Off Pop and Pass Audio Test on the next page.

TEST PROCEDURES

3. ON/OFF Pop Test and Pass Audio Test

Equipment Required:

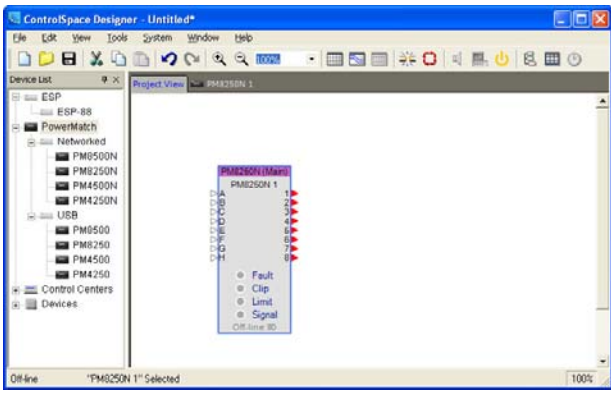
- Audio source - an mp3/CD player with a volume control.
- Wiring harness to allow the input from the mp3/CD player to feed all 8 analog inputs at once
- 8 - 8 ohm speakers (Bose® doubleshot speaker arrays will work)
- PC running Windows XP or higher with the most current version of the Bose ControlSpace® Designer (CSD) software installed. The PC also needs Ethernet and USB connections.
- Multimeter
- Wiring harnesses for speakers
- USB A/B cable
- Jumpers
- AC line cord

3.1 Once the amplifier has passed the Light-up-and-Play and Burn-in tests, remove the unit from the test station and place it on a test bench.

3.2 Connect a doubleshot speaker to each output channel. If you cannot source these speakers, you may use any 8 ohm, single driver loudspeaker.

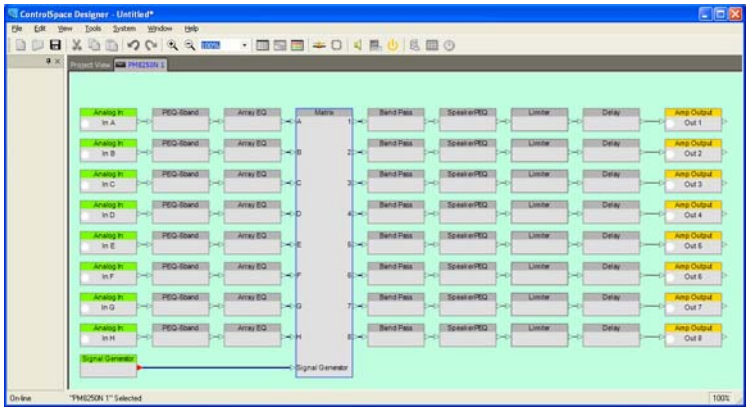
3.3 Connect the audio source or audio signal generator to the audio input A connector. Be sure to wire the connector correctly. Refer to the wiring diagram on page 9 of this manual if needed.

3.4 Open the ControlSpace Designer sofware. You should see the window at right, with the amplifier in it.



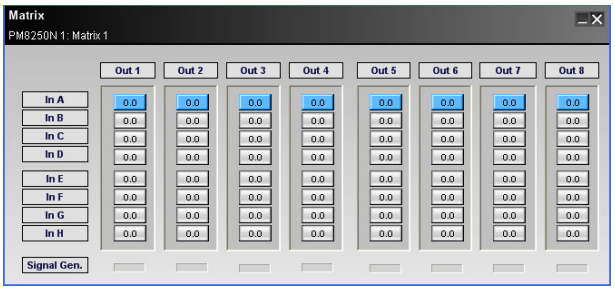
Using the ControlSpace Designer software or the amplifier's front panel controls, map the channel 1 analog input to all 4 or 8 channels (model dependent). To do this in CSD, you should see a graphic of the amplifier.

Click on the tab for the amplifier at the top of the work area. You should see the graphic at right. Doubleclick on the MATRIX block.



TEST PROCEDURES

The window at right should open. Click the Out 1 to Out 8 boxes so that they are lit up in the In A row. This maps all outputs to the input A input connector.



3.5 Connect the amplifier to AC mains.

3.6 With no audio signal applied, turn on the unit. Observe that the bottom 3 LED's light evenly.

1 - "Clip" – Red
2 - "Limit" – Orange
3 - "Power" – Green

Listen for any ON pop noise. Turn the amplifier off. Fail the unit if an on-pop can be heard.

3.7 In the ControlSpace Designer software, mute all channels. You can do this by clicking on the speaker symbol button in the top row of buttons in the CSD window.

3.8 Connect the PC to the unit under test using a USB A/B cable.

3.9 When you connect, a dialog box will appear on the PC asking if you would like to go online, click YES.

3.10 A second dialog box will appear asking if you would like to associate with the project device, click OK.

3.11 A third dialog box will appear, click SEND TO DEVICE. Once you click send to device, the background color of the screen in CSD will turn light blue and the system will be online at that point.

3.12 Connect an audio source to the channel 1 analog input and start playing audio with the volume set all the way down (not using a mute function on the audio source).

3.13 Using ControlSpace® Designer, un-mute each channel one by one and listen for clear, undistorted audio and no unwanted noises such as pops, whistles or any distortion.

3.14 In CSD, click on the Project View tab at the top of the window. You will see a graphic of the amplifier. Right click on the amp graphic and select "Open Monitor Panel" from the menu. The below control window will open. Use the red mute buttons along the bottom of the window to mute and un-mute channels.

3.15 After un-muting the first channel, ramp the volume on the input device up to a comfortable listening level.

TEST PROCEDURES

CAUTION: If you are using Bose® doubleshot speaker arrays as test loudspeakers, be sure to not exceed 50W input to each speaker or you will damage them.

3.16 Mute channel one. Un-mute the rest of the channels one by one. Re-mute each channel before moving to the next one.

3.17 In CSD, Close the control window. Stop or pause the audio source.

3.18 Using the power switch on the back of unit turn it off and listen for any off pops or unwanted noise. Fail the unit if an off-pop can be heard.

4. Hi-Pot Test

THIS IS A MANDATORY TEST

Note: If an amplifier requires removal of the top cover or the AC inlet PCB for repair, it MUST be Hi-Pot tested before being returned to the customer to ensure that there is no potential shock hazard.

This test requires a Hi-Pot tester with a ground bond attachment to perform this test. **Amplifier Connections:**

The Hi-Pot tester connects to the amplifier by means of a wiring harness. The AC cord of the amplifier plugs into the Hi-Pot tester AC adapter box and another lead connects by means of an alligator clip to the rear of the chassis at the unpainted corner of the rear rack ear.

Hi-Pot Tester Settings:

HiPot: 2120VDC, rise time = 1 sec., dwell = 1 to 4 seconds, current limit = 500 uA

4.1 Connect the AC mains cord to the back of the amplifier under test. Plug the other end of the AC cord into the Hi-Pot tester.

4.2 With the tester set to the above parameters, perform the test. If the unit fails, remove the top cover and repair the problem. Once the unit is repaired, repeat the Hi-Pot and the ground bond test to ensure the unit is safe to return to the customer.

5. Ground Bond Test

Note: This test only needs to be performed if the chassis ground wire from the AC IEC connector or AC inlet PCB to the inside of the chassis of the amplifier has been removed or disturbed as part of a repair. If it has not, this test does not need to be performed.

This test measures current handling capability between the ground blade on the AC inlet or mains plug and the earth bond point on the rear of the chassis.

TEST PROCEDURES

Test Parameters:

10A, < 0.1 Ohms from AC earth terminal on IEC connector in chassis, to earth bond point on rear of chassis.

5.1 Connect the AC mains cord to the back of the amplifier under test. Plug the other end of the AC cord into the ground bond test box.

5.2 With the tester set to the above parameters, perform the test. If the unit fails, remove the top cover and repair the problem. Once the unit is repaired, repeat the Hi-Pot and the ground bond tests to ensure the unit is safe to return to the customer.

Equipment Required:

- PC running Windows XP or higher with the most current version of the Bose® ControlSpace® Designer (CSD) software installed. The ControlSpace Designer software is available on the Pro Products web site at http://pro.bose.com, on the PowerMatch® amplifier software download page.
- USB A/B cable
- AC line cord for the power amplifier

1. Firmware Update Procedure

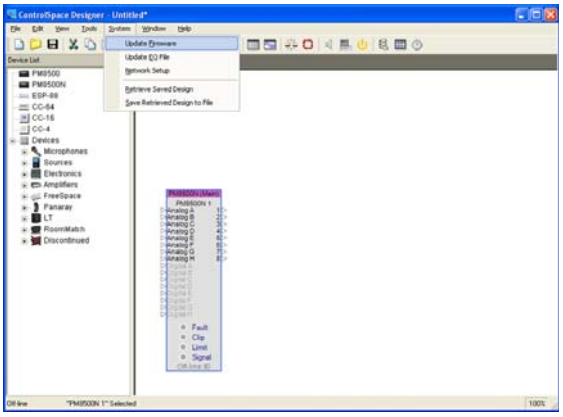
1.1 Connect the AC line cord to the back of the power amplifier and to an AC mains source. Do not power on the unit at this time.

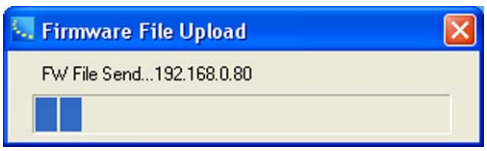
1.2 Connect the USB cable to the PC and to the front panel of the amplifier.

1.3 Double-click on the icon for ControlSpace® Designer. The program will open as shown below right.

1.4 Turn on the amplifier. You should be able to see a graphic for the amplifier as shown below.

1.5 In the ControlSpace Designer window, click on SYSTEM and select UPDATE FIRMWARE from the pull-down menu. The CSD software will check the installed version of firmware and open a dialog box showing the current level of firmware and what it should be updated to. Click UPDATE. You will see the update progress bar as shown below.





Firmware and Speaker EQ Update Procedure (continued)

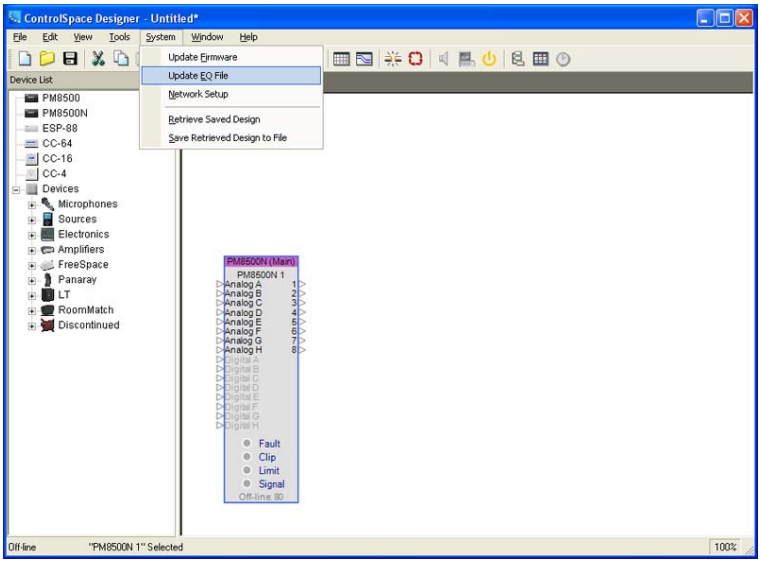
Once the update is complete, you will see a dialog box stating that the update was successful and asking to reboot the amplifier. Click OK. You can verify that the firmware has been updated from the amplifier front panel. Press the MENU key. Select UTILITY. Rotate the knob down to FIRMWARE VERSION and press the knob to select it. The firmware version and speaker EQ version information will be displayed.

Note: The Speaker EQ's are updated separately from the Firmware update. Perform procedure 2 on the next page to update the speaker EQ's.

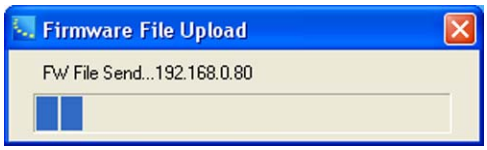
2. Speaker EQ Update Procedure

2.1 Perform steps 1.1 to 1.4 of the Firmware Update procedure on the previous page.

2.2 In the ControlSpace Designer window, click on SYSTEM and select UPDATE EQ FILE from the pull-down menu. The CSD software will check the installed speaker EQ version and open a dialog box showing the current level of speaker EQ and what it should be updated to. Click UPDATE. You will see the update progress bar below.



Once the update is complete, you will see a dialog box stating that the update was successful and asking to reboot the amplifier. Click OK. You can verify that the firmware has been updated from the PM8500 front panel.



Press the MENU key. Select UTILITY. Rotate the knob down to FIRMWARE VERSION and press the knob to select it. The firmware version and speaker EQ version information will be displayed.

SERVICE MANUAL REVISION HISTORY

Date	Revision Level	Description of Change	Change Driven By	Page(s) Affected
11/11	00	Document released at revision 00.	Service manual release	All
10/12	01	Digital PCB part number changes.	Software revisions	20
6/13	02	Added new PowerMatch amplifier versions	New product release	All

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE

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