OWNER/APPLICATION
MANUAL

Series 4100 MIXERS

MX 4108
MX 4112
MX 4116

sunn

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Introducing SUNN Professional Sound Equipment

Audio mixing of live and recorded music is an artform which, in its way, is every bit as creative as the musicians producing the original sound.

Just as a good musician needs the best instrument to project his creativity—so too does the sound engineer require superb quality audio equipment to enhance the musicians performance, and to mold the individual sounds into a composite whole. He needs to modify the instruments' natural timbre via the equalization stages; to compensate for poor acoustics; and route, if necessary, through delays, reverbs, or other devices; and yet have total control of the dynamic range of the music via the faders, to produce a balanced and yet flexible mix. Only good design, both ergonomically and electronically can fulfill his/her requirements and allow him to concentrate on his task—while feeling totally at ease with the equipment he is using.

The SUNN MX 4108, 4112, and 4116 fill the growing need for cost effective, high quality, roadworthy mixing consoles to enhance his abilities as an artist and technician.

Each input channel features Trim, 3-band EQ, separate Eff/Reverb and monitor sends and long throw, precise fader controls.

The Master section features V.U. meters, to monitor the levels of either Program L, Program R, or Main, Monitor, Effects send and Return level controls; Reverb and Main level control and Main, Reverb and Sub Pan controls. High quality master faders are used for Program L and R, Main and Monitor.

The back panel has patching in and out for external devices as well as direct inputs to the Effect and Monitor mixing sections. These rugged consoles also feature 48v Phantom Power for use with all condenser microphones and a built in internal reverb.

Specifications and Quick Reference Guides

SPECIFICATIONS

FREQUENCY RESPONSE	20Hz to 20kHz +1, -3dB
T.H.D.	Less than 0.1% from 20Hz to 20kHz at nominal level. Typically less than 0.06% T.H.D.
EQUIVALENT INPUT NOISE	-129dBm (150 Ohm source, DIN audio bandwidth, 22 Hz - 22kHz)
OUTPUT SIGNAL TO NOISE RATIO	78dB (MX 4108) 75dB (MX 4112) 72dB (MX 4116) with output faders and all input faders at nominal level.
CROSS TALK	-55dB at 1kHz between adjacent signal paths.
MAXIMUM VOLTAGE GAIN	74dB (±2dB) Mic input to L+R output 84dB (±2dB) Mic input to Main output
MAXIMUM OUTPUT LEVEL	+ 21dB into a 10k ohm load all outputs. Headphone output 1 watt into 75 ohms
EQUALIZATION	Low Frequency + 16dB at 50Hz shelving type Mid Frequency + 12dB at 3kHz peak-dip type High Frequency + 16dB at 10kHz shelving type
MIXING BUSSES	2 Stereo, 1 Monitor, 1 Effects, and 1 Main
REVERB UNIT	Spring type Delay time 35ms Reverberation time 2 seconds (1kHz)
METERS	2, switchable between Program L & R and Main & Monitor
PHANTOM POWER	+ 48 volts DC on pins 2 and 3 of each Mic input. LED on indicator and front panel "Phantom" switch
PEAK INDICATOR	Each Input Channel, set to come on 6dB before clipping
POWER REQUIREMENTS	120V AC, 60Hz, 100VA
DIMENSIONS	MX 4108 22-3/4" x 21-1/8" x 5-1/8" 578mm x 537mm x 130mm MX 4112 29" x 21-1/8" x 5-1/8" 737mm x 537mm x 130mm MX 4116 35-3/8" x 21-1/8" x 5-1/8" 899mm x 537mm x 130mm
WEIGHT	MX 4108 35 lbs (15.6kg) MX 4112 42 lbs (19.0kg) MX 4116 50 lbs (22.5kg)

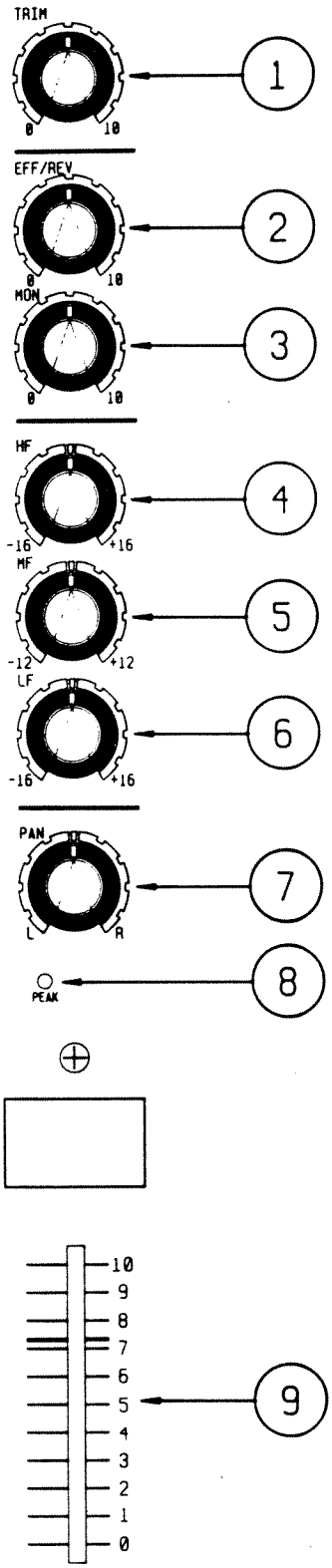
INPUT CHARACTERISTICS

INPUT TYPE	ACTUAL IMPEDANCE	NOMINAL SOURCE IMPEDANCE	NOMINAL LEVEL	MAX LEVEL BEFORE CLIPPING	CONNECTOR TYPE
Mic	3k Ohm	150-160 Ohm	-50-10dB	-30+10dB	XLR-3
Line	20k Ohm	10k Ohm	-30+10dB	-10+30dB	Phone
Ins Ret	5k Ohm	5k Ohm	0dB	+24dB	T/R/S
Eff Ret	10k Ohm	10k Ohm	-10dB	+24dB	Phone
Dir In	20k Ohm	10k Ohm	+4dB	+21dB	Phone

OUTPUT CHARACTERISTICS

OUTPUT TYPE	ACTUAL IMPEDANCE	NOMINAL LOAD IMPEDANCE	NOMINAL LEVEL	MAX LEVEL BEFORE CLIPPING	CONNECTOR TYPE
Ins Send	600 Ohm	10k Ohm	0dB	+21dB	T/R/S
Pgm	100 Ohm	10k Ohm	+4dB	+21dB	Phone
Main	100 Ohm	10k Ohm	+ 4dB	+21dB	Phone
Mon Eff	100 Ohm	10k Ohm	+ 4dB	+21dB	Phone
Phone	25 Ohm	75 Ohm	250mW	1 watt	T/R/S

Input Channel Controls



1. Trim: Adjusts input channel gain from any signal source over a 40 dB range to achieve the maximum signal-to-noise ratio.

2. Eff/Rev: Post EQ, post fader; adjustment of the signal level sent to internal effects device and Effects Out jack.

3. Monitor: Pre EQ, pre fader; adjusts the signal level sent to the monitor buss output and headphone output.

4. High EQ: Adjusts, either boost or cut, a control range of ± 16dB at the center frequency of 10kHz.

5. Mid EQ: Adjusts, either boost or cut, a control range of ± 12dB at the center frequency of 3kHz.

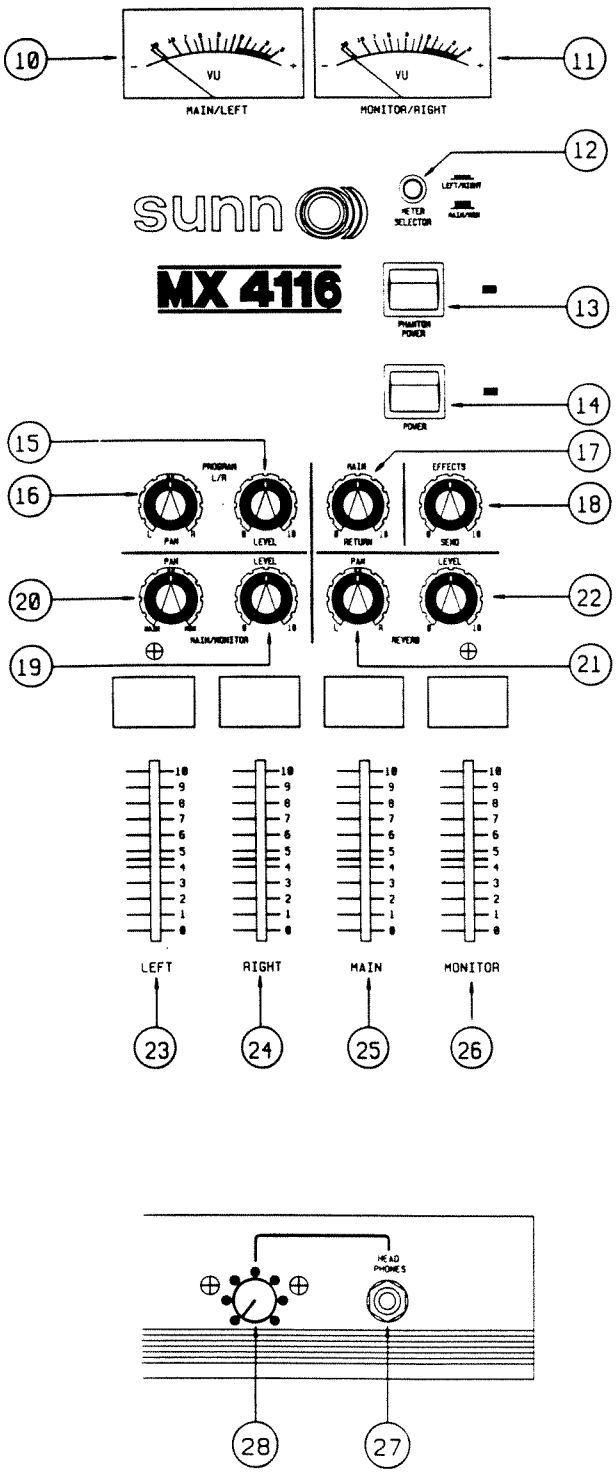
6. Low EQ: Adjusts, either boost or cut, a control range of ± 16 dB at the center frequency of 50 KHz.

7. Pan: Allows the signal from the input channel to be assigned to either or both Program L and Program R. When the control is centered, the signal is sent equally to both Program busses.

8. Peak light: Displays, when used with the gain control, the proper operating level of the preamp input channel. It is set to turn on 6dB before overload.

9. Channel Fader: Adjusts the signal level of the individual input channel being sent to the main output mixes and the Eff/Rev buss.

Master/Output Controls



10. VU Meter: Indicates output level of either Main or Program L.

11. VU Meter: Indicates output level of either Monitor or Program R.

12. Meter Selection: Selects either the output levels of Main and Monitor or Program L and Program R.

13. Phantom Power: This supplies 48v to the microphone inputs allowing high quality condenser microphones to be used.

14. Power Switch: Turns the mixer on and off. Always switch the mixer on before the power amps and off after the power amps.

15. Program Return Level Control: Adjusts the level of signal returning from an external device in the program mix.

16. Program Return Pan Control: Assigns the signal from an external device to either Program L or Program R or both when centered.

17. Main Return: Adjusts the level of the signal returning from an external effects device to the main mix.

18. Effects Send: This controls the output level of the signal being sent to an external effects device from the effects send output jack located on the rear panel.

19. Main/Monitor Return: Adjusts the level of the signal returning from an external device to the main and monitor mix.

20. Main/Monitor Return Pan: Routes the input signal from an external device to either Main or Monitor or both.

21. Reverb Level: Adjust the signal level of the built-in reverb to Program L and Program R busses.

22. Reverb Pan: This control assigns the reverb signal to either Program L or Program R or both.

23. Program L Fader: Adjusts the signal level of Left output.

24. Program R Fader: Adjusts the signal level of Right output.

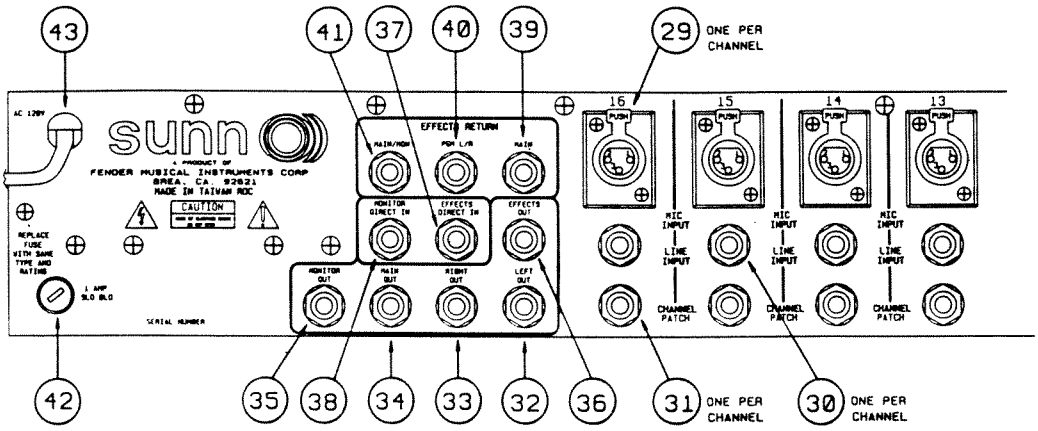
25. Main Fader: Adjusts the signal level of the Right output

26. Monitor Fader: Adjusts the signal level of the monitor output.

27. Headphone Jack: Allows headphone monitoring of the output signal of the monitor buss.

28. Headphone Volume Control: Adjusts the headphone level.

Rear Panel Controls



29. Mic Input Jack: XLR connector accepts any microphone, including unbalanced and balanced dynamic, and condenser and electric types requiring phantom power.

30. Line Input Jack: 1/4" phone jack accepts line level signal from tape recorders, instruments, and other line level (+ or -) devices.

31. Channel Patch Jack: 1/4" phone jack allows pre EQ/Pre trim signal from the input preamp to be sent to another mixer, tape recorder, or signal processing device. Also accepts effects device signal into input channel by 1/4" T.R.S. Phone Jack with: Ring = Send; Sleeve = Common; Tip = Return.

32. Left Output Jack: 1/4" phone jack to connect output from the Program L mix.

33. Right Output Jack: 1/4" phone jack to connect output signal from Program R mix.

34. Main Output Jack: 1/4" phone jack to connect output signal from main mix.

35. Monitor Output Jack: 1/4" phone jack to connect output signal from monitor mix.

36. Effects Out Jack: 1/4" phone jack from Eff/ Reverb buss to external effects devices.

37. Effects Direct In: 1/4" phone jack allows direct input from another mixer or effects device directly into the effects buss.

38. Monitor Direct In: 1/4" phone jack allows direct input of signal to monitor buss.

39. Effects Return Main: 1/4" phone jack allows return of external effects signal to main mix.

40. Program L/R Return: 1/4" phone jack allows return of external signal to Program L and Program R mix.

41. Main/Monitor Return: 1/4" phone jack allows return of external signal to Main and Monitor mix.

42. Fuse: 1 amp fuse—replace with same type and rating.

43. Power Cord

1. Channel Inputs

Connect all low impedance microphones to the MIC INPUTs. High impedance microphones and line level input signals should be connected to the LINE inputs. If the mixer is 25 feet or more from the stage, low impedance microphones with balanced line outputs should be used. This helps to eliminate external noise from getting into the system through microphone cables.

2. Trim Control

Set trim so that when channel is operating the red peak LED flashes occasionally during signal peaks. The Peak LED is set to turn on 6dB before overload.

3. EQ Controls

The choice of frequencies and the amount of boost or cut will vary with the sound source, overall program material, personal preference and acoustics. It is usually best to use as little EQ as possible and to use cut in preference to boost to acheive an overall balance.

4. Pan

Besides its ability to move the apparent source of a sound from one place to another, the Pan control may also be used to "position" an instrument at some point between two loudspeakers. This "widens" the apparent size of the sound source, at least for people sitting in an area where they can hear both loudspeakers.

If, *as in most situations*, at least some part of the audience cannot hear both loudspeakers well, it is a good idea to avoid panning an Input Channel entirely to one side or the other. That would cause it to disappear from one loudspeaker and part of your audience would then not hear that input.

5. Channel Patching

The inputs are designed to allow direct access to each channel either receiving external signals or sending pre EQ/Trim signals to an external device in. The T.R.S. phone jack is wired: Tip = return; Ring = Send; Sleeve = Common.

6. Accessory Patching Using the Effect Out & Eff Return

The EFF OUT jack provides an output signal from the EFF/REV buss which can be used to drive external accessory units. The EFF/REV buss delivers the signals from the EFF/REV controls to the internal reverb pan and also the EFF send amp.

7. Monitor System

The MONITOR system provides performers with a separate mix to monitor their performance. In the example, the MONITOR system consists of the mixer, a graphic equalizer, power amp, and monitor speakers. The channel MONITOR controls are adjusted for the desired signal level from the channel to the monitor buss. The MONITOR FADER control is used to adjust the desired operating level. In a recording session, the Monitor section can be used to drive a headphones system, and in mix down, used as an Effects Send buss.

8. Main PA Sound System

The MAIN PA function in a sound system is to reproduce the sound mix created for the audience. As an example, besides the mixer, there could be a graphic equalizer, electronic crossover, two power amplifiers and high and low frequency speakers. The channel fader controls are used to adjust the signal level from the channels sent to the Program busses. The two Program faders adjust the balance between the vocal mix and instrument mix sent to the MAIN buss. The MAIN FADER control adjusts the overall level of the main sound system.

Operating Hints

Stereo/Mono Operation

In live sound reinforcement, a mono PA will usually give the best sound for most listening locations. It also greatly simplifies the set-up and balancing. For a mono PA, the MAIN OUTPUT drives the PA amplifiers. Program L and Program R can be used for separate sub-mixing (such as vocals and instruments) with the channel PAN controls assigning the inputs to either or both of the sub-groups. Since the MAIN output is derived from the Program L and Program R outputs, you can use the SUB faders to adjust sub-group balance and the MAIN fader to adjust overall PA level.

If the location is suitable for a stereo PA, use Program L and Program R to drive the left and right PA amplifier systems. The Program faders will directly control the left and right PA levels. The MAIN output may be used as a mono backfill. Use the channel PAN controls to assign left/right locations for the individual inputs—it's usually desirable to have the panned locations correspond to the actual locations of the performers.

Cancel Noise with Balanced Lines

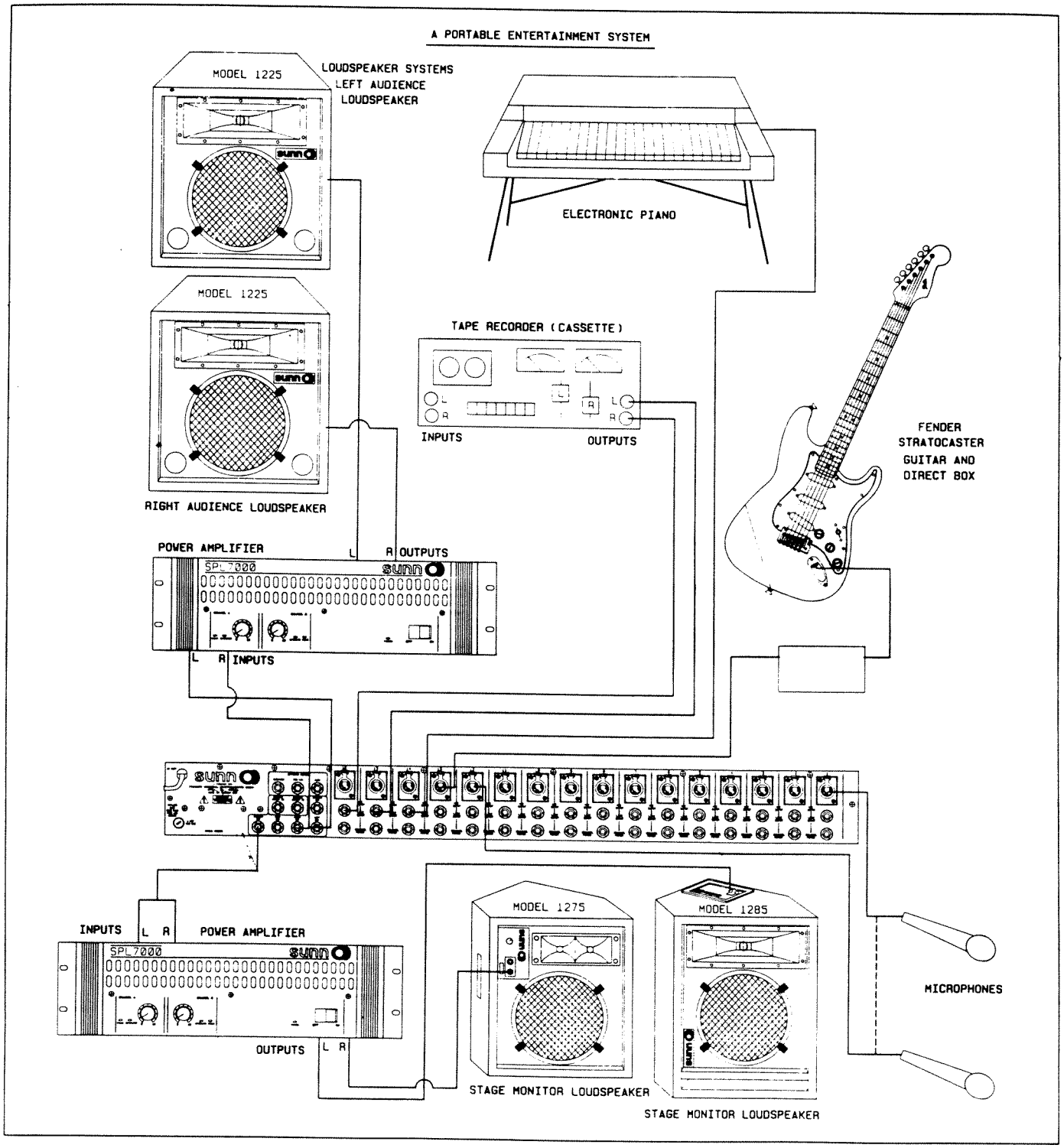
It is possible to be fooled during set-up by an apparently quiet system; however, when the SCR-controlled house lights come on and all the amplifiers are switched on, buzzes and hash will appear. It takes balanced lines to reject the strong EMI fields found in a working environment, although unbalanced lines may be used when the runs are very short (less than 6 feet).

Use balanced two-conductor shielded cable for all long runs. If balanced cable is conected to an unbalanced amplifier or microphone, use a 600 ohm line matching transformer close to the unbalanced device. This ensures maximum common-mode noise rejection for the entire system.

If you have no choice and must use unbalanced cables, keep the lengths as short as possible and well away from AC power mains, lighting cables, and speaker wires. This isn't a bad idea for balanced lines as well, since the balanced system will be just that much quieter.

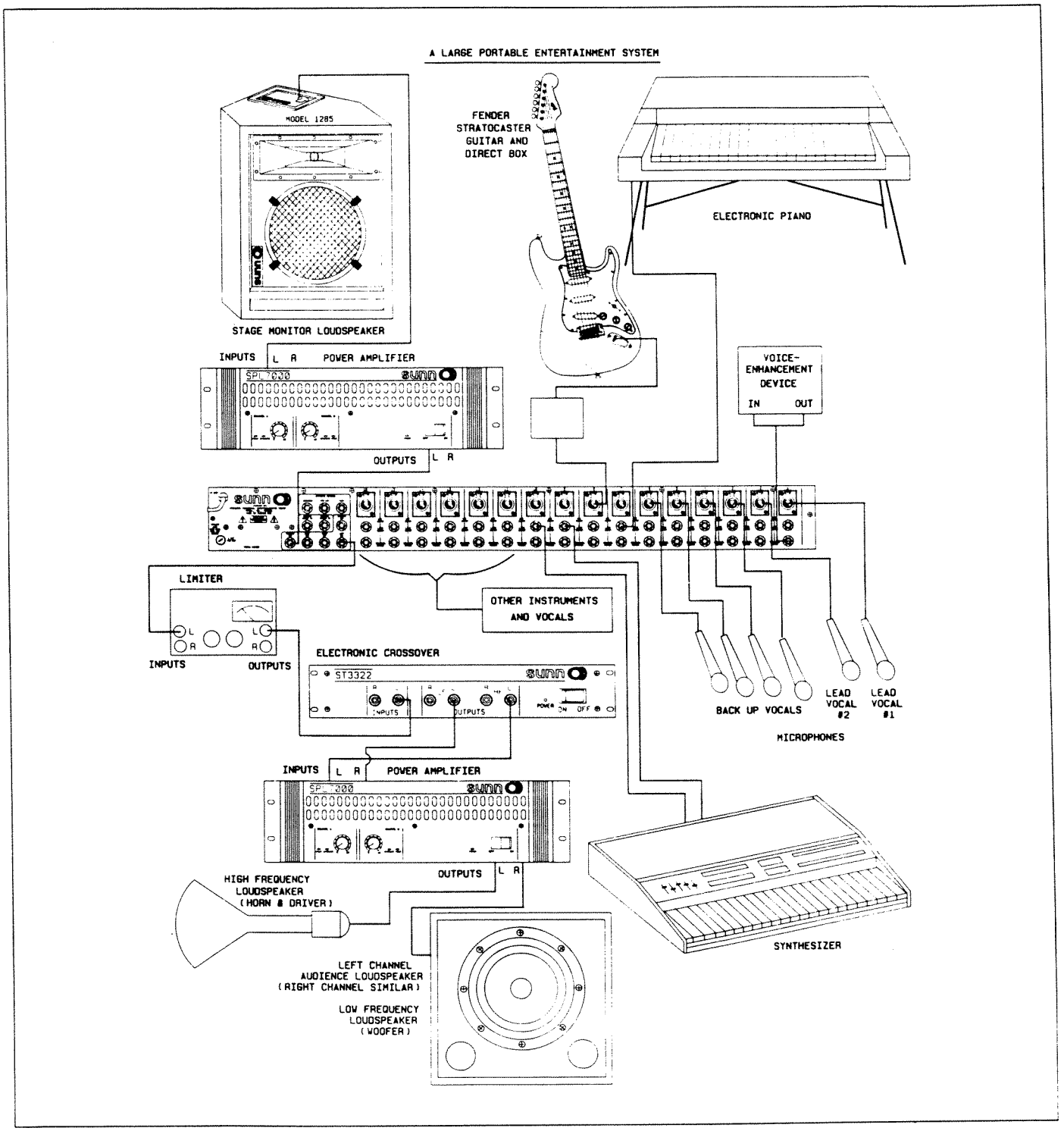
A Portable Entertainment System

This simple system shows how the SUNN 4000 Series Mixers can be the heart of a cost-effective yet versatile pro sound system. This system might be ideal for a small club system.



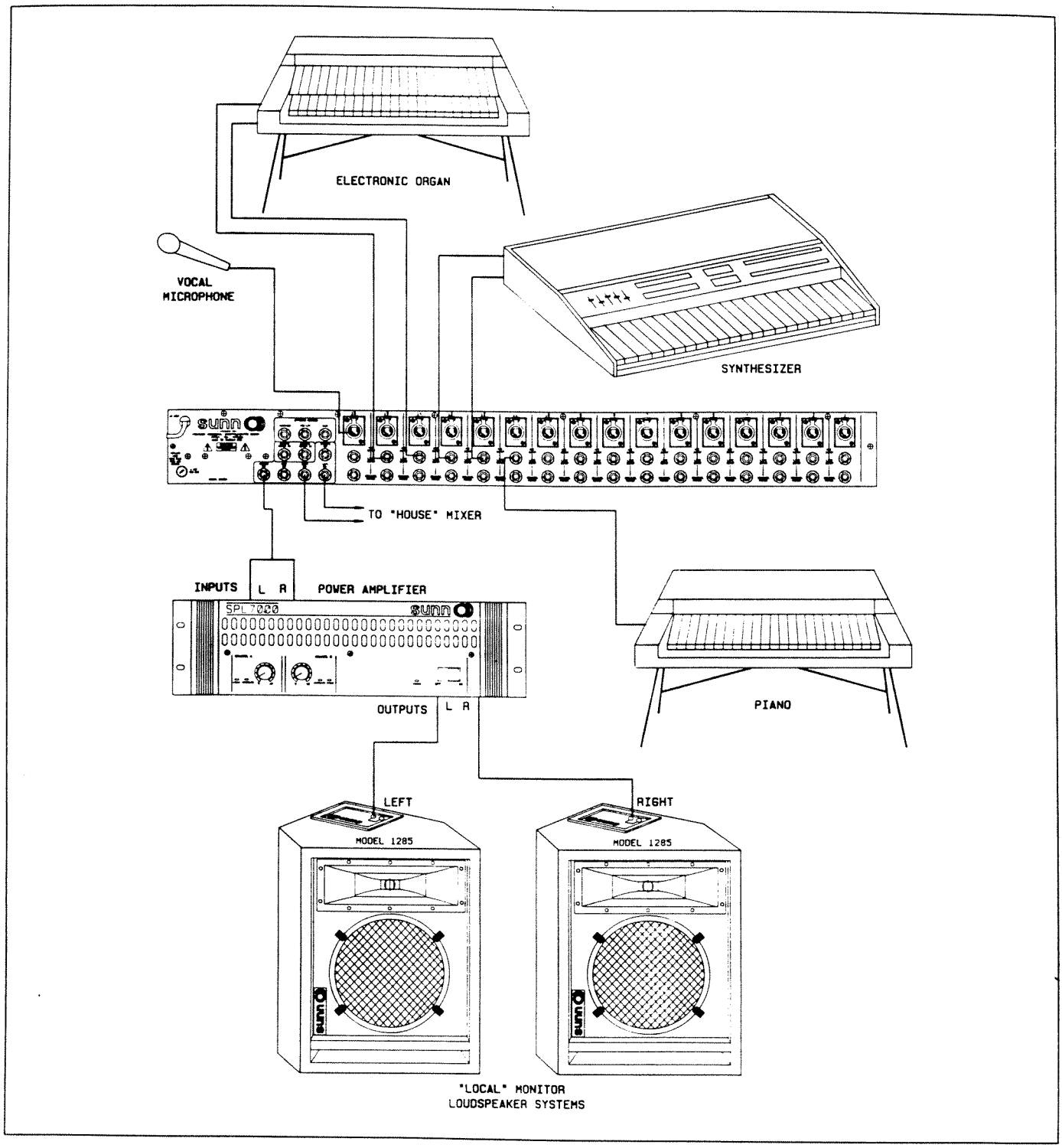
A Larger Portable Entertainment System

In this system, a SUNN SPL 7000 power amplifier is used to power a set of biamplified loudspeaker systems and a second SPL 7000 powers a set of on-stage (foldback) monitors. In addition, we show a stereo limiter used on the Program mixes and an external voice-enhancement device used on one microphone.



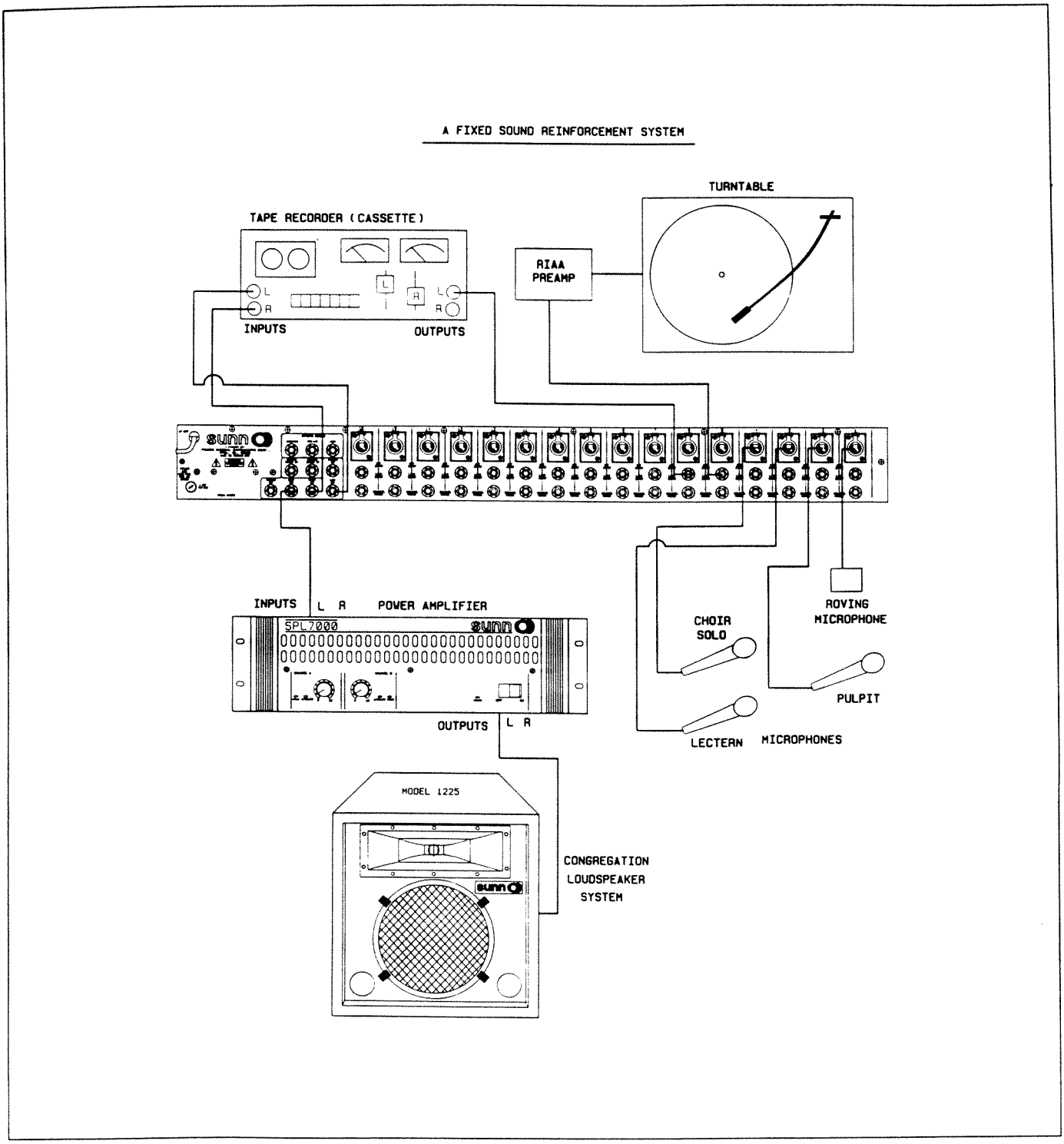
An Instrument Mixing System

A SUNN MX 4100 Series Mixer makes a great keyboard mixer. The Hi-Z input can be adapted (using the Trim controls) to the outputs of just about any keyboard and a SUNN SPL 7000 power amplifier can power "local" keyboard monitor loudspeakers. The Program Out jacks in this system are used to feed the main house mixer.



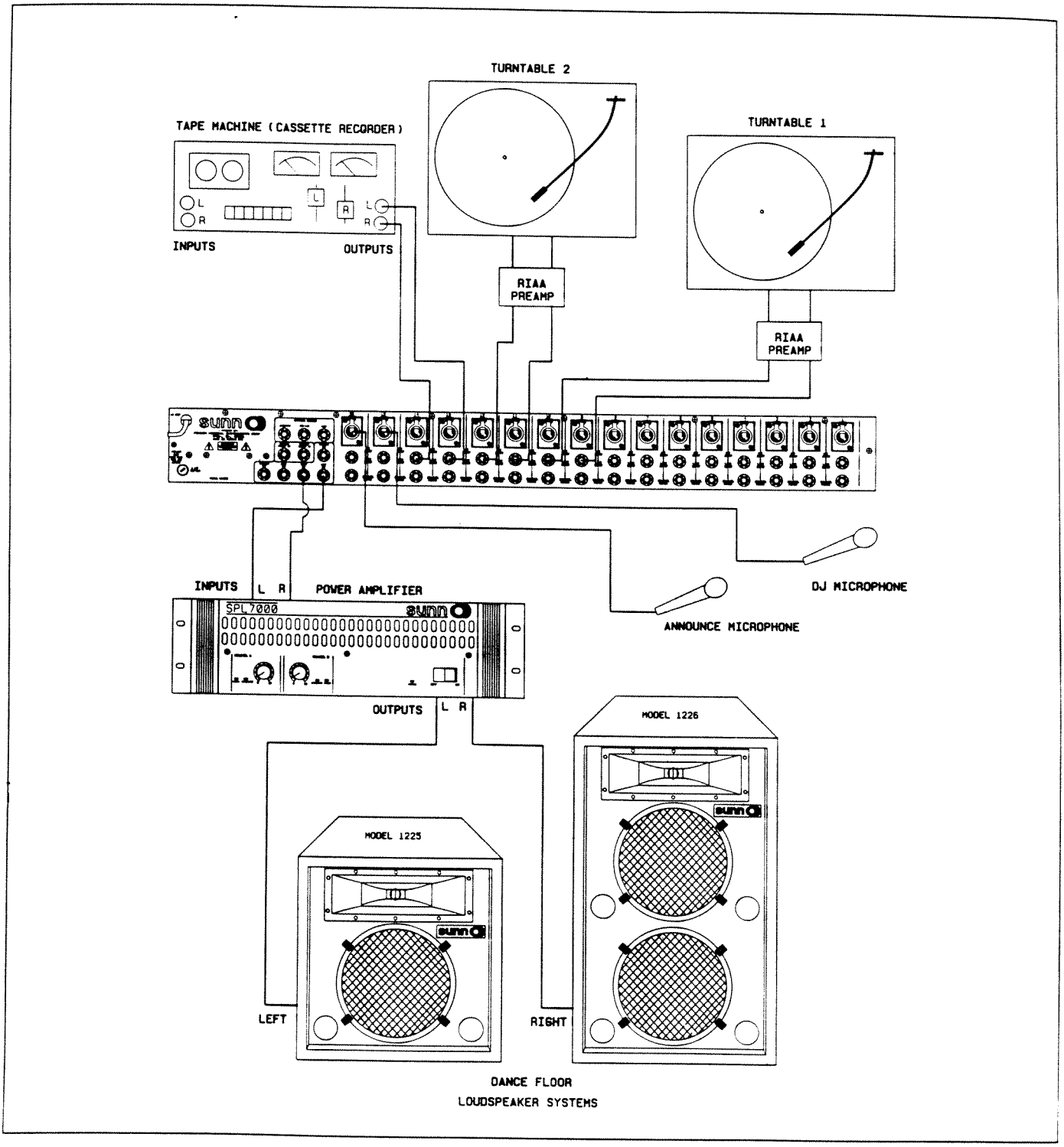
A Fixed Sound Reinforcement System

In this example, a SUNN MX 4100 Mixer is used to provide cost effective yet versatile mixing and equalization capabilities in a small house of worship sound system. A SUNN SPL 7000 amplifier completes the system. The second channel of the SPL 7000 could be used for choir monitors or it could feed ceiling loudspeakers in classrooms, or "privacy" or "mother's" rooms.



A Music Playback System

With external phono preamplifiers, a SUNN MX 4100 mixer becomes a disco mixer. To operate a SUNN Mixer as a stereo disco mixer, pan one Input Channel fully left and the next Input Channel fully right and use these two Input Channels for the left and right outputs of a phono preamp. Then, bring these two channels up and down together to fade one turntable "in" (and use a different pair of Input Channels to fade the other turntable "out"). Use the Phones system to "listen in" on what's going on in your system, and use the VU Meters and the Peak LEDs to help maximize sound output while avoiding distortion.



3 Year Limited Warranty

SUNN Electronic Products
Limited Warranty

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This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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