

<b>CLASS</b> <b>FM</b>	<b>DWG NO.</b> 294963-TT
---------------------------	-----------------------------

REVISIONS			
REV	DESCRIPTION	ENG	DATE
00	INITIAL RELEASE	BOB SMITH	5/09
01	ADDED NEW PREVENTATIVE REPAIR INFORMATION	BOB SMITH	9/10

SIGNATURES REQUIRED	PRINT NAME	SIGNATURE
TSG REPRESENTATIVE	BOB SMITH	
CELL LEAD		
REPAIR SUPERVISOR	KEVIN KING	
OTHER(_____)		

<b>TSG TECHNICIAN</b> Bob Smith	<b>DATE</b> 9/10	<b><i>BOSE</i></b> FRAMINGHAM, MA 01701-9168			
<b>APPLICABLE DOCUMENTS:</b> SERVICE MANUAL: 294963-SM		<b>DESCRIPTION</b> FreeSpace 4400 Amplifier			
		<b>SIZE</b> A	<b>FSCM</b> 32108	<b>CLASS</b> FM	<b>DWG NO.</b> 294963-TT
					<b>REV</b> 01

## Troubleshooting Tips

### FreeSpace® 4400 Amplifier

Refer to the FreeSpace 4400 amplifier service manual, reference number 294963-SM for schematics, PCB layouts and parts lists. It's located on the Service web site at <http://intranet.bose.com/tsq> or <http://serviceops.bose.com> on the Pro Products page.

#### Preventative Repair Measures

**Note:** Perform the following on all units returned for repair.

Product	Check	Action
FreeSpace 4400 amplifier	34 pin ribbon cable at the amplifier module.	On all units built before May 24 <sup>th</sup> , 2010 (DOM 0144) that come in for repair, check the 34 pin ribbon cable at the amplifier module end to ensure that the 2 connectors are fully plugged in. Perform the procedure described in service bulletin 294963-B1 to ensure they will remain in place before returning the unit to the customer.

## Troubleshooting Tips

Product	Symptom	Check	Action
FreeSpace 4400 amplifier	Outputs 1 and 2 and/or 3 and 4 fault LEDs lit.  System STATUS LED is lit red	Ribbon cables  Output FETs  Amplifier setup and installation wiring  Error log for amplifier module fault conditions  Power supply fuses	<ol style="list-style-type: none"> <li>1. Verify that all of the ribbon cables that connect to the DSP and the other boards are properly seated into their connectors. Replace any damaged cables.</li> <li>2. Check the outputs FETs on the upper and lower amplifier boards. Verify that they are properly secured to the heatsink and that they are not shorted to it.</li> <li>3. Check for a shorted speaker line in the installation wiring.</li> <li>4. Check that the source is not overdriving the channel.</li> <li>5. Check for loudspeaker transformer saturation. Verify that the proper loudspeaker EQ's are being used.</li> <li>6. Line voltage too high (surge). Check the unit's error log for an entry that the rail voltage exceeded 150V in 70V mode (US installs) or 190V in 100V mode (Euro).</li> <li>7. Live voltage too low (brownout) Using the FreeSpace Installer software, check the unit's error log for an entry that the rail voltage was lower than normal by at least 20%.</li> <li>8. 70/100V mode switch position changed with unit operating. Check that the output voltage setting (70 or 100V) is correct for the region the unit is used in. Check that the AC input voltage selection switches are set properly for the region.</li> <li>9. Blown power supply fuse (not the AC line fuse). Check the outputs FETs on the upper and lower amplifier boards. Verify that they are properly secured to the heatsink and that they are not shorted to it. Replace the fuse and perform the test procedures in the service manual. If the fuse blows again, replace the amplifier module and retest.</li> </ol>

<b>Product</b>	<b>Symptom</b>	<b>Check</b>	<b>Action</b>
FreeSpace® 4400 amplifier	System STATUS LED is lit red	Error log and system wiring	<ol style="list-style-type: none"> <li>1. Switch the system to STANDBY and then back to active again. If the SYSTEM STATUS LED is green, the system may have logged an error. Check the error log on the unit using the FS 4400 Installer software.</li> <li>2. Switch the system to STANDBY. Set the power switch on the rear panel to OFF. Wait for the STANDBY indicator to turn off. Set the power switch to ON. Press the STANDBY switch and check to see if the SYSTEM STATUS LED is now green.</li> <li>3. Switch the system to STANDBY. Set the power switch on the rear panel to OFF. Disconnect all input and output signal cables. Set the power switch to ON. Press the STANDBY switch. Reconnect one cable at a time and check the SYSTEM STATUS LED and the error log to see if there are errors.</li> </ol>
FreeSpace 4400 amplifier	System STATUS LED is lit red	Error log for power-on self test failure	<p>The power-on self test (POST) checks five major hardware components. Connect to the system using the FreeSpace Installer software to view the error log messages. The failures types are below.</p> <ol style="list-style-type: none"> <li>1. Host controller – will cause the message “Power-on self test incomplete” to appear in the host controller test section of the error log. This is usually caused by a SRAM address failure.</li> <li>2. Flash memory – Contains the system configuration, design file and the system event schedule. Error log will have an entry “Power-on self test incomplete” in the host controller flash test section.</li> <li>3. Peripheral controller – This monitors contact closures, rear panel connections and user interface connections. Error log will have an entry “Power-on self test incomplete” in the peripheral controller flash test section of the error log. Check the user interface wiring for shorts or a failed keypad.</li> <li>4. DSP – The DSP performs all signal processing and routing functions. Error log will have an entry “Power-on self test incomplete” in the DSP test section of the error log.</li> <li>5. Upper and lower amplifier – Amplifier channels 1 and 2 are located on the upper amplifier board. Channels 3 and 4 are located on the lower amplifier board. The upper and lower amplifier test determines if the amplifiers are working properly. Error log will have an entry “Power-on self test incomplete” in the upper or lower amplifier test section of the error log.</li> </ol>

Product	Symptom	Check	Action
FreeSpace <sup>®</sup> 4400 amplifier	Customer complains that the unit goes into Protect mode repeatedly, then shuts down	Installation wiring  Input high frequency noise.	<ol style="list-style-type: none"> <li>1. Call the installer and have him verify that the number of speakers connected to the amplifier channels is correct and that the installed wiring is not shorted.</li> <li>2. Check the unit's error log to see if a fault is entered. Refer to the service manual troubleshooting section for help with determining the cause of the failure.</li> <li>3. Check the input source material for excessive high frequency content. Also check for a potential ground loop. This will cause the amp to go into protect mode. It will repeat the protect cycle 6 times and shut down if the high frequency content is not removed.</li> </ol>
FreeSpace 4400 amplifier	Communications port error	PC setup and connection wiring	<ol style="list-style-type: none"> <li>1. Check that the DB9 – DB9 cable used is a "straight-wired" serial cable. Do not use a null modem cable as the wiring is not the same.</li> <li>2. Check the PC to see if another software application has control of the serial COM port. Applications such as the Palm OS or other audio applications can control the port while they are open. Close these applications and click the TRY AGAIN dialog button in the system software.</li> <li>3. Verify that the COM port settings are correct.</li> <li>4. Verify that the FS 4400 is connected to the correct COM port. Connect to the correct port and click on the TRY AGAIN dialog button.</li> </ol>
FreeSpace 4400 amplifier	No audio in zone	LEDs and system setup	<p><b>Note:</b> In the FreeSpace Installer software, before dismissing the "choose COM port" dialog in the system software, select the COM 2 port and click the TRY AGAIN button. Not doing this will cause the COM 1 port to be locked. If the port locks, you must restart the computer.</p> <p>If the system is powered on and operational, but there is no sound, check the following:</p> <ol style="list-style-type: none"> <li>1. Do the front panel LED's indicate normal operation?</li> <li>2. Is the audio source operating?</li> <li>3. Is the signal routing correct in the system setup?</li> <li>4. Is the output gain correct (not too low)?</li> <li>5. Is the output gain muted?</li> <li>6. Is the installation cabling correct?</li> </ol>

<b>Product</b>	<b>Symptom</b>	<b>Check</b>	<b>Action</b>
FreeSpace <sup>®</sup> 4400 amplifier	Bad sound in a zone	System setup and input level	<ol style="list-style-type: none"> <li>1. Verify that the correct speaker EQ is selected in the FreeSpace Installer software for that zone.</li> <li>2. Verify that the loudspeakers for that zone are wired in phase.</li> <li>3. Reduce the gain in the affected zone using the FS Installer software until the amp output indicator for that zone is solid green.</li> <li>4. If the input and output indicators are green and the sound is still distorted, verify that the input source signal is clean. If the source is from a mixer, reduce the mixer gain to see if it is overdriving the amp channel.</li> <li>5. Verify that the total load impedance for the zone is within specified limits for the selected mode of operation.</li> </ol>
FreeSpace 4400 amplifier	User interface keypads do not operate correctly	System setup and wiring	<ol style="list-style-type: none"> <li>1. Check the wiring of the RJ-45 connectors.</li> <li>2. Check for breaks or shorts in the keypad installation wiring.</li> <li>3. Using the FreeSpace Installer software, check the error log for a peripheral controller error. Repair or replace a defective keypad.</li> </ol>
FreeSpace 4400 amplifier	Auto Volume does not calibrate	System setup and wiring	<ol style="list-style-type: none"> <li>1. Verify that the connected loudspeakers are not set to too high a tap setting.</li> <li>2. Verify that the maximum output gain is less than -20dB.</li> <li>3. Verify that the audio source is operating.</li> <li>4. Verify that the source level setting is not too low.</li> <li>5. Check for broken microphone cable.</li> <li>6. Check that the loudspeakers are connected.</li> <li>7. Check that the sensing microphone is connected and that it is not connected to the wrong zone.</li> </ol>