BOSE®

FreeSpace®
E-4 System

General Description

The Bose® FreeSpace® E-4 system is an integrated four-channel digital signal processor and 400-watt power amplifier for 70/100V business applications.

Freespace system Installer™ software, included with each unit, makes it easy to configure and service the E-4 system.

With capacity for four source inputs, including two Line In, one Mic/Line and one Page/Mic/Line, the E-4 system provides the inputs needed for most business music installations.

Its proprietary power-sharing amplifier dynamically shares 400 watts across 4 output channels ranging from as low as 1W to as high as 400W. For example, if you have a two-zone system that requires 5 watts in Zone 1 and 395 watts in Zone 2, the FreeSpace E-4 system distributes the power based on those needs.

As a single component, the E-4 provides the processing and control features required for one-to-four zone business music applications. These features include:

• Auto Volume: Offers dynamic control of individual zone volume levels to compensate for changes in background noise level. Auto Volume requires the use of the FreeSpace E-4 System Auto Volume Mic Kit.

• Scheduling: Allows programming of the E-4 system for automated on/ off, volume, and source changes according to time of day or day of week.

• Opti-Voice® paging: Provides the appropriate sound level regardless of variations in speech projection.

• Source Leveling: Automates system compensation for variations in source input levels.

• Dynamic Equalization: Maintains tonal balance at all listening levels.

Technical Information

Power Amp Specifications
Power Output
Total shared power available for all channels: 400W

Maximum power per channel: 400W

Output Configurations
70.7V or 100V nominal

Frequency Response
20 Hz to 20 kHz ±3dB

Channel Separation[1]
>70dB @ 1 kHz

THD[1]
<1.0% at rated power, 0.1% at half rated power

Signal-to-Noise Ratio[1]
>97dB, A-weighted

Slew Rate
20V/µs

DSP Specifications
Sample Rate
44.1 kHz

A to D Conversion
24-bit, 128x oversampling

D to A Conversion
24-bit, 128x oversampling

Front Panel Indicators and Control Connections
Amp Output Signal Indicators
Zone 1 – 4: dual-color LED

Source Input Signal Indicators
Source 1 – 4: dual-color LED

Other Indicators
System Status: dual-color LED
Direct Input: yellow LED
Standby Button: button
Standby Indicator: yellow LED

PC Input
USB connector (for future use)

[1]Tested with AES 17 low-pass filter.

Rear Panel Inputs, Outputs, and Controls
Audio Inputs
Line Level Inputs
Type: Unbalanced RCA connectors summed to mono
Sensitivity: -20 dBV to +20 dBV
Impedance: 25K Ohms
Input Clip Level: +17 dBV

Mic Level Inputs
Type: Balanced Euroblock connectors
Sensitivity: -60 dBV to 0 dBV
Impedance: 3.3K Ohms
Input Clip Level: +17 dBV

Direct Input
Type: Balanced Euroblock connectors
Input Sensitivity: 0 dBV
Input Impedance: 2.5K Ohms
Input Clip Level: +6 dBV

Sense Mic Inputs
ZONE 1 – 4: Euroblock connector

Control Connections
Wall Plate Zone 1 – 4: RJ45 connector
Remote On/Off Input: Euroblock connector
PC Input: RS-232 connector

Power Amplifier Outputs (70V or 100V only)
Zone Out 1 – 4: Inverted Euroblock connector

Audio Outputs
Music on Hold/PBX Output: Euroblock connector

Zone 4 – Line Out: Euroblock connector

Output Configuration
70V or 100V: switch

AC Power Consumption
60W or less at idle

200W with musical program

600W at maximum continuous rated power (1 kHz, sine wave input) 70V or 100V mode

Technical Information...*continued*

Power Requirements (±10%)
120 VAC/50-60 Hz
220 VAC/50-60 Hz
240 VAC/50-60 Hz
100 VAC/50-60 Hz

Fusing/Protection
120V: T6.25A, 250V rated
240V: T3.15A, L250V

Size (H x W x D)
5.25" (3U) x 17.25" x 15.5"
(13.3 cm x 43.8 cm x 39.4 cm)

Weight
30 lb (13.6 kg)

Enclosure Construction
Steel chassis designed for rack or shelf mounting

E-4 System Engineers' and Architects' Specifications

The system shall use a digital signal processing architecture running at a 44.1 kHz sample rate. The frequency response shall be from 20 Hz to 20 kHz (±3dB). The signal-to-noise ratio shall be greater than 100dB A-weighted.

The power amplifier section shall deliver 400W of maximum power with less than 1.0% THD from 20 Hz to 20 kHz (±3dB). Channel separation shall be >70dB, 20 Hz to 20 kHz.

The system shall consume power of 60 watts or less at idle, 200 watts with musical program, 600 watts at maximum continuous rated power (1 kHz, sine wave input) 70V or 100V mode.

The system shall run the following algorithm and controls:

- Input Gain
- Input Trim
- Source Leveling
- Mic/Line/Page Assignment
- Opti-Voice® paging
- Signal Routing
- Auto Volume Setup
- Scheduling
- Dynamic EQ
- Music on Hold
- Room EQ
- Loudspeaker EQ for Bose® speaker products
- Output Level Control Scheduling
- Limiting
- System Diagnostics

The system shall weigh 30 lb (13.6 kg).

The system enclosure construction shall be a steel chassis designed for rack or shelf mounting.

The system shall be the FreeSpace® E-4 system from Bose.

General Description
...*continued*

- Music on Hold: Provides an output for simple integration into a phone system.

- Room Equalization: Provides easy adjustment of tonal balance in each zone.

- Limiting: Protects loudspeakers from unwanted transient power loads.

- Signal Routing: Allows for an input source to be routed to any of the four amplifier outputs.

- System Diagnostics: Generates an extensive error log and includes an easy-to-replace memory module to minimize downtime.

- RS-232 for connection to a PC.

- Remote Power Sequencing: Provides a contact closure input.

Rear Panel Features
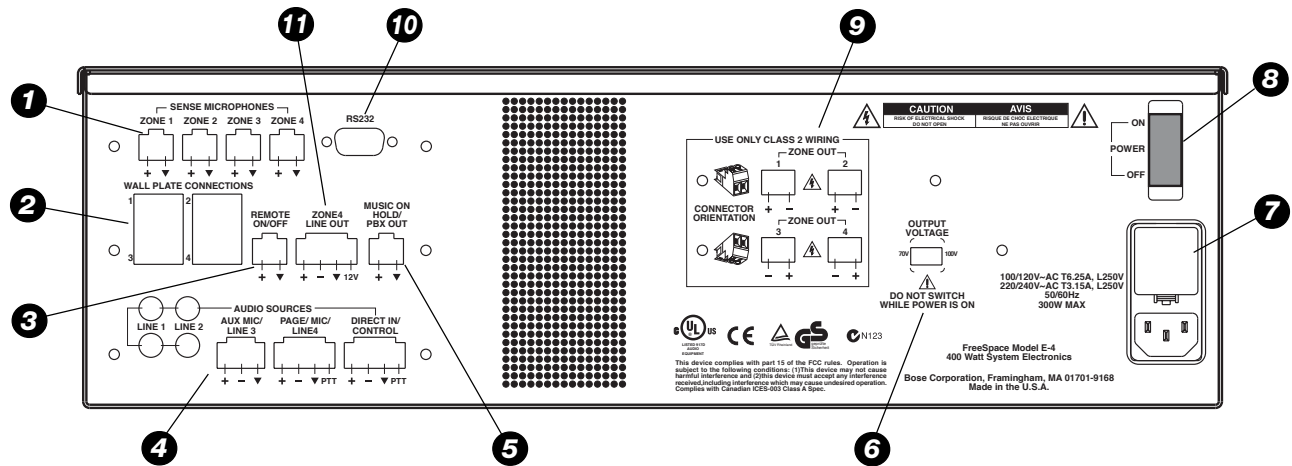
1. Sense Microphone Inputs
2. Wall Plate Connections
3. Remote On/Off Input
4. Audio Source Connections
5. Music on Hold
6. Output Voltage Switch (70/100V)
7. Fuse Box with Voltage Selector
8. Power On/Off Switch
9. Amplifier Outputs
10. RS-232 System Control PC Input
11. Auxiliary Output/Control

E-4 System Accessories

Optional Bose® accessories for the E-4 system

Accessory	Description	PC Codes
FreeSpace® E-4 System Rack Mount Kit	One pair of rack ears	PC029858
FreeSpace E-4 System User Interface Kit	Wall-mount keypad that fits into a standard single-gang junction box	PC029856 (US) PC029857 (Euro)
FreeSpace E-4 System Auto Volume Interface Kit	Wall-mount keypad that fits into a standard single-gang junction box	PC030101 (US) PC030102 (Euro)
FreeSpace E-4 System Auto Volume Mic Kit	One sensing microphone for stand-alone use or installation in a standard single-gang junction box	PC029859 (US) PC029860 (Euro)
FreeSpace E-4 System Auto Accessory Kit	Supplemental rear panel mating connectors and non-skid feet	PC030105

Safety and Regulatory Compliance

The FreeSpace E-4 system complies with UL6500 2nd edition, EN60065, and IEC60065:1998 (6th).
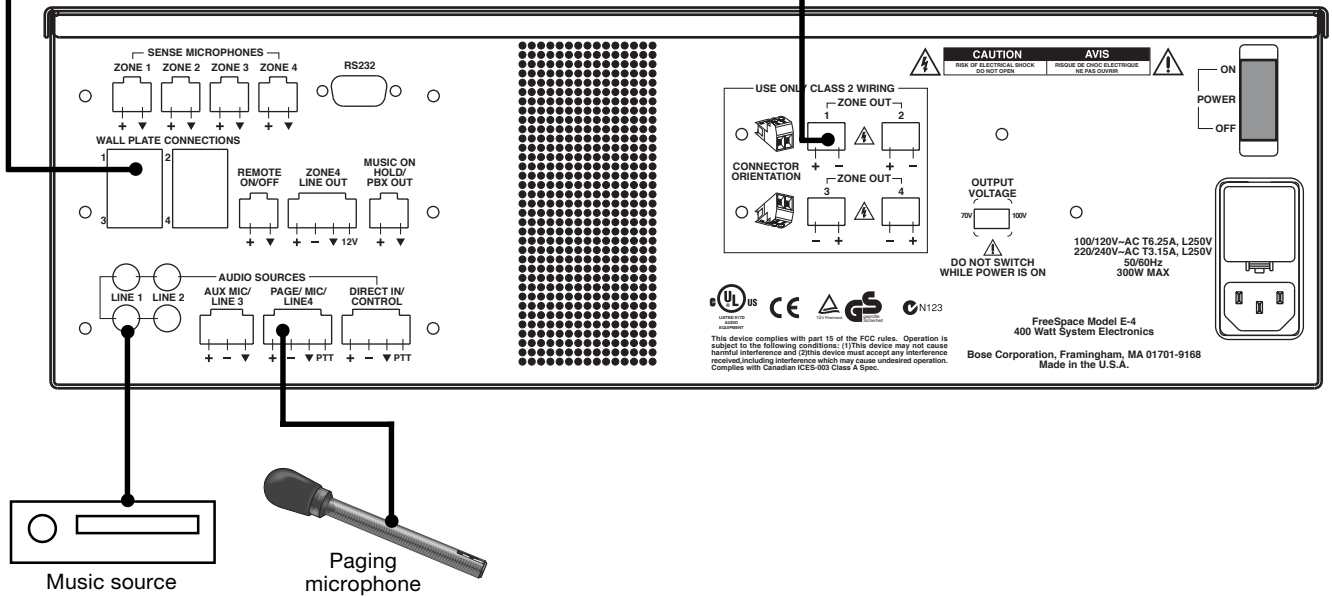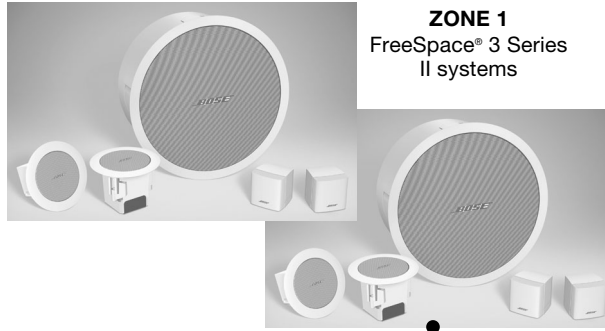
Warranty Information

The FreeSpace E-4 system is covered by a five-year transferable limited warranty.

ZONE 1

Standard User Interface

ZONE 1
FreeSpace® 3 Series II systems

source   volume

1   ▲

2   ▼

3   🔇

BOSE

SENSE MICROPHONES

ZONE 1 ZONE 2 ZONE 3 ZONE 4   RS232

WALL PLATE CONNECTIONS

REMOTE ON/OFF   ZONE4 LINE OUT   MUSIC ON HOLD/ PBX OUT

AUDIO SOURCES

LINE 1   LINE 2   AUX MIC/ LINE 3   PAGE/ MIC/ LINE4   DIRECT IN/ CONTROL

CAUTION — RISK OF ELECTRICAL SHOCK — DO NOT OPEN
AVIS — RISQUE DE CHOC ELECTRIQUE — NE PAS OUVRIR

USE ONLY CLASS 2 WIRING

ZONE OUT 1   2

CONNECTOR ORIENTATION

ZONE OUT 3   4

OUTPUT VOLTAGE 70V 100V

DO NOT SWITCH WHILE POWER IS ON

ON
POWER
OFF

100/120V~AC T6.25A, L250V
220/240V~AC T3.15A, L250V
50/60Hz
300W MAX

This device complies with part 15 of the FCC rules. Operation is subject to the following conditions: (1)This device may not cause harmful interference and (2)this device must accept any interference received,including interference which may cause undesired operation. Complies with Canadian ICES-003 Class A Spec.

FreeSpace Model E-4
400 Watt System Electronics

Bose Corporation, Framingham, MA 01701-9168
Made in the U.S.A.

Music source

Paging microphone

Requires the following connections:

WALL PLATE CONNECTION 1 .... E-4 Standard User Interface

AUDIO SOURCE LINE 1 .... Music Source

PAGE/MIC/LINE 4 .... Paging Microphone

ZONE OUT 1 .... Two FreeSpace 3 Systems

70/100V Four-Zone Configuration Example
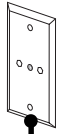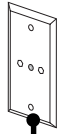
ZONE 1 – Dining Room
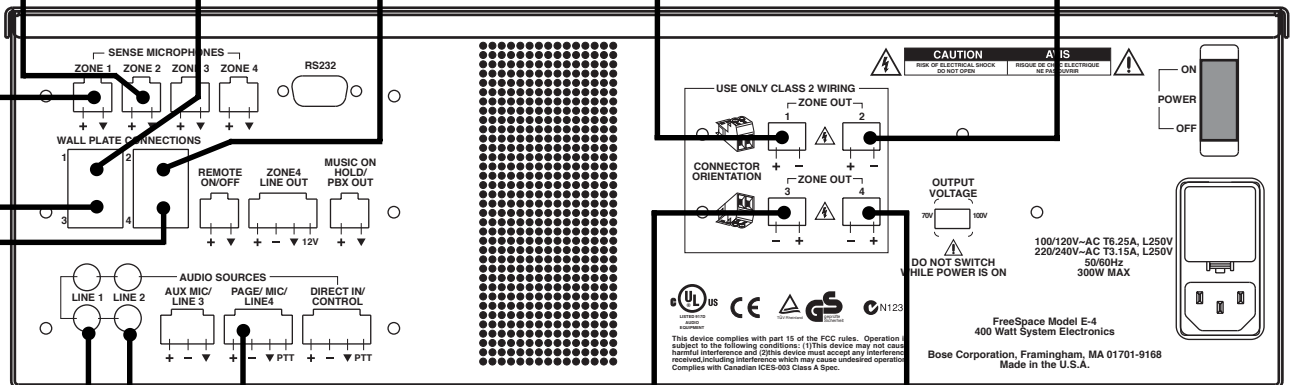
FreeSpace® 3 Series II systems

ZONE 1
Sense Microphone

ZONE 2
Sense Microphone

ZONE 1
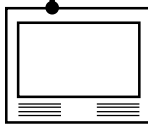Auto Volume User Interface

ZONE 2
Auto Volume User Interface

source | volume
1 | ▲
2 | ▼
3 | ◁▲▽

BOSE

source | volume
1 | ▲
2 | ▼
3 | ◁▲▽

BOSE

ZONE 2 – Bar

FreeSpace® 3 Series II system

SENSE MICROPHONES
ZONE 1 ZONE 2 ZONE 3 ZONE 4   RS232
+ ▼   + ▼   + ▼   + ▼

WALL PLATE CONNECTIONS
1   2

REMOTE   ZONE4   MUSIC ON
ON/OFF   LINE OUT   HOLD/
                           PBX OUT
3   4
+ ▼   + − ▼ 12V   + ▼

AUDIO SOURCES
LINE 1   LINE 2   AUX MIC/   PAGE/ MIC/   DIRECT IN/
                  LINE 3   LINE4   CONTROL
                  + − ▼   + − ▼ PTT   + − ▼ PTT

CAUTION   AVIS
RISK OF ELECTRICAL SHOCK   RISQUE DE CHOC ELECTRIQUE
DO NOT OPEN   NE PAS OUVRIR

USE ONLY CLASS 2 WIRING
ZONE OUT
1   2
+ −   + −
CONNECTOR
ORIENTATION
ZONE OUT
3   4
− +   − +

OUTPUT VOLTAGE
70V   100V

DO NOT SWITCH
WHILE POWER IS ON

ON
POWER
OFF

100/120V~AC T6.25A, L250V
220/240V~AC T3.15A, L250V
50/60Hz
300W MAX

FreeSpace Model E-4
400 Watt System Electronics

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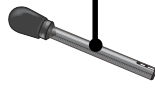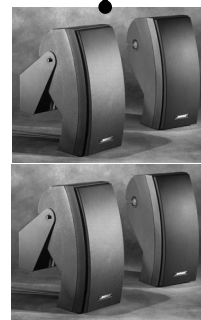Complies with Canadian ICES-003 Class A Spec.

Music source

TV source

Paging microphone

ZONE 3 – Patio
302™A loudspeakers

ZONE 4 – Restroom
Model 16 loudspeakers

source | volume
1 | ▲
2 | ▼
3 | 🔇

BOSE

source | volume
1 | ▲
2 | ▼
3 | 🔇

BOSE

ZONE 3
Standard User Interface

ZONE 4
Standard User Interface

Requires the following connections:

SENSE MICROPHONE 1/2 .... E-4 Auto Volume Mic Kit
AUDIO SOURCE LINE 1 .... Music Source
AUDIO SOURCE LINE 2 .... TV Source
PAGE/MIC/LINE 4 .... Paging Microphone
WALL PLATE CONNECTION 1/2 .... E-4 Auto Volume Interface
WALL PLATE CONNECTION 3/4 .... E-4 Auto Volume Interface
ZONE OUT 1 – Dining Room .... Two FreeSpace 3 Systems
ZONE OUT 2 – Bar .... One FreeSpace 3 System
ZONE OUT 3 – Patio .... Four 302 loudspeakers
ZONE OUT 4 – Restroom .... Two Model 16 loudspeakers

FreeSpace® System *Installer*™ Software

[New Document] - FreeSpace® Installer™ Software

Set Up System — *Service* Hardware

Hardware | Schedule

Bose FreeSpace E-4

LINE 1 → In Gain

LINE 2 → In Gain

AUX → In Gain → EQ

PAGE → In Gain → Page Set Up → EQ

Source Assign → Auto Volume → Dynamic EQ → EQ → Out Gain → ZONE 1

Source Assign → Auto Volume → Dynamic EQ → EQ → Out Gain → ZONE 2

Source Assign → Auto Volume → Dynamic EQ → EQ → Out Gain → ZONE 3

Source Assign → Auto Volume → Dynamic EQ → EQ → Out Gain → ZONE 4

Source Assign → Music On Hold

System Overview — Bose FreeSpace E-4

LINE 1 Input Gain
Type: Line
Mic Power +12V: On / ☑ Off
Gain: 20 … -40
More ▷

Features and Control Settings
(accessible using FreeSpace® system *Installer*™ software):

- Input Gain
- Input Trim EQ
- Source Leveling
- Mic/Line/Page Assignment
- Opti-Voice® paging
- Signal Routing
- Auto Volume
- Scheduling
- Dynamic EQ
- Music on Hold
- Room EQ
- Loudspeaker EQ for Bose® speaker products
- Output Level Control
- System Diagnostics

System requirements for *Installer* software:

- Hardware
  - Minimum 200 MHz Pentium®-based PC (400 MHz recommended)
  - 128MB free RAM (256MB recommended)
  - 16-bit audio sound card
  - 4x CD-ROM
  - 50MB free internal hard disk space
- Operating System(s)
  - Windows 98, Windows NT 4.0, Windows 2000, Windows ME
- Display
  - 800 x 600 resolution, 16-bit color (32-bit color recommended)

For further information, contact Bose Corporation Professional Systems Division. Or visit us on the web at http://pro.bose.com.

The *Installer* software makes it easy to configure the E-4 system, using a Windows PC.

Installer software is a copyrighted application in Sound System Software (S³™software) from Bose. A copy of the *Installer* software is included in the box with each E-4 system.

BOSE®
Better sound through research®