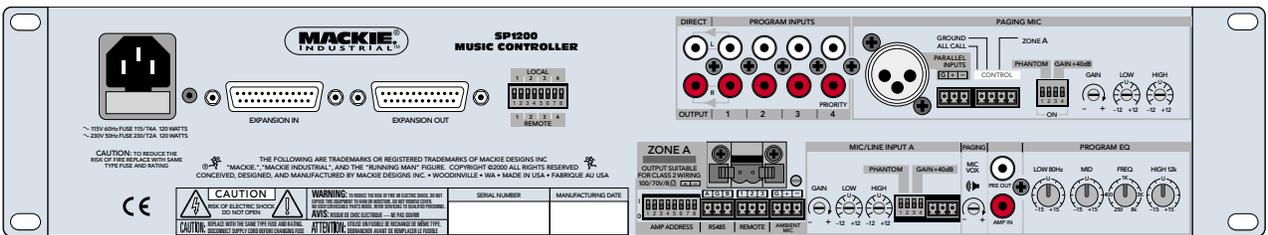# SP1200 SINGLE-CHANNEL PROGRAM CONTROLLER/AMPLIFIER

INSTRUCTION MANUAL

sound palette

CAUTION *AVIS*

**RISK OF ELECTRIC SHOCK
DO NOT OPEN**
*RISQUE DE CHOC ELECTRIQUE
NE PAS OUVRIR*

**CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK)
NO USER-SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED PERSONNEL**

*ATTENTION: POUR EVITER LES RISQUES DE CHOC
ELECTRIQUE, NE PAS ENLEVER LE COUVERCLE. AUCUN
ENTRETIEN DE PIECES INTERIEURES PAR L'USAGER. CONFIER
L'ENTRETIEN AU PERSONNEL QUALIFIE.
AVIS: POUR EVITER LES RISQUES D'INCENDIE OU
D'ELECTROCUTION, N'EXPOSEZ PAS CET ARTICLE
A LA PLUIE OU A L'HUMIDITE*

The lightning flash with arrowhead symbol within an equilateral
triangle is intended to alert the user to the presence of uninsulated
"dangerous voltage" within the product's enclosure, that may be
of sufficient magnitude to constitute a risk of electric shock to persons.
*Le symbole éclair avec point de flèche à l'intérieur d'un triangle
équilatéral est utilisé pour alerter l'utilisateur de la présence à
l'intérieur du coffret de "voltage dangereux" non isolé d'ampleur
suffisante pour constituer un risque d'éléctrocution.*

The exclamation point within an equilateral triangle is intended to
alert the user of the presence of important operating and maintenance
(servicing) instructions in the literature accompanying the appliance.
*Le point d'exclamation à l'intérieur d'un triangle équilatéral est
employé pour alerter les utilisateurs de la présence d'instructions
importantes pour le fonctionnement et l'entretien (service) dans le
livret d'instruction accompagnant l'appareil.*

1. Safety Instructions

1. Read Instructions — Read all the safety and operation instructions before operating the SP1200.

2. Retain Instructions — The safety and operating instructions should be kept for future reference.

3. Heed Warnings — Follow all warnings on the SP1200 and in these operating instructions.

4. Follow Instructions — Follow all operating and other instructions.

5. Water and Moisture — Do not use the SP1200 near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, near a swimming pool, etc.

6. Ventilation — This SP1200 should be situated so that its location or position does not interfere with its proper ventilation. For example, it should not be situated on a bed, sofa, rug, or similar surface that may block any ventilation openings, or placed in a built-in installation such as a bookcase or cabinet that may impede the flow of air through ventilation openings.

7. Heat — Locate the SP1200 away from heat sources such as radiators, or other devices which produce heat.

8. Power Sources — Connect the SP1200 to a power supply only of the type described in these operation instructions or as marked on the rear panel.

9. Power Cord Protection — Route power supply cords so that they are not likely to be walked upon or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit the SP1200.

10. Object and Liquid Entry — Do not drop objects into or spill liquids into the inside of the SP1200.

11. Damage Requiring Service — The SP1200 should be serviced only by qualified service personnel when:

    A. The power-supply cord or the plug has been damaged; or

    B. Objects have fallen, or liquid has spilled into the SP1200; or

    C. The SP1200 has been exposed to rain; or

    D. The SP1200 does not appear to operate normally or exhibits a marked change in performance; or

    E. The SP1200 has been dropped, or its chassis damaged.

12. Servicing — The user should not attempt to service the SP1200 beyond those means described in this operating manual. All other servicing should be referred to the Mackie Service Department.

13. To prevent electric shock, do not use this polarized plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

Pour prévenir les chocs électriques ne pas utiliser cette fiche polariseé avec un prolongateur, un prise de courant ou une autre sortie de courant, sauf si les lames peuvent être insérées à fond sans laisser aucune pariie à découvert.

14. Grounding or Polarization — Precautions should be taken so that the grounding or polarization means of the SP1200 is not defeated.

15. This apparatus does not exceed the Class A/Class B (whichever is applicable) limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

ATTENTION — Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de class A/de class B (selon le cas) prescrites dans le règlement sur le brouillage radioélectrique édicté par les ministere des communications du Canada.

WARNING — To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture.

Table of Contents

2. INTRODUCTION

The SP1200 is a single-channel version of our popular SP2400 dual-channel microprocessor-based music controller. Having a single 200 watt power amplifier, it's designed for use in a variety of installations requiring high performance, flexible features, and ease of use. Examples of such installations are retail stores, restaurants, bars, and theme venues. The SP1200 provides one output that can be used for single-zone coverage. Four stereo line-level inputs are provided on the rear panel, along with a paging mic input and two local mic/line inputs.

The program input sources can be independently assigned to the zone with the Input Select buttons on the front panel. The boxes under the Input Select buttons are sized to accept Brother P-Touch® labels. Each of the four inputs has an integral AGC circuit to automatically compensate for level differences between the input sources. Input 1 has a buffered line-level output that may be used for music-on-hold or other external applications. Program Priority can be assigned to Input 4 for use with a jukebox or alternative paging configurations. When a signal is detected at Input 4 with priority activated, it overrides any other program source assigned to that channel or zone.

Each of the four input sources can be either stereo or mono, although output from the SP1200 is a combined mono signal of both left and right inputs. The zone has a 3-band program EQ with sweepable mid for tuning the four program sources.

Each mic input has a 40 dB gain switch for use with either mic or line-level signals as well as a variable gain trim, phantom power switch, and a two-band EQ.

In addition, the zone has a variable **VOX** control for adjusting the trigger threshold of the paging mic's ducking circuit. The paging mic operates in the zone when voice-activated. However, it can be assigned to operate over the entire system when manually operated with a switch connected to the **PAGING MIC CONTROL** connector.

The zone is equipped with an input for an optional ambient microphone that can sample the ambient noise level in the room. The microprocessor then adjusts the paging mic gain in the zone to compensate for increased or decreased noise levels. This way the paging mic is always audible above the background noise.

The Master Volume Up/Down buttons adjust the overall level that is routed to the **PRE OUT** connector (and the **AMP IN** connector when the jumper is installed). Internal jumpers are provided for configuring the amplifier outputs for 70V, 100V, or 8-ohm operation.

Audio expansion connectors are provided on the rear panel for connecting multiple SP1200s, with shared audio via balanced busing. Each of the four program input signals are internally balanced and can be independently assigned to the balanced bus with internal assignment switches. The **LOCAL/ REMOTE** switches on the rear panel are provided for selecting either local or bus operation for each input. The paging mic and paging control signal are also carried over the expansion bus.

A wired remote control is available that can be used to select input sources and adjust volume levels for the zone. The amplifier can be programmed with a unique address, and two amplifiers with the same address can be controlled by a single remote when interconnected by means of the RS485 port. The remote control fits into a double-gang electrical box with a Decora®-style faceplate.

In addition, the RS485 port can interface with third-party control systems, or a PC-compatible computer loaded with the SPLinker software application for computer control of up to 32 zones in a system.

An internal option slot is provided for installing an optional DSP card (SP-DSP1). It provides additional ambient noise sensing for the Program Inputs using the optional ambient microphone. As the noise level in the room increases, the gain on the selected source gradually increases to keep the music audible above the background noise.

An RS232 port (**COMM PORT**) is provided on the front panel for connecting a Palm™ Handheld or PC-compatible laptop computer for configuring the optional DSP card.

KEY FEATURES

- Single Channel Controller/Amplifier
- 4 Stereo, Line-Level Program Inputs
- 1 Page Mic Input
- 1 Local Mic Input
- Digital Cross-Fade between Input Sources
- 200 Watts at 70V and 100V
- 200 Watts at 8 Ohms
- Transformerless Amplifier Output
- Ambient Noise Sensing for Page Mic
- AGC for Music Sources
- 3-Band Sweepable EQ for Music Sources
- 2-Band EQ on each Mic Input
- Multiple-Zone or Mono Operation
- Each Zone Addressable (0-31)
- REMOTE connection for optional Remote Control
- RS485 Port for Third-Party Control Systems

Front Panel Features

① INPUTS select buttons are used to choose the program source for the zone. Only one source may be selected at a time. These are non-priority inputs. However, Input 4 can become a Program Priority Input by setting the AMP ADDRESS ㉑ switch #7 UP. In this mode, when a signal is present on Input 4, it automatically overrides whatever input source is selected for that zone. This is useful for jukeboxes or alternative paging configurations.

INPUT OFF deselects Inputs 1-4 and activates the MIC/LINE INPUT ⑱ .

MASTER VOLUME is used to adjust the overall volume level for Inputs 1-4.

When OFF is selected, the Up/Down MASTER VOLUME buttons adjust the output level for the MIC/LINE INPUT ⑱ . The Master Volume setting for Inputs 1-4 is retained in memory, and is recalled when a program source is selected.

The Meter indicates the level at the PRE OUT jack. Normally, it operates as a peak program meter (PPM). When adjusting the MASTER VOLUME level, the meter changes from level indication to level setting indication. After five seconds, the meters switch back to normal peak program metering.

There are two STATUS indicators. The OVERLOAD LED indicates when the amplifier is beginning to current limit. The ON LED indicates when the SP1200 is operating.

The COMM PORT is used to connect to the optional DSP card with a Palm™ Handheld or PC-compatible laptop computer for configuration.

Turning the POWER switch on activates the soft-start circuit in the power supply. The soft-start circuit impedes in-rush current from the AC supply.

Rear Panel Features

PROGRAM INPUTS 1-4 are stereo RCA unbalanced inputs that accept line-level signals. The LOCAL/REMOTE ㉕ switches on the rear panel select either the local program input signal connected here or the program signal on the expansion bus. See "EXPANSION IN/OUT" on page 18 for more information.

Note: The SP1200 combines the left and right input signals into mono after the expansion bus I/O.

DIRECT OUTPUT is a buffered line-level output providing the stereo signal from the program source connected to INPUT 1. Signal is always present at the DIRECT OUTPUT, regardless of whether INPUT 1 is selected as the source. This is useful for music-on-hold and other external applications.

⑩ PAGING MIC is the connection for the paging microphone. There are two connectors available: a 3-pin XLR and a 3-pin Phoenix-type connector. In both cases, pin 1 is ground, pin 2 is signal high (+), and pin 3 is signal low (–).

⑪ CONTROL is a Phoenix-type connector for connecting external normally-open switches for remote paging. Two options are available: page to Zone A, and page to the entire system (ALL CALL). Connect the switches between GROUND and the option of choice.

⑫ PHANTOM applies phantom power (+24V DC) to pins 2 and 3 of the microphone input. Move both switches to the down position to turn on phantom power.

⑬ The GAIN +40 dB DIP switch is used to set the gain for use with either a mic-level or a line-level signal. Move both switches to the down position for mic-level signals, and up for line-level signals.

⑭ The GAIN variable control is used to trim the mic preamp gain for the best signal-to-noise ratio.

⑮ The LOW variable control is a shelving filter that provides 12 dB of boost and cut below 100Hz.

⑯ The HIGH variable control is a shelving filter that provides 12 dB of boost and cut above 12kHz.

17 The **PAGING MIC VOX** variable control adjusts the ducking threshold for the paging mic. Rotate the control clockwise to reduce the threshold. Rotate the control counterclockwise to increase the threshold.

18 **MIC/LINE INPUT** is provided to connect a local microphone. This is a 3-pin Phoenix-type connector where pin 1 is ground, pin 2 is signal high (+), and pin 3 is signal low (–).

19 **AMBIENT MIC** is a 3-pin Phoenix-type connector used to connect the optional MT-3100 ambient microphone. This microphone is used to detect the ambient noise level in the room. The microprocessor uses this information to adjust the paging mic level above the ambient noise. The ambient mic also provides an input for the optional DSP card when it is installed.

20 **EQ** is a 3-band equalizer with a sweepable midrange that only affects Inputs 1-4. **LOW** is a shelving filter that provides 15 dB of boost and cut below 80Hz. **MID** is a peaking filter that provides 15 dB of boost and cut at the selected frequency between 250Hz and 8kHz. **HIGH** is a shelving filter that provides 15 dB of boost and cut above 12kHz.

21 **AMP ADDRESS** is used to assign a unique address to the amplifier, as well as to enable or disable features. Switches 1-5 provide 32 separate addresses, switch 6 determines Master/Slave status, switch 7 enables Input 4 Priority, and switch 8 enables the optional ambient mic. Any two amplifiers assigned to the same address can be controlled by a single remote control when connected together via the RS485 ports.

22 **RS485** is a 3-pin Phoenix-type connector in the zone that provides an interface for the SPLinker Sound Palette Control PC application software for centralized computer control of up to 32 zones, as well as communication between SP1200s and SP2400s.

When two SP1200s are linked via their RS485 connectors and assigned the same AMP ADDRESS (switches 1-5), the front panel controls and remote controls operate both amplifiers.

23 **REMOTE** is a 3-pin Phoenix-type connector for the optional wired remote control (SP-41R), which provides Input Select and Master Volume control.

24 **EXPANSION IN/OUT** consists of two parallel 25-pin D-Sub connectors for connecting multiple SP1200s and SP2400s together in a serial fashion. Any of the four program sources from any SP1200 and SP2400 can be used as the source for any of the zones in the system by assigning it to the expansion bus with the internal Bus Assign switches. This is a balanced bus for the four stereo input sources. In addition, the paging mic and paging control signal are also provided on the **EXPANSION** bus.
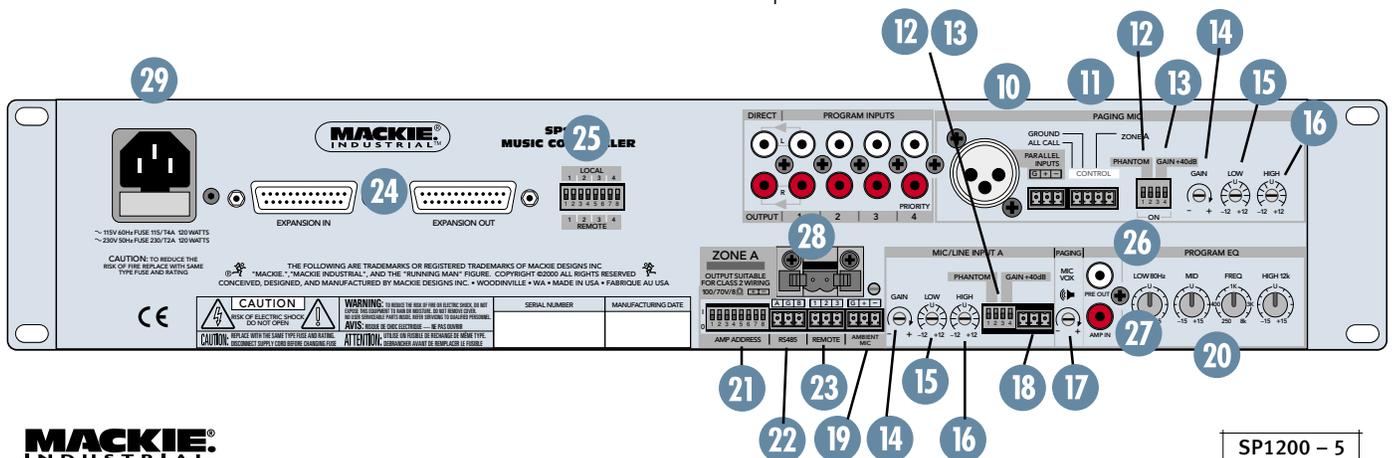
25 **LOCAL/REMOTE** is a set of eight DIP switches used to select the input source for each input. Each program input has two switches, one to select the left signal source (odd-numbered switches) and one to select the right signal source (even-numbered switches). Move the switches up to select the local program source, and down to select the remote (external) program source from the **EXPANSION** bus.

26 **PRE OUT** is an unbalanced RCA jack that provides a line-level signal from the preamplifier stage of the SP1200. This provides a method for inserting an external signal processor into the signal chain prior to the amplifier stage. The U-shaped jumper wire should remain installed between the **PRE OUT** and **AMP IN** jacks for normal operation.

27 **AMP IN** is an unbalanced RCA jack that accepts a line-level signal. See **PRE OUT** above.

28 **ZONE A OUTPUT** is a 2-pin Phoenix-type connector that provides speaker-level signals. *The SP1200 is shipped with the outputs configured for 70-volt operation in U.S. versions, and 100-volt operation in European versions.* Internal jumpers are provided to configure the amplifier for 8 ohm systems as well. See page 14 for more information.
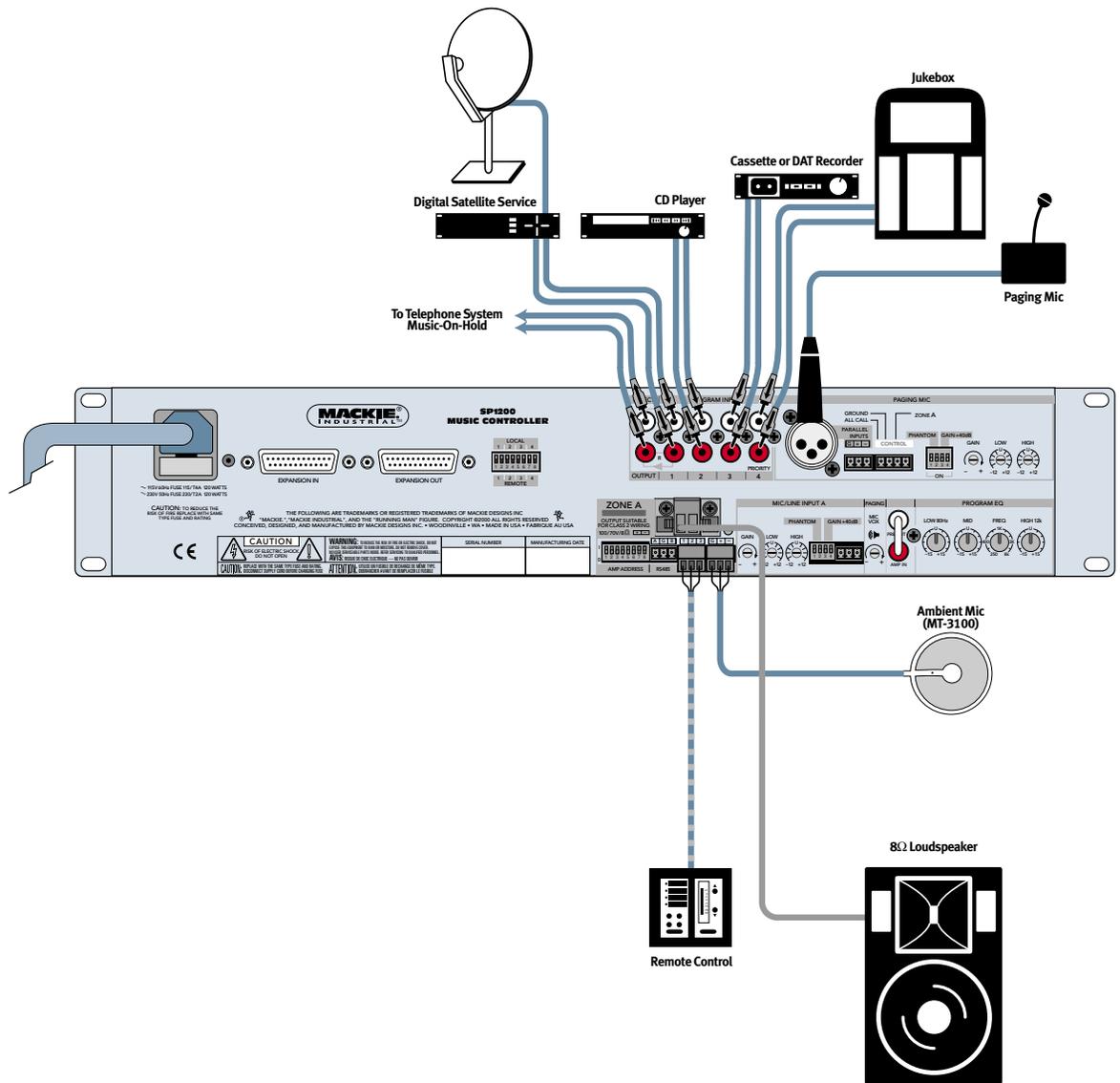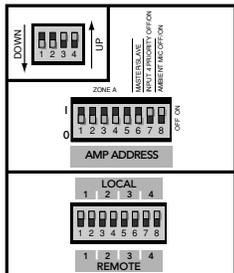
29 Connect the supplied AC linecord to the IEC AC Socket. The AC line fuse is contained in the socket, behind the cover located at the bottom of the socket. Use replacement fuses only as indicated on the rear panel.

3. INSTALLATION

APPLICATION DIAGRAMS

SP1200 SWITCH SETTINGS

Digital Satellite Service

CD Player

Cassette or DAT Recorder

Jukebox

Paging Mic

To Telephone System
Music-On-Hold

Ambient Mic
(MT-3100)

8Ω Loudspeaker

Remote Control


Note: This illustration demonstrates a typical monaural application using a single SP1200. Input 4 Priority is turned on to allow the Jukebox to override the other Program Inputs, and the optional ambient microphone allows the SP1200 to adjust the paging microphone volume to changing ambient noise levels.
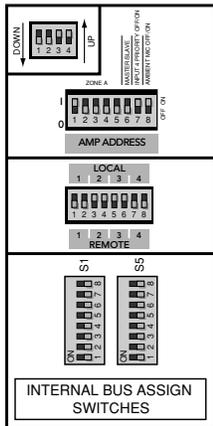

A: TYPICAL MONAURAL APPLICATION

SP1200 SWITCH SETTINGS

INTERNAL BUS ASSIGN SWITCHES
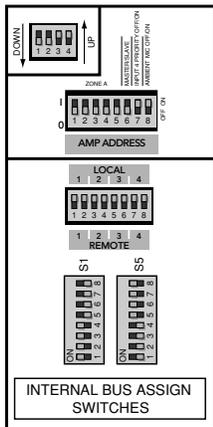
Note: See CAUTION under "Bus Assign" on page 13.

SP1200 SWITCH SETTINGS

INTERNAL BUS ASSIGN SWITCHES

Note: See CAUTION under "Bus Assign" on page 13.
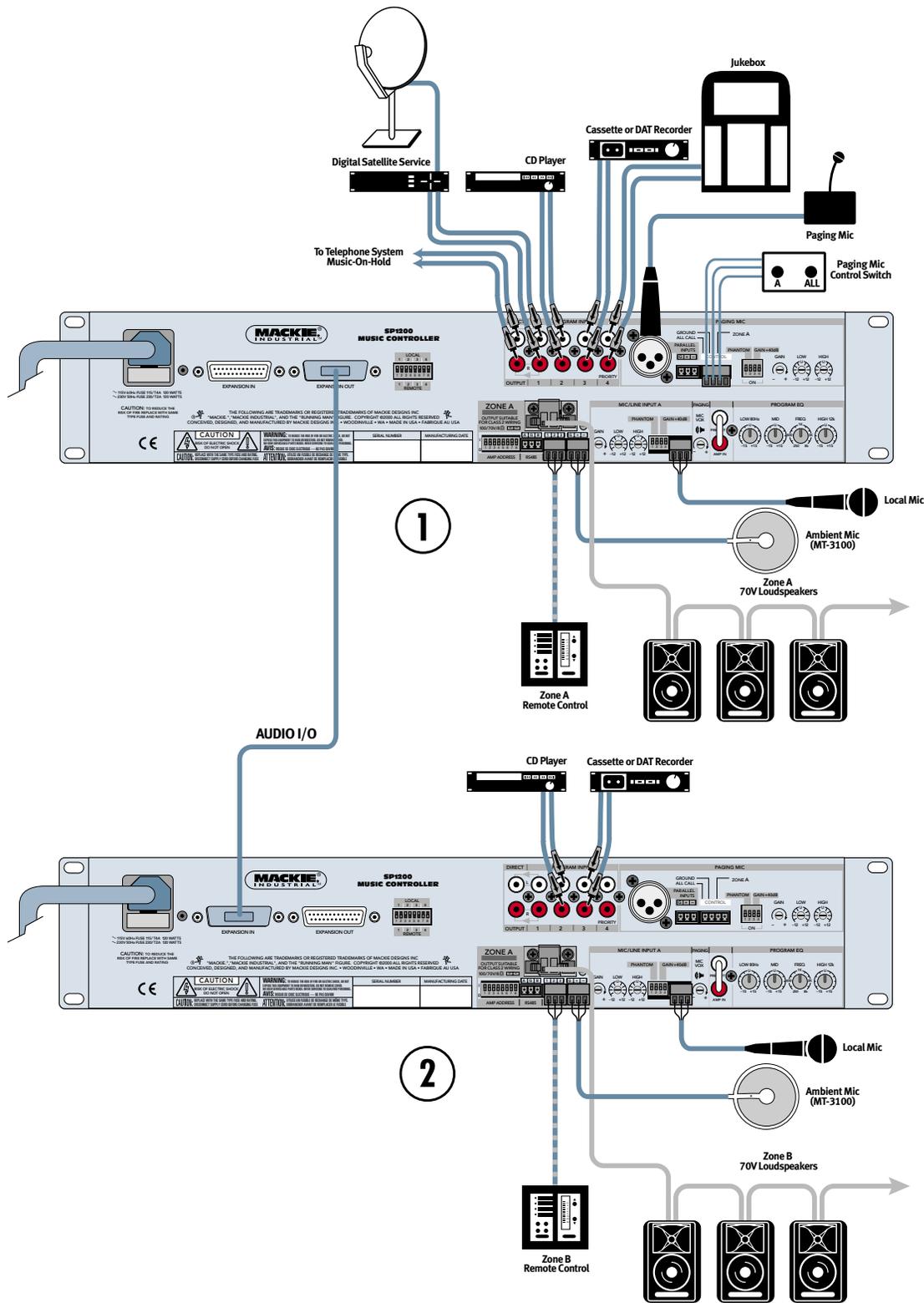
Note: This application uses the Expansion Bus to share audio sources between two SP1200s. The Digital Satellite Service (Input 1) and the Jukebox (Input 4) connected to Unit 1 are assigned to the Expansion Bus with the internal Bus Assign switches (on the Input Board). On Unit 2, Inputs 1 and 4 are set to the REMOTE setting, and Inputs 2 and 3 are set to the LOCAL setting.

B: MULTIPLE SP1200S—MULTIPLE ZONES—SHARED SOURCES

Digital Satellite Service

CD Player

Cassette or DAT Recorder

Jukebox

Paging Mic

Zone A Remote Control

Zone A Remote Control

Local Mic

Zone A 70V Loudspeakers

SP1200 SWITCH SETTINGS

DOWN / UP

ZONE A

AMP ADDRESS

LOCAL
1   2   3   4
1 2 3 4 5 6 7 8

1   2   3   4
REMOTE

S1   S5

INTERNAL BUS ASSIGN SWITCHES

Note: See CAUTION under "Bus Assign" on page 13.
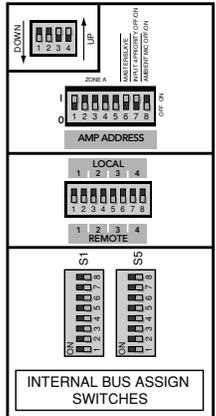
MACKIE INDUSTRIAL

SP1200 MUSIC CONTROLLER

①

②

Zone B 70V Loudspeakers

Zone B Remote Control

Zone B Remote Control

Note: This application makes the Local Mic/Line Input available to both Zones A and B. When the OFF button is pressed, the Local Mic is heard in both zones. When Inputs 1-4 are pressed, the selected input is heard in both zones. Zones A and B are assigned the same AMP ADDRESS, and connecting the RS485 terminals between the two zones allows the front panel buttons and the remote controls to affect both zones.

C: Expansion with Local Mic

MACKIE INDUSTRIAL
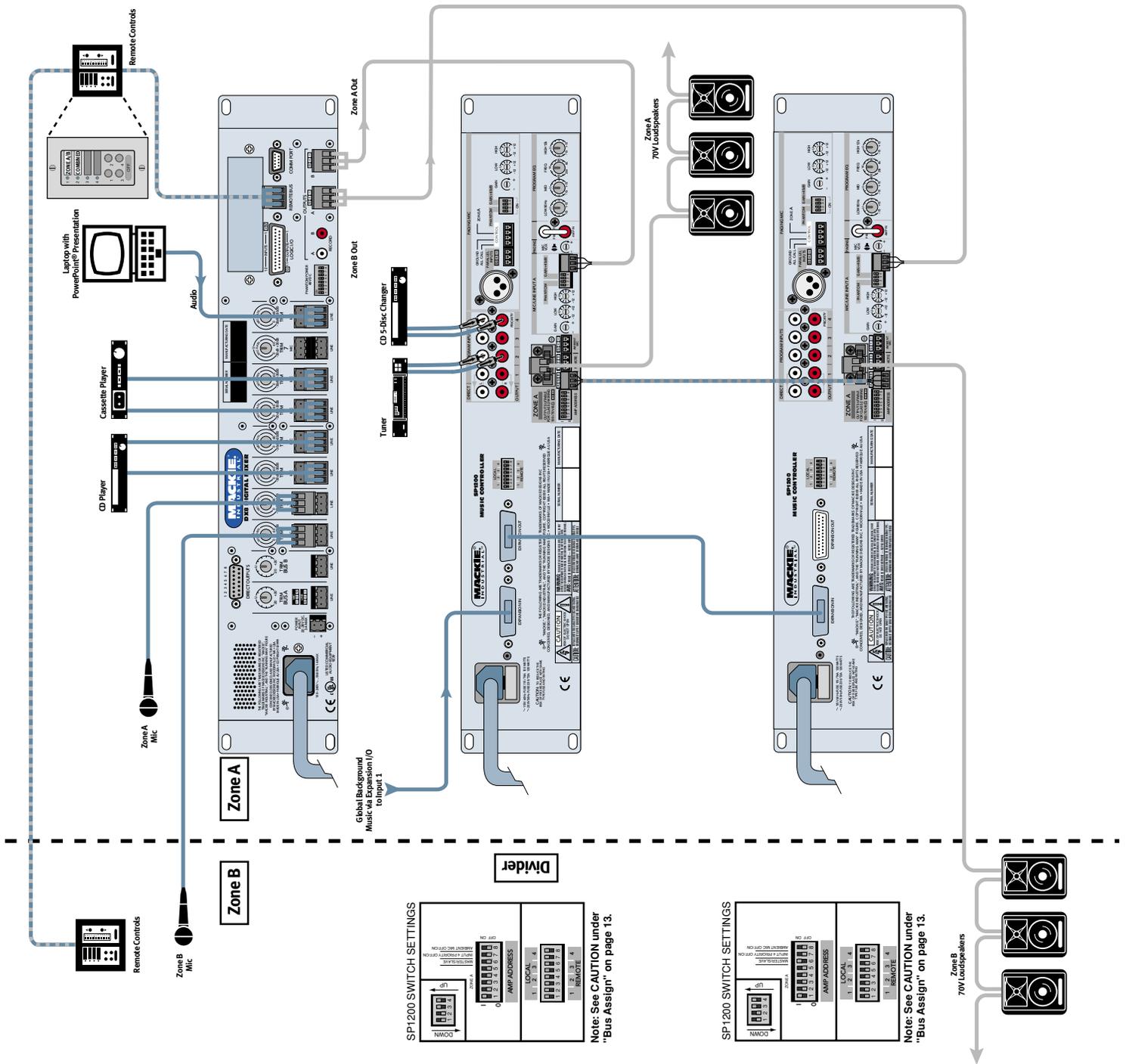
Note: This application provides independent source selection for each zone, or common input source selection for both zones (room combining). Both DX8 Selection Remote Controls are used to select Presets 1 and 2.

For example, Preset 1 might route the CD Player and the Zone A microphone to Zone A, and the Cassette Player and the Zone B microphone to Zone B, to be used when the divider is in place between the two zones. Preset 2 might route both microphones and the audio signal from the laptop to both Zones A and B, to be used when the divider is removed between the two zones.

Each zone on both SP1200s are assigned the same AMP ADDRESS, so when "OFF" is selected on one SP1200, the DX8 signal at the Mic/Line Input is routed to the SP1200 outputs. The local input sources (Tuner and CD 5-Disc Changer) or the Global Background Music via the Expansion I/O can be routed to the SP1200 outputs by selecting 1, 2, or 4 on the SP1200 front panel.

D: ROOM COMBINING—ZONES

APPLICATIONS

A: TYPICAL MONO APPLICATION

This diagram depicts a typical setup, using the SP1200 in a mono application. A Digital Satellite Service (DSS) is connected to Input 1, which also serves as the music-on-hold for the telephone system. A CD player and cassette deck are connected to Inputs 2 and 3 for general purpose music playback. A jukebox is connected to Input 4, which is configured for priority playback via AMP ADDRESS switch #7.

An ambient mic is connected to provide paging level compensation for varying ambient noise levels in the room. This amplifier has been configured for 8-ohm operation.

B: MULTIPLE SP1200s: MULTIPLE ZONES

In this example, two SP1200s are used in a system with two separate zones configured for 70V operation (default configuration for U.S. versions). Four program sources are connected to Unit 1. Of these, only the DSS and Jukebox signals are shared with Unit 2 by means of the Expansion Bus. Inputs 1 and 4 are assigned to the Expansion Bus via the internal Bus Assign switches. Both units have sources connected to Inputs 2 and 3 that are exclusive and not shared between units. Each unit/zone has a different AMP ADDRESS assigned, and each remote control exclusively operates its own zone.

The Paging Mic can be manually operated with the Paging Mic Control Switch, and the Paging Mic and ALL CALL control signal is transferred to Unit 2 via the Expansion bus.

Each ambient mic and local mic operates independently in its own zones.

C: MULTIPLE SP1200s, MULTIPLE ZONES: EXPANSION WITH LOCAL MIC

This example shows how to share the Local Mic/Line input with another zone, along with the remote Expansion Bus signals.

Zone A and Zone B are assigned the same AMP ADDRESS, with Zone A assigned Master status and Zone B assigned Slave status via AMP ADDRESS switch #6. This allows the front panel buttons for both zones, and all the remote controls, to operate both zones simultaneously.

When an input is selected, it is heard in both zones because Zone A is set to LOCAL input source, and Zone B is set to REMOTE input source over the Expansion Bus. When OFF is pressed, the Local Mic connected to Zone A is heard in both zones because the PRE OUT from Zone A is connected to the MIC/LINE input on Zone B.

D: MULTIPLE SP1200s, MULTIPLE ZONES: ROOM COMBINING—ZONES

In this example, a dividing wall can be extended to divide the room into two. The Mackie Industrial DX8 is used to route independent source selections to each zone (Preset 1 on the Remote Controls), or common input source selections for both zones (Preset 2 on the Remote Controls).

For example, Preset 1 might route the CD Player and the Zone A microphone to Zone A, and the Cassette Player and the Zone B microphone to Zone B, to be used when the divider is in place between the two zones. Preset 2 might route both microphones and the audio signal from the laptop to both Zones A and B, to be used when the divider is removed between the two zones.

Both zones are assigned the same AMP ADDRESS, so when "OFF" is selected on either SP1200, the DX8 signal at the Mic/Line Input is routed to both SP1200 outputs. The local input sources (Tuner and CD 5-Disc Changer) or the Global Background Music via the Expansion I/O can be routed to the SP1200 outputs by selecting 1 (global remote), 2 (tuner), or 4 (CD) on the SP1200 front panel.

TIPS ON INSTALLING AND USING THE SP1200—PLAN AHEAD!

The key to any successful installation is planning your system well in advance. Know which components are going to be used in the system, their locations, and how they will interface with each other. Plan the wire routing and AC power requirements.

Here are some steps to follow to help insure a smooth installation of the SP1200:

1. *How many zones require coverage in the system?* This will determine how many SP1200s you need in the system.

2. *How many program sources are going to be used?* If the number of program sources is four or less, they can be centralized at one SP1200 and distributed via the Expansion Bus. If there are more than four program sources, they must be distributed among the SP1200s. Determine the number and location of the program sources that are going to be used.

Determine which program sources are going to be used for each zone, and set the LOCAL/REMOTE and internal BUS ASSIGN switches appropriately.

MACKIE.
INDUSTRIAL

CAUTION: When using multiple SP1200s that use the expansion bus, these switch settings *must* be unique to each unit or you can damage your SP1200(s). **Never** assign more than one program source to the same channel on the Expansion Bus.

If there is a requirement for music-on-hold, use Input 1 for the continuous music source (i.e., satellite feed, prerecorded background music, multi-disc CD player). Then use the DIRECT OUTPUT jacks to route the signal to the telephone system.

If there is a jukebox or other device that needs priority, use Input 4 in Program Priority mode (set the AMP ADDRESS switch #7 UP to activate). When a signal appears at Input 4 it overrides the selected Input source.

Using a chart similar to the one below can be very helpful in organizing the various components of the system:

Zone \ Source	SAT	CD	Cassette	Tuner	Jukebox				
A	X	X	X	X	X				
B	X	X	X	X	X				
C		X	X		X				
D	X	X			X				
E		X	X	X					
F	X	X	X		X				
G	X	X		X					

3. *Is there a paging microphone? Is there a requirement for a local microphone for a guest speaker?* You must decide where the microphones are going to be located. Avoid placing a microphone near a speaker, to increase gain before feedback. If the mics require phantom power, set the PHANTOM power switches to the down position (ON) for the Paging Mic and Mic/Line Inputs. Make sure the GAIN +40 dB switch is set to the down position as well (+40).

Note: The Paging Mic has priority over the system, including Input 4.

4. *Is there a manual switch for paging?* Up to two switches can be connected to the SP1200 PAGING MIC CONTROL to manually engage the paging microphone. Otherwise, the paging mic can be voice-activated. Adjust the VOX control as described on page 19.

CONNECTIONS

CONNECTING THE PROGRAM SOURCES

All four Program Inputs use unbalanced RCA connectors. They accept line-level signals (–10 dBV). Each of the Program Inputs is equipped with an AGC circuit instead of input trim controls. These circuits automatically adjust the gain for the best signal-to-noise ratio according to the strength of the input signal. It also ensures that the relative volume level remains the same when switching between input sources.

Use high-quality, two-conductor shielded cable to make these connections.

CONNECTING THE MICROPHONES

If using the XLR input for the paging microphone, wire it per AES standard where pin 1 is ground (shield), pin 2 is signal high (+), and pin 3 is signal low (–). If using the Phoenix-type connector, strip the wire back about 1/4" inch. Then insert the wire as far as it will go into the appropriate hole in the connector, and tighten down the screw with a small slot-head screwdriver. It is recommended that you use 20 or 22 gauge wire with the Phoenix-type connectors, where pin 1 (the left-most pin) is ground (shield), pin 2 is signal high (+), and pin 3 is signal low (–).

The MIC/LINE INPUT A is for a local microphone. This is a Phoenix-type connector, and is wired as described in the previous paragraph for the paging microphone.

All microphone inputs are equipped with a pad switch for use with line-level signals. When connecting a line-level signal to these inputs, make sure the GAIN +40 dB switches (and the PHANTOM switches) are in the up (OFF) position.

CONNECTING THE SPEAKERS

The speaker output connector is a two-conductor Phoenix-type, with a position-locking mechanism. Use 16 or 18 gauge wire for connecting the amplifier outputs to the speakers. If the amplifier output is configured for 8-ohm operation, connect the speakers' output directly to an 8-ohm load. The amplifier will deliver up to 200 watts. If the amplifier is configured for either 70V or 100V operation, connect the speaker output directly to the distributed system. No output transformer is required. Make sure that the taps on the speakers add up to 200 watts or less per amplifier for 70V or 100V systems.

CONNECTING THE EXPANSION BUS

These are 25-pin D-Sub connectors (DB25F). The two connectors are wired in parallel, so it doesn't matter which one you use as an input or output. The signals on the EXPANSION IN/OUT are balanced so they can be transmitted down long lines. The limiting factor is the capacitance of the cable, which causes the higher frequencies to roll-off as the capacitance increases (see chart below). The chart indicates the lengths of cable at which the high-frequencies are 1 dB down and 3 dB down, using cable rated at 20pf/ft and 30pf/ft.

Use shielded twisted pairs for the EXPANSION cable to ensure the best rejection of external noise (EMI and RFI).

Maximum Feet of Cable vs. High-Frequency Roll-Off

Distance Chart for SP1200 Expansion Bus Cable
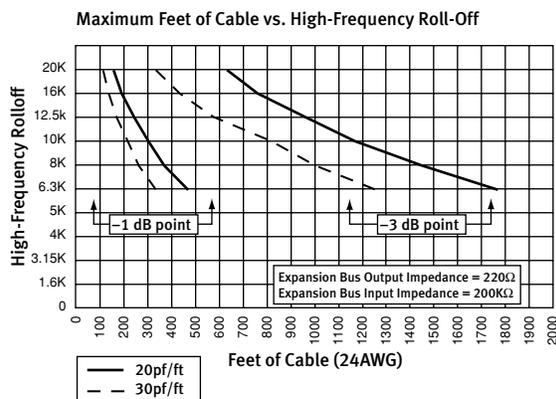
For local interconnection of the Expansion Bus, the use of standard computer cable with an overall shield is acceptable, such as Belkin Pro Series 25-Conductor Straight-Through Cable Assembly (Part Number F3D111-06) or equivalent. Ensure that the cable is wired straight-through and terminated to DB25M connectors on each end.

Note: The use of ribbon cable is permissible for these connections, only where the total length of each cable is 12" (30cm) or less.
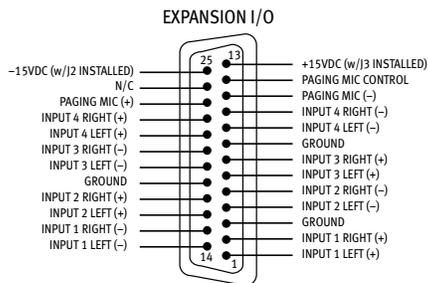
Signal	Pin No.
Input 1 Left (+)	Pin 1
Input 1 Left (–)	Pin 14
Input 1 Right (+)	Pin 2
Input 1 Right (–)	Pin 15
Ground	Pin 3
Input 2 Left (+)	Pin 16
Input 2 Left (–)	Pin 4
Input 2 Right (+)	Pin 17
Input 2 Right (–)	Pin 5
Ground	Pin 18
Input 3 Left (+)	Pin 6
Input 3 Left (–)	Pin 19
Input 3 Right (+)	Pin 7
Input 3 Right (–)	Pin 20
Ground	Pin 8
Input 4 Left (+)	Pin 21
Input 4 Left (–)	Pin 9
Input 4 Right (+)	Pin 22
Input 4 Right (–)	Pin 10
Paging Mic (+)	Pin 23
Paging Mic (–)	Pin 11
N/C	Pin 24
Paging Mic Control	Pin 12
–15VDC (w/J2 Installed)	Pin 25
+15VDC (w/J3 Installed)	Pin 13

Note: There is a 0.5 amp limit on the ±15VDC supply.

Expansion Bus Connection Chart

CONNECTING THE REMOTE BUS

This is a 3-pin Phoenix-type connector specifically for connecting the optional remote control. Use a high-quality three-conductor shielded cable to make this connection, such as Belden 8451, 9451, or equivalent. The lower the nominal capacitance of the wire, the more distance you can have between the remote control and the SP1200 before suffering transmission losses.

Strip the wire back about 1/4 inch, insert the wire as far as it will go into the appropriate hole in the supplied Phoenix-type connector, and tighten down the screw with a small slot-head screwdriver. It is recommended that you use 18 to 24 gauge wire for the remote control connections, depending on the distance between the SP1200 and the remote control.

The REMOTE connector is wired as follows:
Pin 1 = Ground (Shield)
Pin 2 = Data + (with +24V DC power)
Pin 3 = Data – (with +24V DC power)

Note: See the instructions with the remote control for more information.

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Connecting the RS485 Serial Port

This is a 3-pin Phoenix-type connector that follows standard RS485 protocol. Select either a data-grade shielded twisted pair cable or a standard 3-conductor microphone cable for this connection.

The **RS485** port is wired as follows:

Pin 1 = A (non-inverting I/O)
Pin 2 = G (Ground)
Pin 3 = B (inverting I/O)

The SPLinker Sound Palette Control PC application uses the **RS485** serial port to connect between a computer and the SP1200. Connect the PC RS485 port to the first SP1200, and then inter-connect up to two SP1200s in the system using their **RS485** connections.

Note: It may be necessary to install an RS485 interface card in the PC, or to use an RS232 to RS485 converter.

Two SP1200s can be connected together for stereo operation (each SP1200 assigned the same **AMP ADDRESS**, with one assigned Master, and the other Slave).
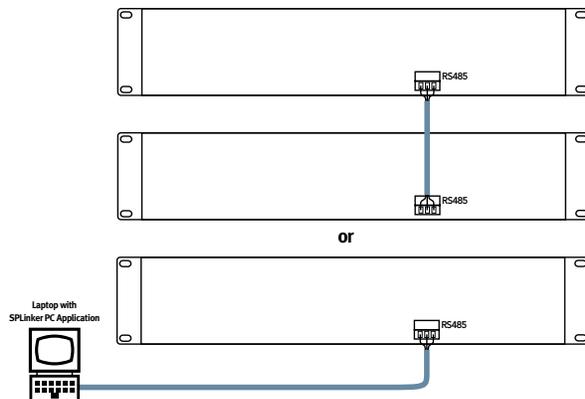
Internal Settings

Note: There are several settings that can be changed inside the SP1200. These settings should be made prior to installing the SP1200.

CAUTION: These servicing instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel. *Make sure the power is off and the power cord disconnected* before removing the top cover to gain access to the inside of the SP1200.

Bus Assign

There are two 8-position DIP switches on the Input Board that allow you to assign a Program Input source to the balanced expansion bus. Each

Program Input Source has four corresponding switches: Left (+), Left (–), Right (+), and Right (–). Typically, you would move all four switches either down (off) or up (on to assign to expansion bus).

Note: These DIP switches can be accessed without removing the cover of the unit. A flathead screwdriver at least 2" (50.8 mm) long, and no larger in diameter than 1/8" (3.175 mm) is required. See illustration below.

CAUTION: When using multiple SP1200s that use the expansion bus, these switch settings *must* be unique to each unit or you can damage your SP1200(s). **Never** assign more than one program source to the same channel on the Expansion Bus.
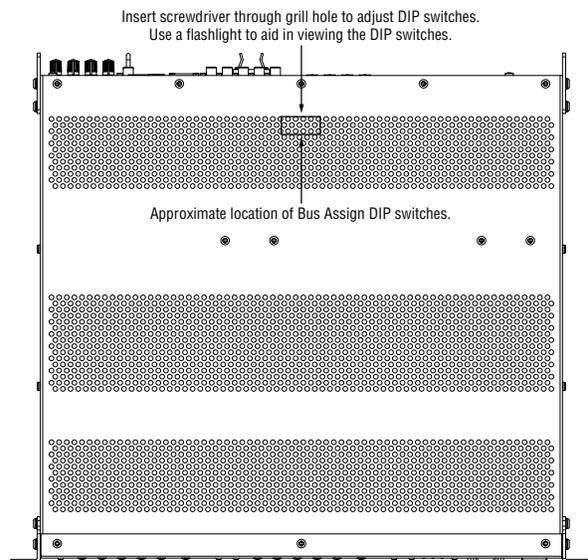
Bus Assign DIP Switch Location
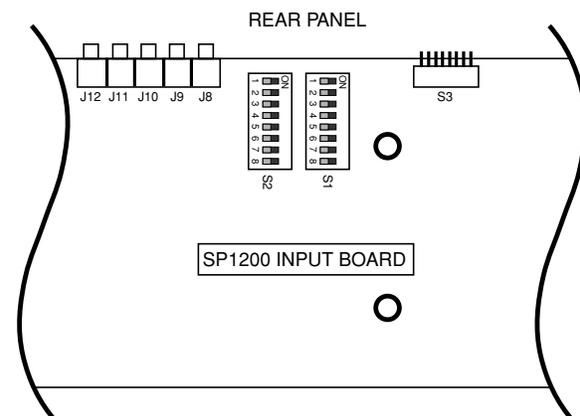
| Signal	Switch No.	Signal	Switch No.
Input 1 Left (+)	S1-1	Input 3 Left (+)	S2-1
Input 1 Left (–)	S1-2	Input 3 Left (–)	S2-2
Input 1 Right (+)	S1-3	Input 3 Right (+)	S2-3
Input 1 Right (–)	S1-4	Input 3 Right (–)	S2-4
Input 2 Left (+)	S1-5	Input 4 Left (+)	S2-5
Input 2 Left (–)	S1-6	Input 4 Left (–)	S2-6
Input 2 Right (+)	S1-7	Input 4 Right (+)	S2-7
Input 2 Right (–)	S1-8	Input 4 Right (–)	S2-8

Bus Assign Switch Chart

EQ BYPASS

Jumper J6, located on each Filter Board, allows you to bypass the 3-band EQ for the four Program Inputs.

Jumper pins 1 and 2 to bypass the EQ.
Jumper pins 2 and 3 to engage the EQ (default).

Note: The top Input Board must be removed in order to access Jumper J6 on the Filter Board.

EQ Bypass Internal Jumper
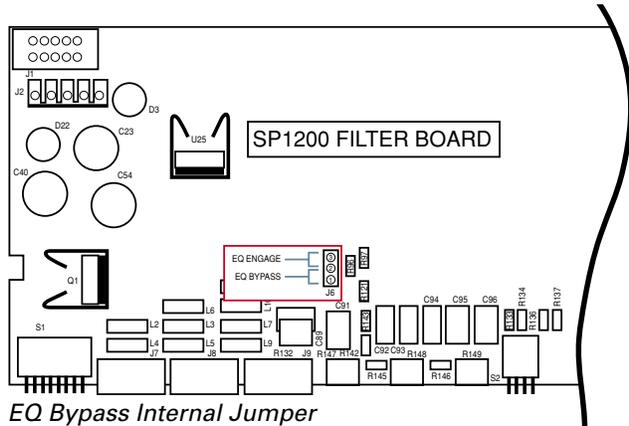
70V/100V/8 OHM SETTINGS

There are several jumpers on the Amplifier Board that are used to configure the amplifiers for use with a 70V distributed system, a 100V distributed system, or an 8-ohm load.

The SP1200 is shipped with the jumpers set for 70 Volt operation in U.S. versions, and 100 Volt operation in European versions. You will need to change these jumpers only if you require a different configuration than the default settings. Refer to the following illustration for the locations of the jumpers.

On the Amplifier Board

J1
Jumper pins 1 and 2 for 8-ohm operation
Jumper pins 2 and 3 for 70V or 100V operation

J2
Jumper pins 1 and 2 for 100V or 8Ω/250W operation
Jumper pins 2 and 3 for 70V or 8Ω/150W operation

J3
Jumper pins 1 and 2 for 70V or 8Ω/150W operation
Jumper pins 2 and 3 for 100V or 8Ω/250W operation

J4
Jumper pins 1 and 2 for 70V or 8 ohm operation
Jumper pins 2 and 3 for 100V operation

J9
Jumper pins 1 and 2 for 8-ohm operation
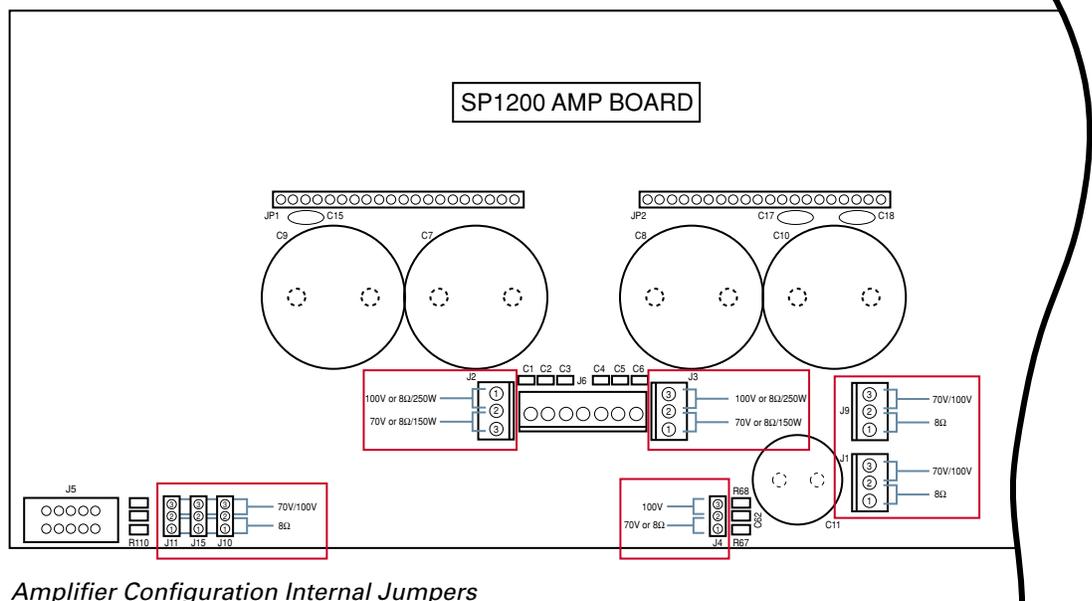Jumper pins 2 and 3 for 70V or 100V operation

J10
Jumper pins 1 and 2 for 8-ohm operation
Jumper pins 2 and 3 for 70V or 100V operation

J11
Jumper pins 1 and 2 for 8-ohm operation
Jumper pins 2 and 3 for 70V or 100V operation

J15
Jumper pins 1 and 2 for 8-ohm operation
Jumper pins 2 and 3 for 70V or 100V operation

Amplifier Configuration Internal Jumpers

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AC Power Considerations

Each SP1200 draws an average of 3 amps of AC line current (@ 120VAC) when fully loaded and playing music with a relatively high crest factor.

Voltage Conversion

The SP1200 can be configured to operate at 115V AC or 230V AC. See Appendix C for instructions on how to change the operating voltage configuration.

Thermal Considerations

⚠️ **IMPORTANT:** The SP1200 is convection cooled rather than fan cooled. This design was chosen to avoid the requirement for periodic air filter maintenance, and to keep the insides of the SP1200 clean in dirty environments. This avoids blowing dirty, smoky air into it. Heat is drawn away from the amplifiers by the heatsinks and radiated through the cooling vents in the top cover. When installing the SP1200, be sure to allow sufficient air space around the top and rear of the amplifier to allow adequate cooling for the heatsinks. If installing in a rack, *leave at least one rack space above and below the SP1200 for a vent, and at least 6 inches behind the chassis to allow proper ventilation.*

If installing three or more SP1200s in a rack, use a fan in the rack to move cool air in and warm air out of the rack's enclosure. It may be necessary to provide a cool air intake fan at the bottom of the rack, and a warm air exhaust fan at the top (see Figure below).

If the amplifier should overheat, a thermal switch is activated that disengages the speaker output, allowing the heatsink to cool down. The **OVERLOAD** indicator on the front panel will also light to show that a protection circuit has been activated. Once the amplifier has cooled to a safe operating temperature, the thermal switch resets and reactivates the speaker output. If this should occur, identify the cause of the problem and take corrective action, such as providing better ventilation, installing a fan in the rack to move more air, making sure the amplifier is not overloaded with too low of a load impedance, etc.
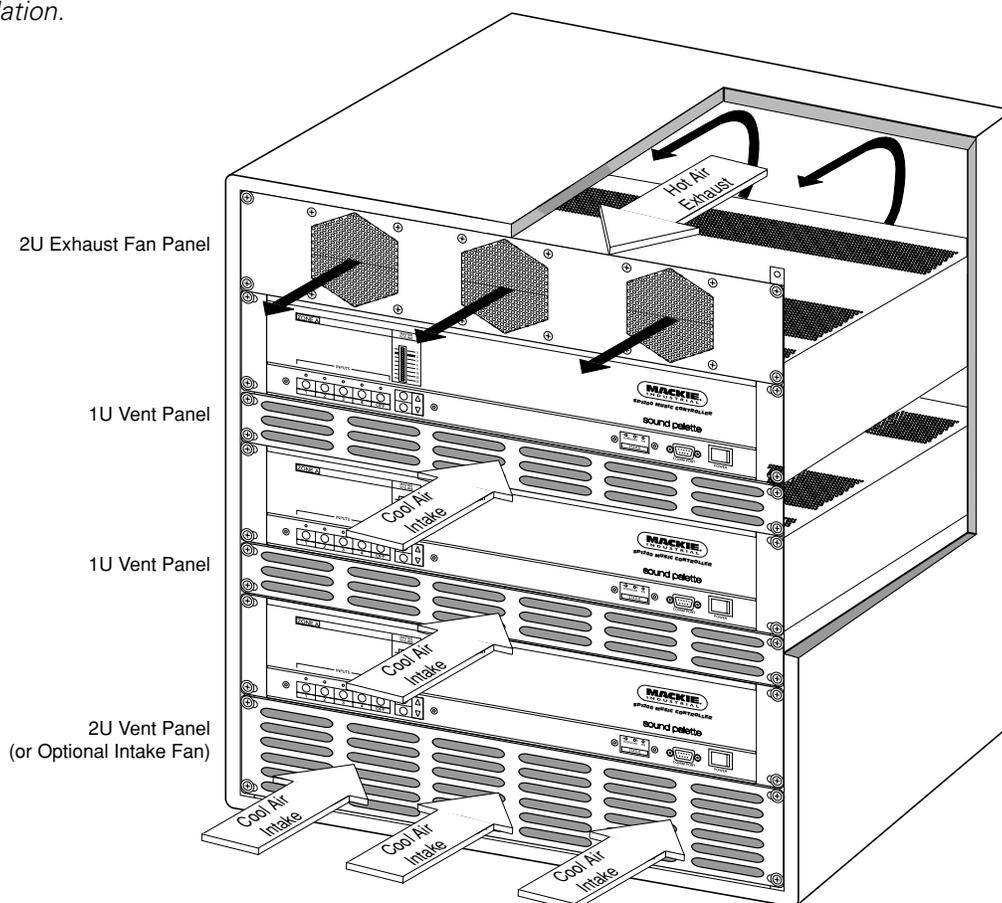
4. OPERATION

SP1200 QUICK START

This isn't a substitute for reading the entire instruction manual, which is the only way to fully understand how the SP1200 works. However, the Quick Start provides a quick overview so you can get the SP1200 set up and working right away.

Make sure the power switch is off while setting up and making connections to the SP1200.

EXTERNAL SWITCH SETTINGS

• The Paging Mic and the Local Mic have +24 VDC PHANTOM power switches. Move the switches down to activate the phantom power if you are using condenser microphones.

• The Paging Mic and Local Mic also have GAIN +40 dB switches. Leave the switches in the down position when microphones are connected to these inputs.

• If you plan on connecting two or more SP1200s together in a system with the EXPANSION IN/OUT bus, use the LOCAL/REMOTE switches. They select either the local Program Input source (switches up) or a remote program source from the EXPANSION IN/OUT bus (switches down). The odd-numbered switches (1, 3, 5, 7) select the left inputs, and the even-numbered switches (2, 4, 6, 8) select the right inputs.

• To operate two SP1200s with one remote control, assign the same AMP ADDRESS setting to both amplifiers (DIP switches 1-5). Set the AMP ADDRESS DIP switch #6 to the Master position on one amplifier and to the Slave position on the other amplifier. The front panel and remote control panels operate both amplifiers when they are assigned to the same AMP ADDRESS. For example, if you select Program Input 1 with one unit's Input Select control, Program Input 1 is also selected for the other unit.

• For independent zone operation, assign different AMP ADDRESS settings to each amplifier. The front panel and remote control panels will operate independently for each amplifier and zone.

INTERNAL SWITCH AND JUMPER SETTINGS

Refer to "Internal Settings" on page 13 for more information.

• Bus Assign switches are used to assign a program input source to the balanced expansion bus. There are four switches for each program input source: Left (+), Left (–), Right (+), and Right (–).

⚠️ **CAUTION:** When using multiple SP1200s that use the expansion bus, these switch settings *must* be unique to each unit or you can damage your SP1200(s). **Never** assign more than one program source to the same channel on the Expansion Bus.

• EQ Bypass allows you to bypass the 3-band EQ, which is in the Input 1-4 signal path. EQ engaged is the default setting.

• The amplifier can be configured for 8-ohm, 70V (default for U.S. versions), or 100V (default for European versions) operation via eight jumpers on the amplifier board.

PROGRAM INPUTS

Connect any stereo line-level signal source to the Program Inputs 1-4. If you have a music-on-hold requirement, connect a continuous music source to INPUT 1. The DIRECT OUTPUT jacks next to INPUT 1 can feed the signal connected to INPUT 1 to the telephone system.

If you have a need for a priority Program Input (e.g., a jukebox), connect it to INPUT 4. Move the AMP ADDRESS switch #7 UP to enable INPUT 4 priority.

Set the 3-band EQ controls to the "U" position for now (1K for the FREQ control). These can be adjusted later, if necessary.

PAGING MIC INPUT

Connect a microphone to the PAGING MIC input. Use either the XLR connector, or the supplied Phoenix-type connector. Set the PHANTOM and GAIN +40 dB switches to their appropriate positions. Adjust the MASTER VOLUME up/down buttons so the meter level is at the "0" mark. Set the GAIN control so the meter indication is near the "0" mark when speaking at an average level into the microphone. See "Setting The Vox Threshold" on page 19 for more information.

Set the 2-band EQ (LOW and HIGH) to the "U" position. This can be adjusted later, if necessary.

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PAGING MIC CONTROL

The PAGING MIC CONTROL connector is provided to connect a manual paging switch. Connect a normally-open switch between GND and ZONE A (to page in Zone A only), or GND and ALL CALL (to page over the entire system–if using multiple units). The voice-activated (VOX) control for the Paging Mic still operates in Zone A when the switch is off.

LOCAL MIC/LINE INPUT

Connect a microphone to MIC/LINE INPUT A, using the supplied Phoenix-type connector, to use for a meeting room or other local speaking requirements. Set the PHANTOM and GAIN +40 dB switches to their appropriate positions.

Select the OFF button on the front panel. This disengages the selected Program Source and engages the MIC/LINE INPUT. Adjust the MASTER VOLUME up/down buttons so the meter level is at the "0" mark.

Note: The MASTER VOLUME setting for the MIC/LINE INPUT is independent of the MASTER VOLUME setting for INPUTS 1-4. The MASTER VOLUME setting for INPUTS 1-4 is stored in memory when the MIC/LINE INPUT is selected (the OFF button is engaged). When an INPUT 1-4 is selected, the MASTER VOLUME setting for the MIC/LINE INPUT is stored in memory.

Set the GAIN control so the meter indication is near the "0" mark when speaking at an average level into the microphone.

Set the 2-band EQ (LOW and HIGH) to the "U" position. These can be adjusted later, if necessary.

AMBIENT MIC INPUT

This is an optional connection, but can greatly enhance the performance of the Paging Mic. Connect the optional MT-3100 mic to the AMBIENT MIC input. This provides an "ear" for the microprocessor to adjust the Paging Mic gain to compensate for the ambient noise level in the room. Use the supplied Phoenix-type connector to make these connections.

Note: Move the AMP ADDRESS switch #8 UP to enable the ambient mic. See page 19 for more information on "Using the Ambient Mic."

EXPANSION IN/OUT

If you are connecting two or more SP1200s in a system, use the EXPANSION IN/OUT connections to distribute the Program Input sources assigned to the Expansion Bus between SP1200s. The two 25-pin D-Sub connectors are in parallel (use one to connect to the previous SP1200 and one to connect to the next SP1200 in the chain).

REMOTE

You can connect one or more optional remote controls (up to 10) to the SP1200 to provide wall-mounted input select, program signal volume control, and local mic volume control.

RS485

A PC can be connected to the RS485 port to provide computer control using the SPLinker Sound Palette Control software application. If the PC doesn't have an RS485 serial port, you can either install an RS485 interface card, or use an RS232 serial port with an RS232-to-RS485 converter.

Two SP1200s can be controlled with one wired remote control by connecting the RS485 ports between the two SP1200s. Each amplifier must have the same AMP ADDRESS with one assigned as Master and the other as Slave. Use the supplied Phoenix-type connectors to make these connections.

Note: Move the AMP ADDRESS switch #6 DOWN for Master and UP for Slave.

PRE OUT/AMP IN

These connections can be used to insert a signal processor (i.e., graphic equalizer, compressor, etc.) into the signal chain, or to feed the signal to additional power amplifiers. If no external processor or external amplifier is to be used, leave the U-shaped jumper in place between the PRE OUT and AMP IN connectors.

OUTPUTS

Use the supplied two-conductor Phoenix-type connector with appropriate speaker wiring to connect to the speaker or distributed speaker system.

Using Inputs 1-4

Connect the program sources to Inputs 1-4. These could include a CD player, tape deck, tuner, satellite feed, TV audio, jukebox, or an audio feed from a live band. All four program inputs use unbalanced RCA connectors and accept stereo line-level signals.

Note: The Input Select buttons are labeled 1 through 4 on the front panel. The spaces below the buttons are sized to accept 1/4" labels from the Brother P-Touch Electronic Labeling System. Professional-looking labels can be made to clearly identify the program source connected to each input (visit www.brother.com).

There are no individual volume controls for Inputs 1-4. The SP1200 automatically adjusts the volume for each input using an AGC circuit (Automatic Gain Control). This provides the best signal-to-noise ratio and insures that the volume remains the same when you switch from one source to another.

Only one Input source can be selected at a time. When switching from one source to another, the previous source fades out while the new source fades in (digital crossfade), rather than abruptly switching between the two.

Input 1 and the DIRECT OUTPUT

Input 1 provides a direct line-level output that can be used for music-on-hold or other external applications. Connect a continuous music source (i.e., satellite feed, prerecorded background music, multi-disc CD player) to Input 1 and connect the DIRECT OUTPUT jacks to the external destination.

Input 4 Priority

Normally, the four program inputs are non-priority inputs. However, if there is a jukebox or other priority program source in the system, Program Priority can be activated on Input 4 by setting AMP ADDRESS switch #7 UP. When a signal appears at Input 4, it overrides the other three inputs. When the signal stops, the SP1200 switches back to the previously selected input source, fading it in smoothly.

Local or Remote

These switches are used to select the input source for each of the four Program Inputs. Leave the switches up to select the local input source connected to the PROGRAM INPUT connector. Move the switches down to select the remote signal coming from the EXPANSION IN connector. Each Program Input has two switches, one for the left input and one for the right input.

Bus Assign

These internal switches are used if you have two or more SP1200s connected together in a system using the EXPANSION IN/OUT connectors. Each of the four program inputs can be individually assigned to the EXPANSION balanced bus. There are four switches associated with each Program Input source (see the Bus Assign Switch chart on page 13).

CAUTION: When using multiple SP1200s that use the expansion bus, these switch settings *must* be unique to each unit or you can damage your SP1200(s). **Never** assign more than one program source to the same channel on the Expansion Bus.

EXPANSION IN/OUT

These two 25-pin D-Sub connectors are used to connect two or more SP1200s together so they can share program sources. This is a true balanced bus and transmits the left and right signal from each of the four inputs over balanced lines. Refer to the "Connections" section on page 11 for information on wiring these connectors.

These connections allow a common program source to be available to all the SP1200s in a system. For example, prerecorded music that is used for music-on-hold can also serve as background music for an entire office building by setting the internal bus assign switches for Input 1 to the up position on the first SP1200. The music is then available to Input 1 on all the SP1200s connected via the EXPANSION IN/OUT connectors when their LOCAL/REMOTE switches are set to the REMOTE position (down).

Note: Switching the LOCAL/REMOTE switch to REMOTE doesn't disconnect the local input. If a different program source is connected locally to Input 1 on one of the SP1200s in the above example, both the common program source (the remote prerecorded music) and the local program source will be combined on Input 1 and can be played simultaneously. Typically, a local program source would not be connected to an Input which has REMOTE selected as the source.

Using the 3-Band EQ

This equalizer is applied to the selected program source from Inputs 1-4, whether it is a local source or remote source (via the EXPANSION IN/OUT bus).

This equalizer does not affect the paging mic or the local MIC/LINE INPUTS, which each have their own 2-band EQ controls.

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Using the Paging Mic

The paging mic is used to make announcements over the system. If the paging mic is a condenser mic or other type of mic that requires phantom power, move the PHANTOM switches to the down position. Otherwise, leave them switched up.

The paging mic can be voice-activated and is routed to all channels or zones. However, you have the option of activating it manually with an external switch. If you choose to use a switch for the paging mic, you have the additional option of assigning the paging mic to either Zone A or to all zones (if multiple SP1200s are used).

• For Zone A only, connect a (normally-open) switch between the ZONE A and GROUND pins on the PAGING MIC CONTROL connector.

• For all zones in a system interconnected via the EXPANSION bus, connect a switch between the ALL CALL and GROUND pins on the PAGING MIC CONTROL connector.

• For maximum flexibility, connect two switches to the PAGING MIC CONTROL connector and have both selections available.

The paging mic can be configured to automatically turn down (duck, or attenuate) the music that is playing over the system so the announcement can be heard when using the VOX circuit. When an announcement is over, the music gradually returns to its original volume.

The music ducks fairly rapidly, attenuating the music 20 dB within 300 ms (milliseconds) of detecting a signal on the paging mic. When the signal on the paging mic stops, there is a 1500 ms (1.5 second) timeout period to make sure the announcement is over, and then the music ramps up to its original volume over the next 2.5 seconds.

Note 1: When manually activating the paging mic, there is no timeout period after the announcement ends. The moment you let go of the switch, the music begins to ramp up to its original volume.

Note 2: When the manual switch is off, the voice-activated (VOX) control for the paging mic is still operational. Ensure that the PAGING MIC VOX threshold is set accordingly to prevent false triggering of the paging mic input when using PAGING MIC CONTROL switching. Alternatively, turn the PAGING MIC VOX control all the way up (fully clockwise) to defeat the VOX circuit. Note that each zone has its own PAGING MIC VOX control.

Setting the GAIN

When a microphone is connected directly to the paging mic input, the GAIN +40 dB switch should be set in the down position (for a mic-level signal). When the paging mic is going through an external mixer, sending a line-level signal to the paging mic input, move the GAIN +40 dB switch to the up position (for a line-level signal only).

Adjust the MASTER VOLUME control by pressing the up/down buttons so the meter indicates a level at the "0" mark. With all music sources off, speak into the paging mic with a normal voice. Adjust the PAGING MIC GAIN control with a non-conductive alignment tool so that the meter indication is near the "0" mark. This provides the best signal-to-noise ratio for the mic, and insures that the signal from the paging mic is strong enough to trigger the VOX circuit.

Setting the VOX Threshold

This control determines how strong the signal from the paging mic must be to trigger the VOX circuit, which ducks the program source when an announcement is made. Ideally, the threshold should be set so it is sensitive enough to trigger the VOX circuit as soon as you begin speaking, but not so sensitive as to be triggered by ambient sounds around the microphone. Set the PAGING MIC VOX control to the center position with a non-conductive alignment tool to start. Turn the control counter-clockwise to lower the threshold (increase the sensitivity) if the beginning of announcements are getting clipped off. Turn the control clockwise to increase the threshold (decrease the sensitivity) should you experience false triggering due to ambient noise around the microphone.

Using the EQ

The paging mic has a 2-band equalizer for adjusting the lows or highs on the microphone signal. When the controls are set to "U" (unity), the EQ has no effect on the signal.

Using the Ambient Mic

The ambient mic is an optional accessory (MT-3100) that is available for the SP1200, which is used to sense the ambient noise level in the room. Set the AMP ADDRESS switch #8 up to enable the ambient mic, otherwise leave the switch down.

The ambient mic provides an "ear" for the micro-processor to gauge the ambient noise in the room and adjust the gain of the paging mic accordingly. When the background noise is relatively quiet, the paging mic gain is at its lowest level. If the background noise is relatively loud, the paging mic gain is at its highest level. If the background noise is some-where in between, the paging mic gain is midway between its lowest and highest preset levels.

Ambient Mic Calibration and Placement

1. Connect the MT-3100 (or other microphone) to the AMBIENT MIC connector on the rear panel. Make sure the ambient mic switch is on (AMP ADDRESS switch #8 up). Locate the ambient mic in an appropriate position to pick up the ambient noise in the room. It can be mounted on the ceiling or on a wall. Avoid placing the ambient mic close to the speaker over which the announcement is being made. Keep the ambient mic away from a constant noise source, such as a refrigerator or other mechanical device that emits a continuous noise. The best placement is where the mic can pick up an average representation of the ambient noise level in the room.

    Note: Each zone or channel must be calibrated individually.

2. Turn off the SP1200, then turn it back on again while pressing and holding the Input 2 button. This causes the ambient mic preamp level to appear on the meter.

3. Establish the highest noise level that you would expect to have in the room using a pink or white noise source, or a music source. Input 1 is operational in this mode to use as a music source, if desired.

4. The ambient mic preamp gain trim is located just above the ambient mic connector on the rear panel, through the unmarked hole. Adjust it with a non-conductive alignment tool until all the green LEDs on the meter are lit. Insure that no yellow or red LEDs are lit, which runs the risk of clipping the ambient mic preamp or ADC.

5. Press the "OFF" button when finished to return to normal operation.

Paging Microphone Calibration Procedure (When Used with Ambient Mic)

1. Perform the "Ambient Microphone Calibration Procedure" described above.

2. Switch the ambient mic OFF (AMP ADDRESS switch #8 down).

3. Adjust the MASTER VOLUME control by pressing the Up/Down buttons so the meter indicates a level at the "0" mark.

4. Adjust the PAGING MIC GAIN control as high as it will go before feedback occurs while speaking into the paging microphone.

5. Switch the ambient mic on (AMP ADDRESS switch #8 up).

6. Turn off the SP1200, then turn it back on again while pressing and holding the "3" button.

7. Release the Input 3 button after a few seconds and the third LED starts flashing slowly.

8. Use the front panel Up/Down buttons to set the lower level of the paging mic (how loud it is with very quiet background noise). It should be loud enough to be heard clearly throughout the coverage area.

9. Press the "OFF" button and the level is stored. The third LED starts flashing faster.

10. Use the front panel Up/Down buttons to set the upper level of the paging mic (how loud it is with very loud background noise). As a general rule, set this level as high as it will go before feedback (at the "0" mark if steps 3-4 above were followed).

11. Press the Input 3 button when finished to store the level and return to normal operation.

12. Verify that the paging microphone's volume is sufficient to be heard over the background noise in the room.

    Note: For best results, with the background noise level at a minimum, the paging mic volume should be approximately the same as the music volume.

13. If the paging microphone is not loud enough to be heard over the background noise, verify that the ambient mic is properly placed to pick up an accurate representation of the background noise. If it is, it may be necessary to readjust the lower and upper levels for the paging mic gain (steps 6-11).

Using the Local MIC/LINE INPUT

The MIC/LINE INPUT A is provided for the zone to connect a microphone for a speaker in a conference room, or similar sound reinforcement applications. If the local mic is a condenser mic, move the PHANTOM switches to the down position.

Setting the GAIN

When a microphone is connected directly to the MIC/LINE INPUT, the GAIN +40 dB switch should be set in the down position (for a mic-level signal). When the mic is going through an external mixer, sending a line-level signal to the input, move the GAIN +40 dB switch to the up position (for a line-level signal only).

Press the OFF button to select the MIC/LINE INPUT. Adjust the MASTER VOLUME control by pressing the up/down buttons so the meter indicates a level at the "0" mark. With all music sources off, speak into the mic with a normal voice. Adjust the MIC/LINE INPUT GAIN control with a non-conductive alignment tool so that the meter indication is near the "0" mark. This provides the best signal-to-noise ratio for the mic and insures that its relative volume will be equivalent to the program sources.

Using the EQ

Each local MIC/LINE INPUT has a 2-band equalizer for adjusting the lows or highs on the microphone signal. When the controls are set to "U" (unity), the EQ has no effect on the signal.

Using the PRE OUT/AMP IN Connections

The PRE OUT and AMP IN connectors are provided to give you more flexibility in your system design. The SP1200 is shipped with U-shaped jumpers installed between the PRE OUT and AMP IN jacks. This routes the signal from the output of the preamplifier stage to the input of the amplifier stage.

This also provides a point in the signal chain to insert an external signal processor. Simply connect the line-level signal from the PRE OUT jack to the input of the processor, and connect the line-level output from the processor to the AMP IN jack on the SP1200.

Another option that is available is to connect another amplifier into the system. Simply use a Y-cord at the PRE OUT jack to split the signal between the AMP IN jack and the input jack on an external amplifier.

Zone A Output

The amplifier output on the SP1200 can be used with an 8-ohm impedance load, or to drive a 70V or 100V distributed system directly (also called constant-voltage systems).

Direct Speaker Connection

If the SP1200 is not being used in a distributed speaker system, you can reconfigure the amplifier to drive an 8-ohm load. Each amplifier can provide up to 200 watts into an 8-ohm load. See the "Internal Settings" section on page 13 for instructions on how to reconfigure the amplifiers.

Distributed Speaker System

When using the SP1200 in a 70V or 100V system, connect the speaker output directly to the distributed system. The SP1200 can directly drive a distributed system's speaker line without the need for an output transformer. The SP1200 can supply up to 200 watts into a 70V or 100V distributed system. Make sure the taps on the speakers in the system do not exceed a total of 200 watts.

Using the Remote Connection

The optional SP1200 Remote Control (SP-41R) provides Input Selection and Master Volume control for each amplifier or zone. The Remote Control can be mounted in a standard double-gang electrical box and covered with a Decora®-style faceplate.
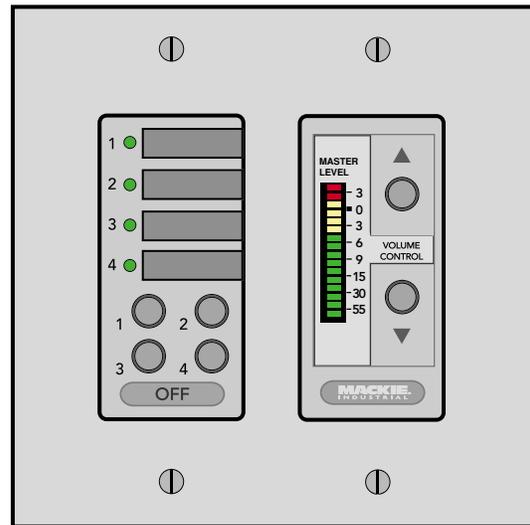
Connecting One or More Remote Controls

Each Remote Control affects only the zone to which it is connected. Up to ten remote controls may be connected to each zone simultaneously. This allows controls to be conveniently placed. Each control will interact with the SP1200, and all controls will reflect the current source and level settings. Note that the remote control indicates the gain setting and not the actual signal level in real time. In addition, the SP1200 provides a method for controlling two independent zones using a single Remote Control by assigning them to the same AMP ADDRESS (see next section).

The maximum distance between the remotes and the SP1200 varies, depending on the type of cable selected and the number of remote controls used. Typically, a lower wire gauge and cable capacitance allow longer distances. See the instructions with the remote control for more information.

Using the RS485 Connection

The amplifier is equipped with an RS485 connection. When two SP1200s are linked via the RS485 connection and assigned to the same zone (AMP ADDRESS switches 1-5), the Input Selection and MASTER VOLUME buttons on both amplifiers track each other. One unit must have AMP

ADDRESS switch #6 in the Master position (up), and the other unit in the Slave position (down).

In this way, you can have one Remote control operate both amplifiers that are assigned to the same zone.

Note: The microprocessor polls the AMP ADDRESS switch when it initializes at power-up. If a change is made to the AMP ADDRESS switch, turn the SP1200 off for five seconds, then turn it back on again for the new settings to take effect.

USING THE SPLINKER SOUND PALETTE CONTROLLER

The RS485 connection can also be used to connect the SP1200 to a computer loaded with the SPLinker software application. The PC-compatible computer must have an RS485 port to properly connect to the SP1200. It may be necessary to install an RS485 interface card, or use an RS232 port with an RS232-to-RS485 converter.

The SPLinker is a PC-based graphical interface to provide real-time monitoring and control (for up to 32 zones when used with SP2400s). It provides individual program source selection and volume control for each zone. Select boxes are located at the bottom of each zone for selecting multiple zones. All selected zones can then be modified at the same time in the Multiple settings box located on the right-hand side of the screen.

USING A 3ʳᴰ PARTY CONTROL SYSTEM

The RS485 connection can also be used to interface with common third-party control systems. Contact the third-party provider or Mackie Industrial Technical Support to determine if your control system is compatible with the SP1200.

UPGRADING THE SOFTWARE

From time to time, Mackie Industrial will release upgrades for the internal operating software in the SP1200. This can be downloaded from our website (www.mackieindustrial.com) to a PC-compatible computer. Use the serial port on the computer to connect to internal connector on the SP1200's CPU board to transfer the data to the on-board flash memory. Instructions will be provided when upgrades are available.

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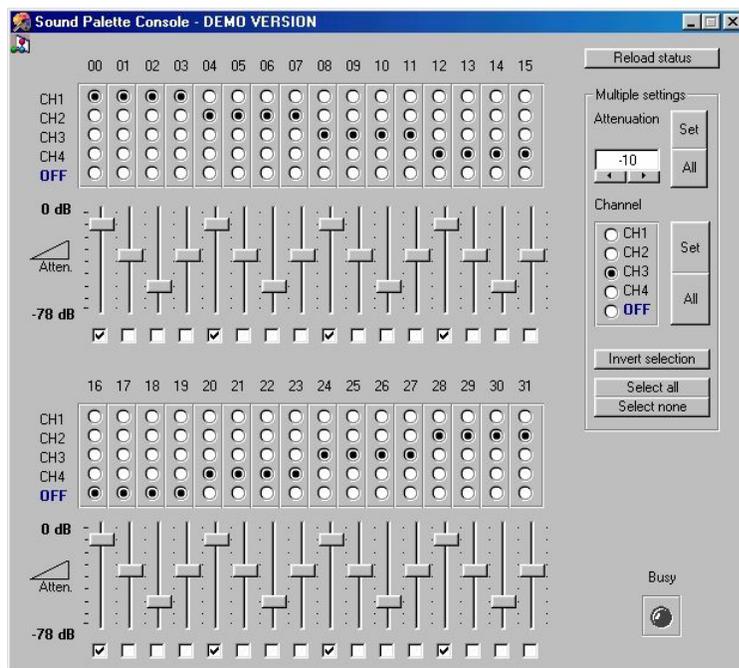
5. SPECIFICATIONS

SP1200 BLOCK DIAGRAM

MACKIE INDUSTRIAL
SP1200
BLOCK DIAGRAM
(#01.02.01.DF)
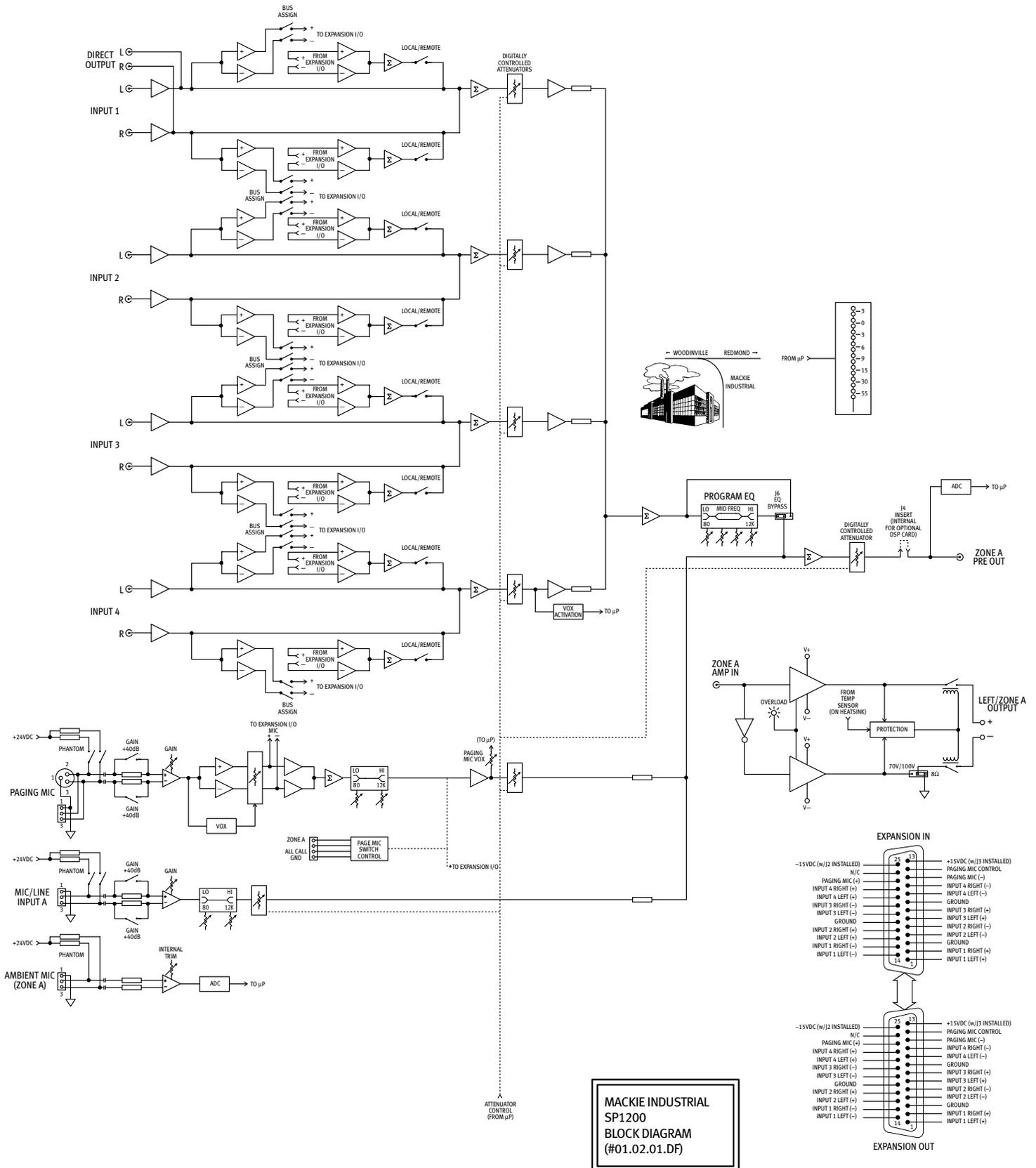
SP1200 Specifications

Power Amplifier Section

Continuous Sine Wave Average Output Power, single channel driven:

200 watts into 8 ohms from 20Hz to 20kHz, with no more than 0.01% THD

100V RMS into 50 ohms from 20Hz to 20kHz, with no more than 0.1% THD (J2/J3 in 100V position)

70V RMS into 25 ohms from 20Hz to 20kHz, with no more than 0.1% THD (J2/J3 in 70V position)

Frequency Response

20Hz to 20kHz (+0, –0.5 dB)

Distortion

THD: < 0.01% @ rated output into 8 ohms

Signal-To-Noise Ratio

> 90 dB below rated power into 8 ohms
> 100 dB (A-weighted) below rated power into 8 ohms

Channel Separation

> 80 dB @ 1kHz

Amp Input Impedance

20k ohms

Input Sensitivity

+5 dBu (1.37V rms) for rated power into 8 ohms

Gain

27 dB (8-ohm position)
27 dB (70V position)
30 dB (100V position)

Maximum Input Level

12 volts P-P (+15 dBu)

Rise Time

< 5 μS

Slew Rate

> 17V/μS

Preamplifier Section

Input Levels

Program Inputs:	–10 dBu to +10 dBu for maximum output level with internal AGC
Paging Mic Input:	–52 dBu to +4 dBu
Local Mic Input:	–52 dBu to +4 dBu

Maximum Input

Program Inputs:	+15 dBu
Mic Inputs:	+15 dBu

Maximum Output at Pre Out

+10 dBu

EQ

3-Band Program EQ:

High Shelving:	±15 dB @ 12kHz
Mid Peaking:	±15 dB with sweepable frequency (250Hz to 8kHz)
Low Shelving:	±15 dB @ 80Hz

2-Band Mic EQ:

High Shelving:	±12 dB @ 12kHz
Low Shelving:	±12 dB @ 100Hz

General

Power Consumption

700 watts with musical program, 8 ohms per side
800 watts maximum

Phantom Power

24V DC

AC Line Voltage

115V AC, 60Hz
230V AC, 50Hz (internally switchable)

Fuse Rating

115V	4A Slow Blow, 250V
230V	2A Slow Blow, 250V

Dimensions

Height:	3.5" (88 mm)
Width:	19.0" (483 mm)
Depth:	16.7" (424 mm)
Weight:	25 lbs. (11.2 kg)

Accessories

MT-3100	Ambient Noise Sensing Microphone
SP-41R	Remote Control
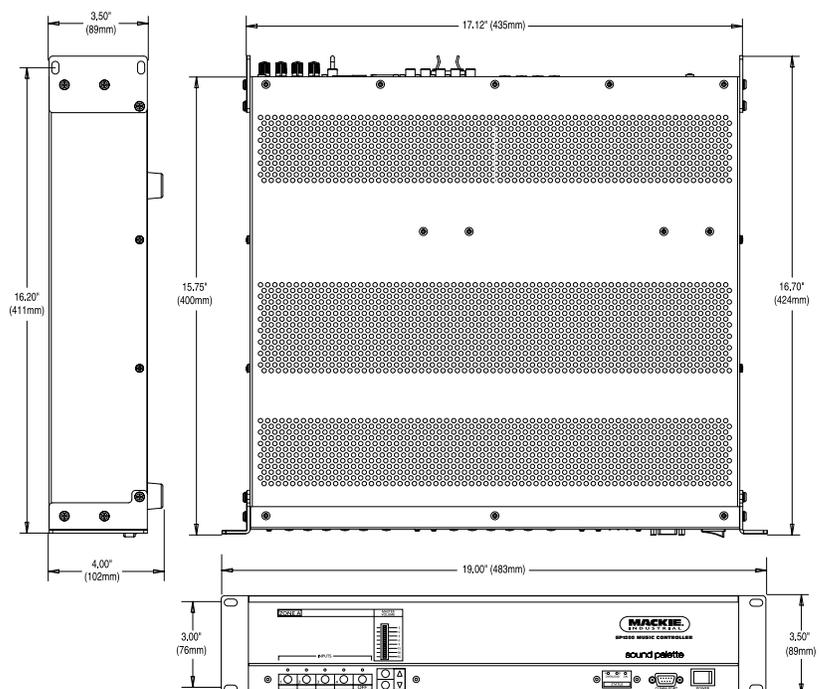
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Disclaimer

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6. SERVICE INFORMATION

In the event that your SP1200 should require servicing, please follow these instructions:

1. Call Mackie Industrial Tech Support at 1-888-337-7404, 8 am to 5 pm PST (Monday-Friday), to verify the problem and obtain a Return Authorization (RA) Number. Be sure to have the serial number of the unit when you call. You must have a Return Authorization Number in order to obtain warranty service at the factory or at an authorized service center.

2. Pack the unit in its original packaging. This is very important. Mackie Industrial is not responsible for any damage that occurs during shipping due to non-conventional packaging. Original packaging helps to minimize the possibility of shipping damage.

3. Include a legible note stating your name, return shipping address, (no P.O. boxes), daytime phone number, Return Authorization Number, and a detailed description of the problem, including how we can duplicate it.

4. Write the Return Authorization Number in BIG BOLD PRINT on the top of the box.

5. Ship the unit to us. We suggest insurance for all forms of cartage. Ship to this address:

Mackie Industrial
Service Department
16140 Wood-Red Road NE, Suite 5
Woodinville, WA 98072

APPENDIX A: DEFAULT SETTINGS

Control	Setting
LOCAL/REMOTE	UP (LOCAL)
PAGING MIC PHANTOM	UP (OFF)
GAIN +40dB	UP (0dB)
GAIN	CENTER
LOW	CENTER (FLAT)
HIGH	CENTER (FLAT)
	ZONE A
AMP ADDRESS	10000000
MIC/LINE INPUT GAIN	CENTER
LOW	CENTER (FLAT)
HIGH	CENTER (FLAT)
PHANTOM	UP (OFF)
GAIN +40dB	UP (0dB)
MIC VOX	CLOCKWISE (OFF)
PROGRAM EQ LOW	CENTER (FLAT)
MID	CENTER (FLAT)
FREQ	CENTER (1kHz)
HIGH	CENTER (FLAT)
INTERNAL BUS ASSIGN (S1/S2)	OFF

NOTE: All SP1200s sold in the U.S. and Canada are configured for 115 VAC line input and 70V speaker output. All units sold outside the U.S. and Canada are configured for 230 VAC and 100V speaker outputs. Please confirm your configuration prior to installation.

APPENDIX B: BUTTON MODES

SP1200 Button Modes

Press **1** on Power Up: *AGC Reset*

• Press and hold the Input 1 button while powering up the SP1200.
• Release the Input 1 button and the Input 1 LED blinks.
  This resets the AGC for all four inputs to the default setting (–5 dBu).
• Press the Input 1 button again and the **OFF** LED lights. This indicates that the
  AGC circuit is turned off.
• Press the Input 1 button again and the **OFF** LED turns off. This indicates that the
  AGC circuit is turned on.
• Press the **OFF** button to save the settings and return to normal operation.


Press **2** on Power Up: *Ambient Mic Preamp Metering*

• Press and hold the Input 2 button while powering up the SP1200.
• Release the Input 2 button. The Ambient Mic Preamp gain is indicated on the LED meter.
• Use this mode to calibrate the ambient mic (see procedure on page 20).
• Press the **OFF** button to return to normal operation.

Press **3** on Power Up: *Paging Mic Level Adjustment*

• Press and hold the Input 3 button while powering up the SP1200.
• Release the Input 3 button. The lowest Paging Mic level is indicated on the LED meter.
• Use the Up/Down buttons to adjust the lowest Paging Mic level.
• Press the **OFF** button. The highest Paging Mic level is indicated on the LED meter.
• Use the Up/Down buttons to adjust the highest Paging Mic level (see procedure on page 20).
• Press the Input 3 button to save the settings and return to normal operation.


Press **4** on Power Up: *Firmware Version*

• Press and hold the Input 4 button while powering up the SP1200.
• Release the Input 4 button. The LEDs on the front panel indicate the firmware version in binary.
• The Input 1-4 LEDs indicate the digit to the left of the decimal point, and the LED meter indicates
  the digit to the right of the decimal point.
• For example, the following illustration indicates version 1.7.
• Press the **OFF** button to return to normal operation.


Version 1.7

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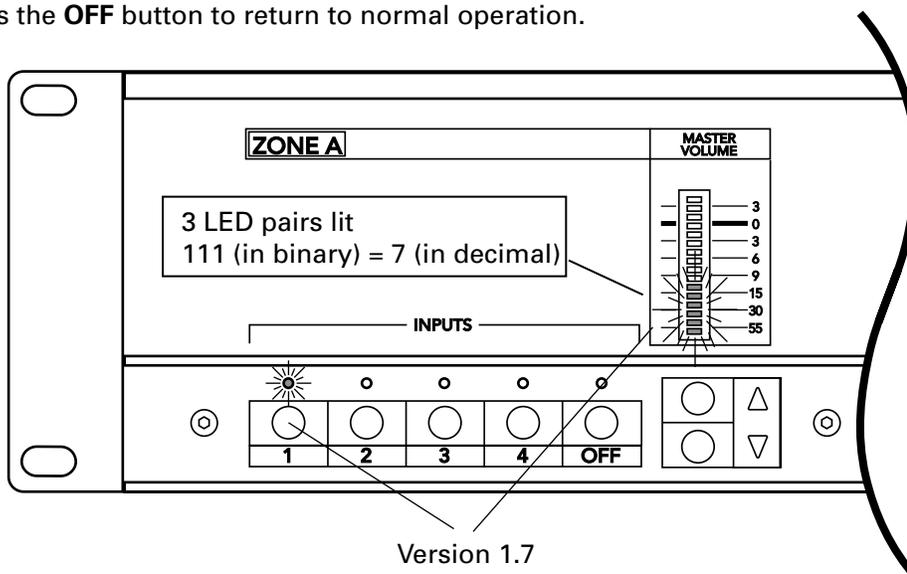
APPENDIX C: VOLTAGE CONVERSION

CAUTION: These servicing instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel. *Make sure the power is off and the power cord disconnected* before removing the top cover to gain access to the inside of the SP1200.
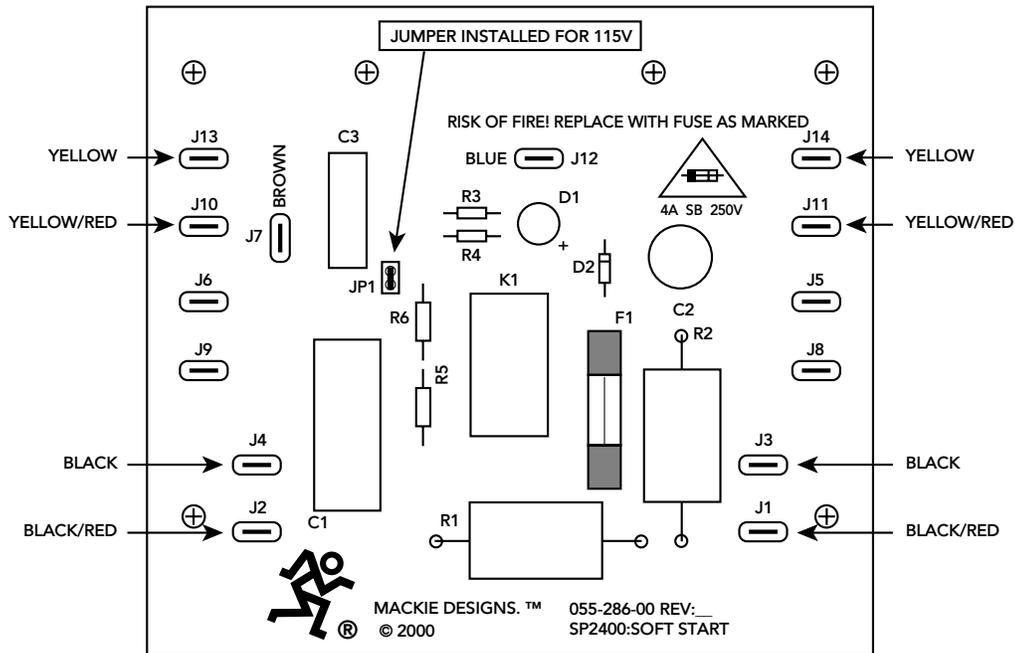
SP1200: 115V AC CONFIGURATION
(4A, 250V SLOW BLOW FUSE INSTALLED IN IEC SOCKET)
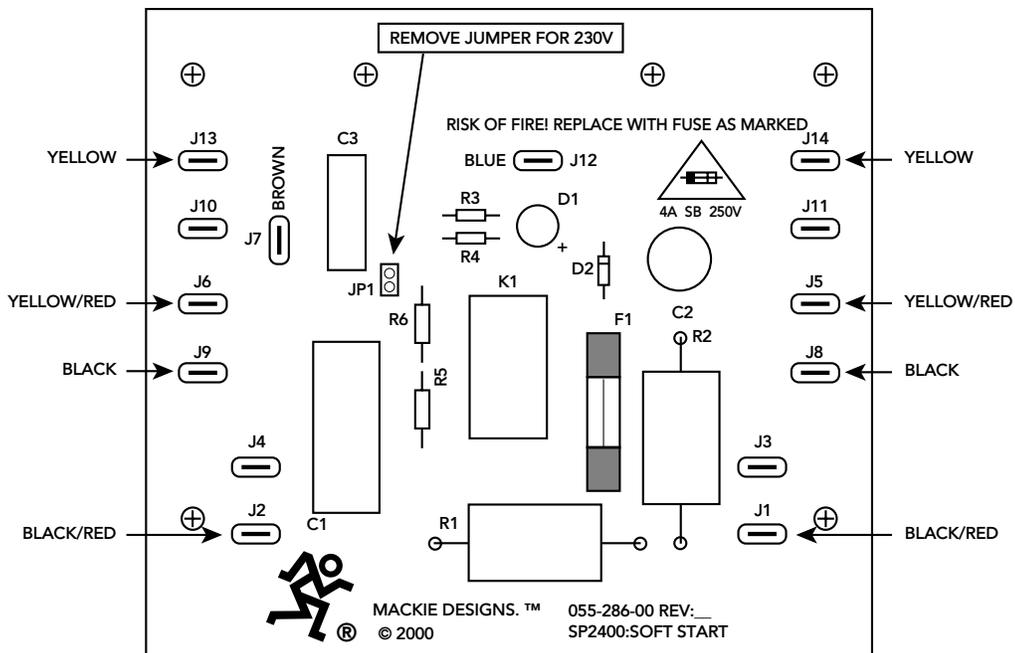
SP1200: 230 VAC CONFIGURATION
(2A, 250V SLOW BLOW FUSE INSTALLED IN IEC SOCKET)

SP1200 Music Controller

Mackie Industrial

16220 Wood-Red Rd. NE • Woodinville, WA 98072 • USA
888/337-7404 • Outside the U.S.: 425/487-4333
Fax: 425/487-4337 • www.mackieindustrial.com