



**LX-1504 / LX-1506
Powered Mixer**

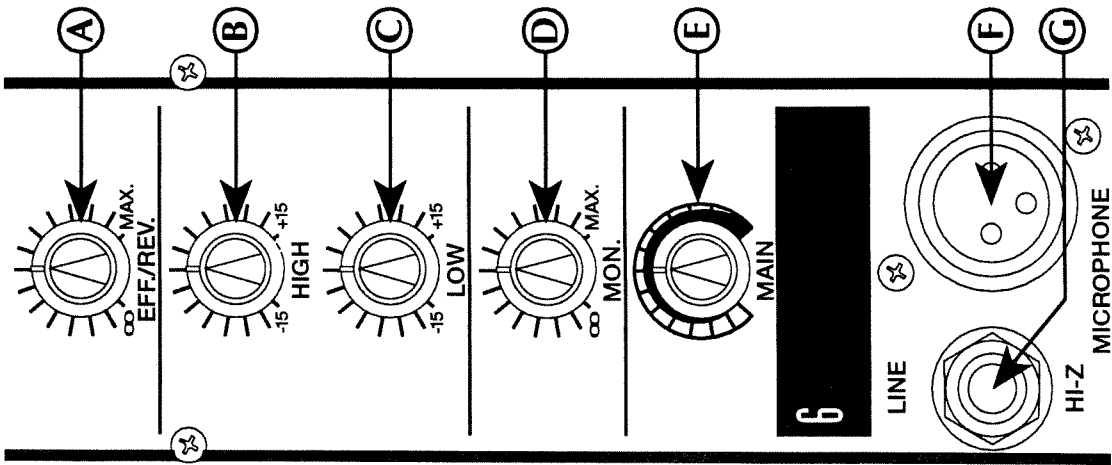
Owner's Manual

P/N 039122

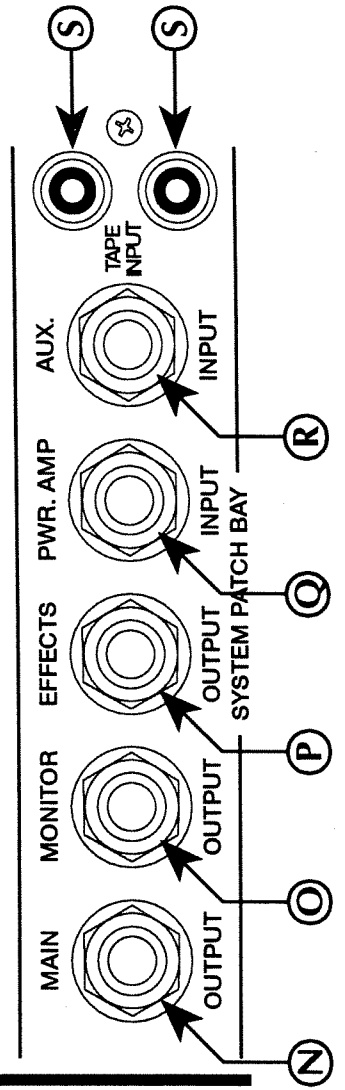
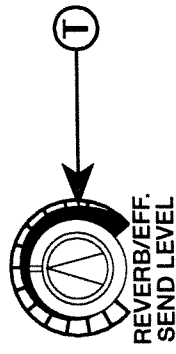
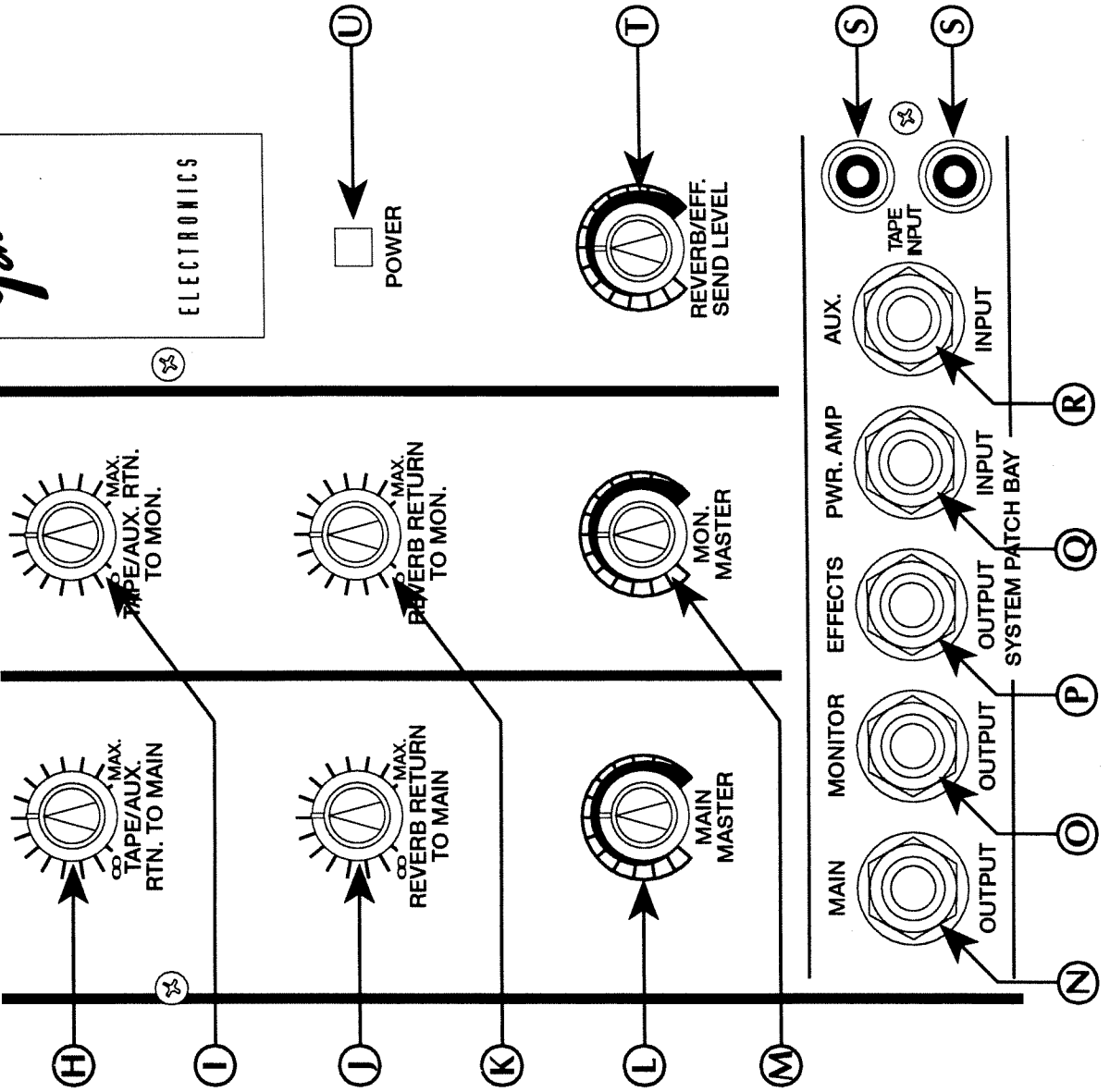
FRONT PANEL CONTROLS



CHANNEL CONTROLS

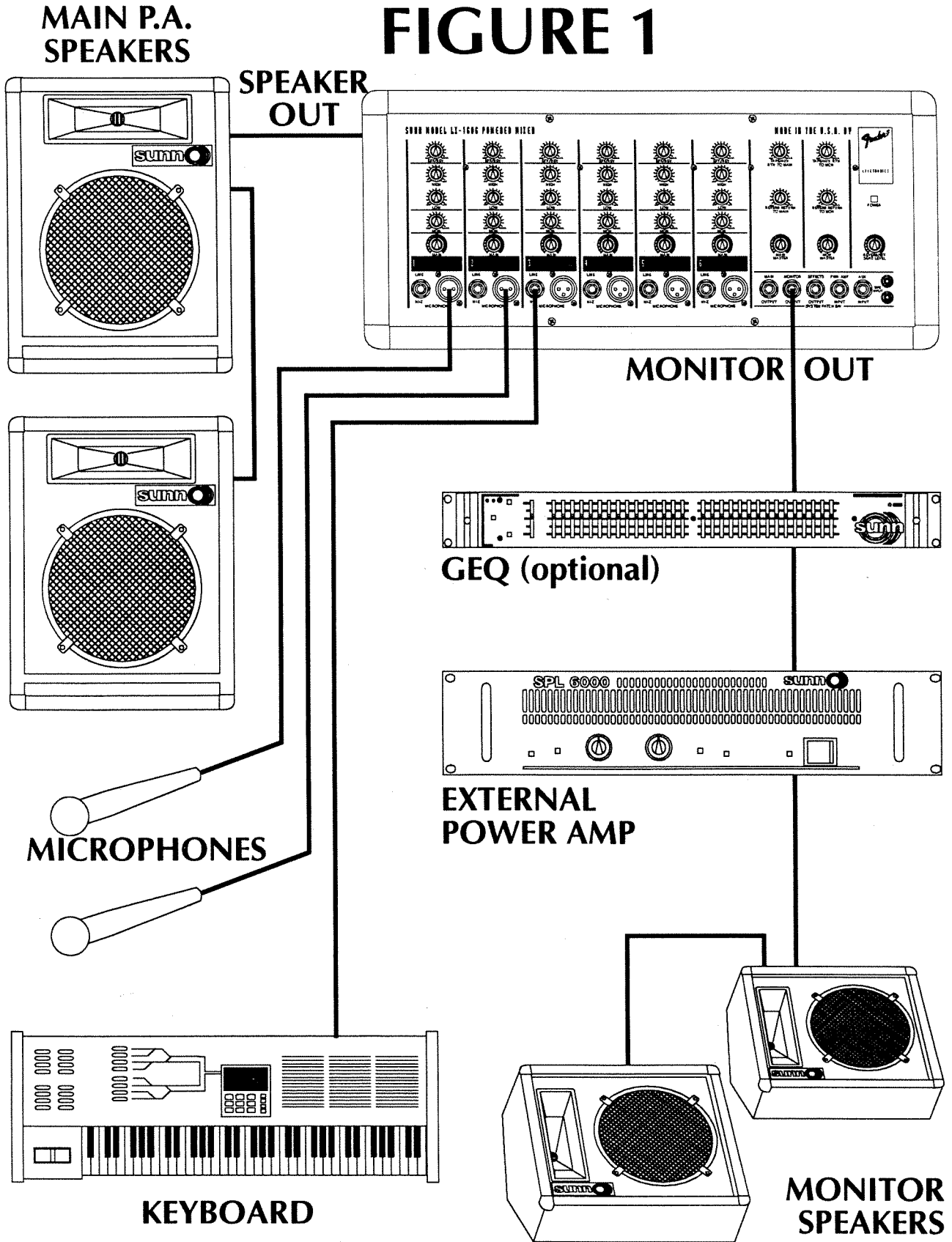


MASTER SECTION CONTROLS



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FIGURE 1



Speaker Wire Length	100'-UP	8	10	12	14
	50'-100'	10	12	14	16
	*25'-50'	12	14	*16	18
	10'-25'	14	16	18	18
	0'-10'	16	18	18	18
		2Ω	3Ω	*8Ω	16Ω
		Speaker Impedance			

FIGURE 2

*Example- The length of speaker wire required is between 25 and 50 feet and the speaker impedance is 8 ohms. The minimum recommended gauge speaker wire is 16 gauge.

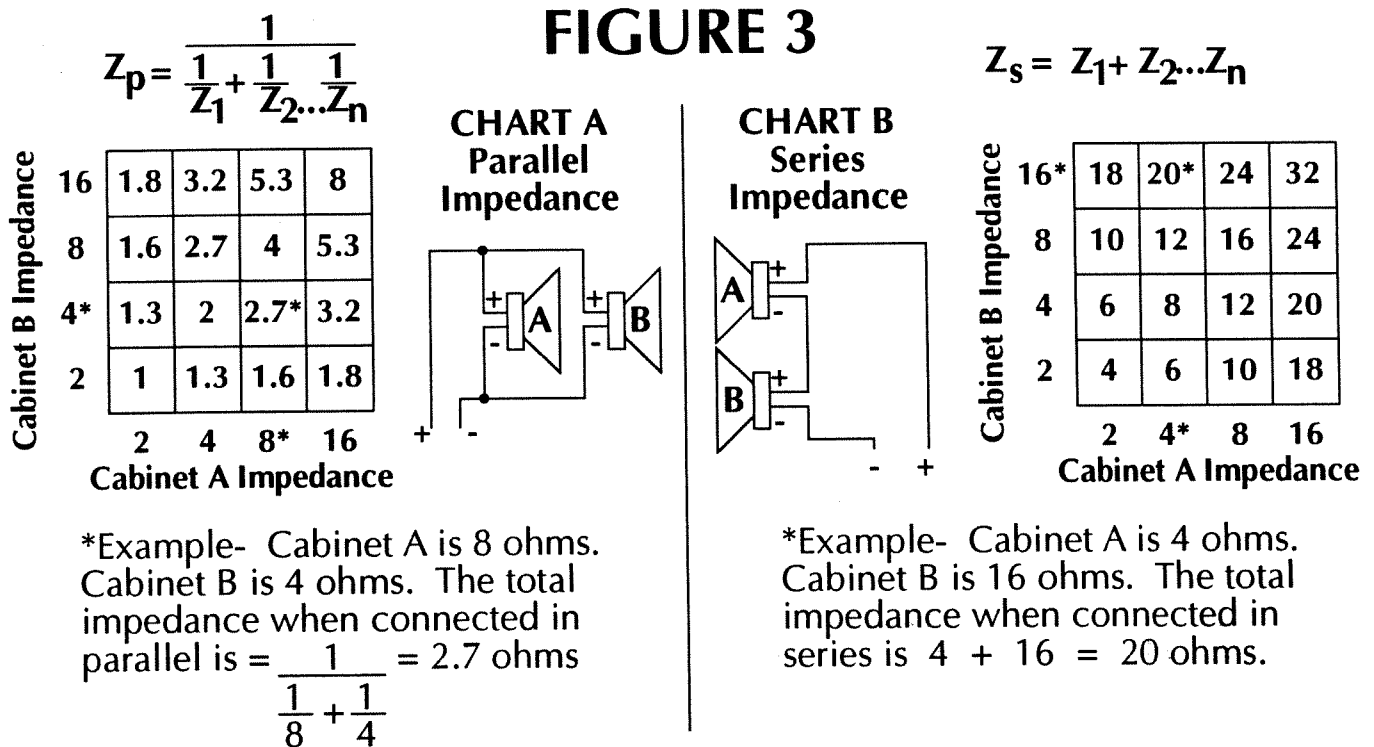


FIGURE 4

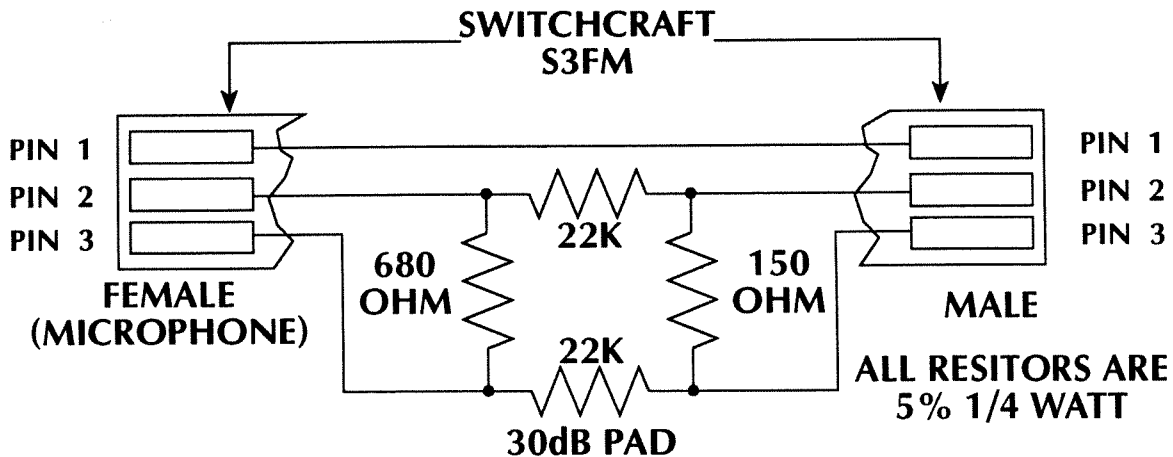


FIGURE 5

USING AN AUXILIARY POWER AMP AND ADDITIONAL SPEAKERS ON THE MAINS FOR MORE POWER; AND THE BUILT IN LX POWER AMP TO POWER UP TO 4 STAGE MONITOR LOUDSPEAKERS.

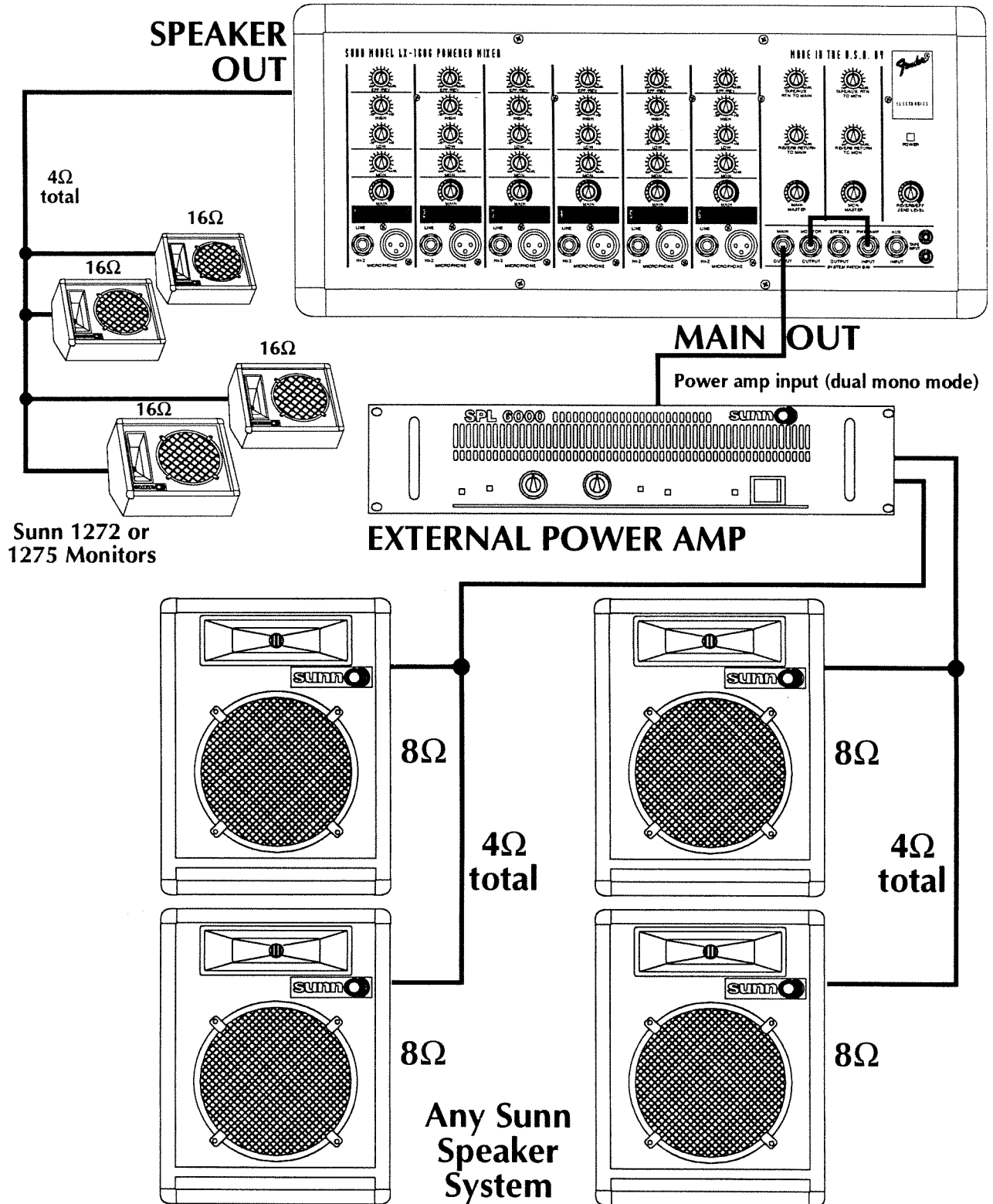


FIGURE 6

PATCHING AN EFFECT BETWEEN THE EFFECTS OUT AND THE AUX. IN.

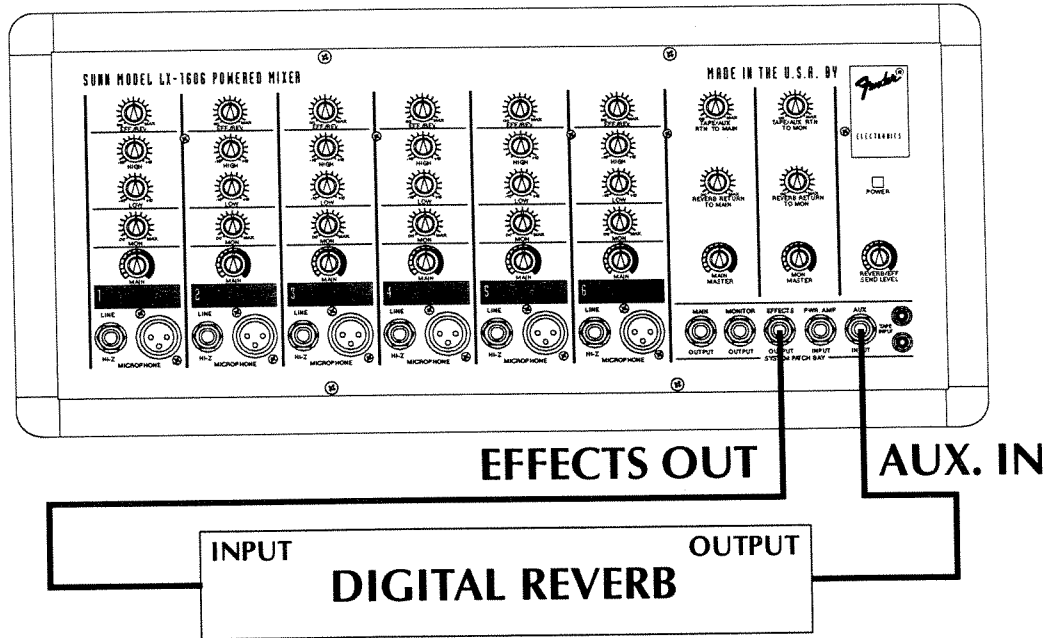
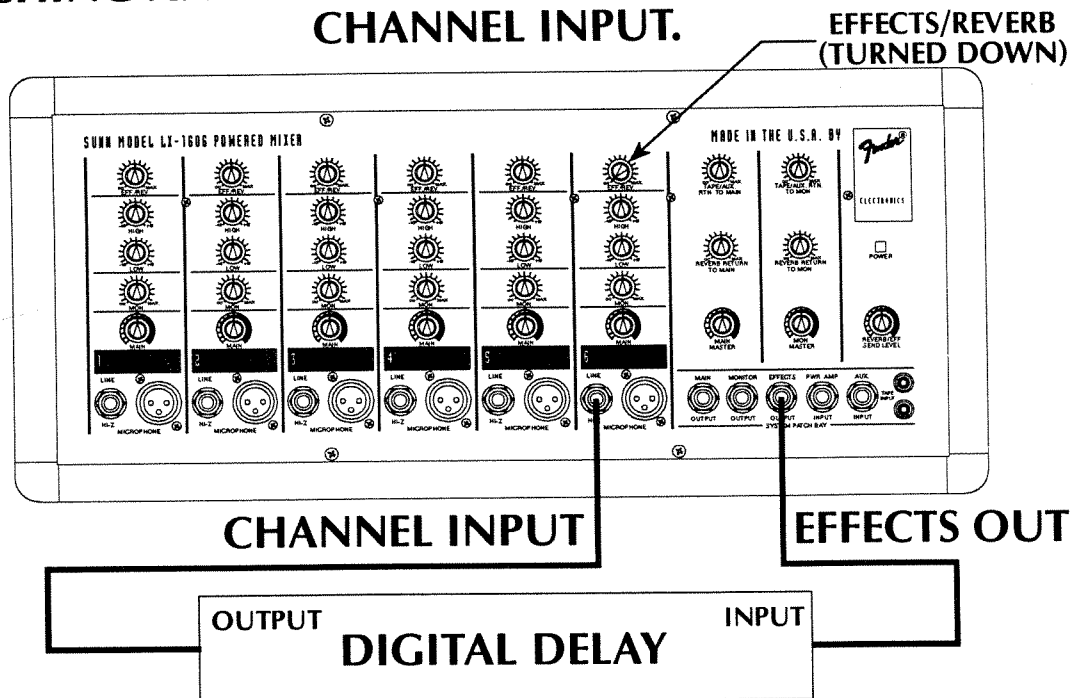


FIGURE 7

PATCHING AN EFFECT BETWEEN THE EFFECTS OUT AND CHANNEL INPUT.



INTRODUCTION

The Surrn LX Series integrated mixer/amplifiers have been designed for easy setup and simple but versatile operation. Requiring only the addition of microphones and speakers, the LX powered mixers are self-contained sound reinforcement systems with features and performance generally found only in units costing much more.

Each preamp channel provides a balanced microphone XLR jack and an unbalanced 1/4" phone input jack. main level, low and high frequency tone, monitor level and effects/reverb level controls. The master section features main master, monitor master, reverb/effects master send, and main and master reverb return controls. There are also auxiliary and tape playback input jacks with return level controls for both main and monitor. LX15XX mixers also feature a versatile patch bay, and a built-in power amplifier. The power amplifier in the LX1504 and LX1506 is capable of driving an eight ohm load to 70 watts and a four ohm load to a potent 100 watts.

To make setup as simple as possible, the mixer and power amplifier are pre-patched in a standard configuration that requires only the microphones and speakers to be plugged in in order to be "on the air." To make the system as versatile as possible, this "normalized" patch may be bypassed by using the inputs and outputs of the patch bay. These allow the individual components of the system to be used in various combinations, and for external equipment to be added into the system as the need arises.

The LX Series has been designed to meet the needs of professionals, and to provide reliable service in the most demanding situations.

FRONT PANEL CONTROLS, JACKS AND L.E.D.

A. CHANNEL EFF/REV CONTROL. This control determines how much signal from each channel goes to the effects/reverb bus. All signals on this bus are combined and sent to the internal reverb system, and also sent to the REVERB/EFF. SEND LEVEL control in the master section. The

signal from this control is then sent to the EFFECTS OUTPUT jack in the master section. The EFF./REV. control is wired post-MAIN control and post-tone controls; thus, the level and tone of the EFF./REV. signal is altered by the setting of the channel MAIN, LOW and HIGH controls.

B. CHANNEL HIGH TONE CONTROL. The HIGH control on each channel may be adjusted to enhance the qualities of that channel's audio signal and to control excessive sibilance ("s" sounds).

C. CHANNEL LOW TONE CONTROL. The LOW control on each channel may be adjusted to enhance that channel's audio signal and to control excessive "boominess". When these controls are straight up, the channel is "flat" (no frequencies cut or boosted). The most natural sound is achieved by avoiding extreme tone control settings.

D. CHANNEL MONITOR CONTROL. The MONITOR control determines how much of a channel's signal is sent to the stage monitor mix bus. If no stage monitors are used the monitor mix could also be used as a second reverb or effects send bus. This allows a separate mix to be created for stage monitoring. The control is wired pre-MAIN control and pre-EQ; thus, the monitor signal is independent of other channel controls.

E. CHANNEL MAIN CONTROL. The channel MAIN control determines how much of the channel's signal is sent to the main mixing bus and to the EFF/REV control. For best signal-to-noise ratio, this control should be set relatively high; the usual setting is straight up, except when input signal levels are great enough to cause clipping.

F. XLR JACK. The three-pin audio connectors (often called "XLR" or "Cannon" connectors) on the front panel are intended for balanced input signals from low impedance microphones. To avoid clipping in the input stage, signal levels

should not exceed 0.8 VRMS. Higher amplitude signals, such as balanced line level signals, may also be patched into these jacks if an input pad is used (see Section "Cords and Cables, Input Pads").

The XLR jack is wired according to the following standard:

Pin 1 is ground

Pin 2 is the non-inverting (+) input

Pin 3 is the inverting (-) input.

Signals at the XLR jacks experience 20 dB more gain than those at the 1/4" channel input jacks.

G. 1/4" JACK. The 1/4" phone jacks are intended for high impedance unbalanced input whose amplitude is under 8 VRMS.

MASTER SECTION CONTROLS

H. TAPE/AUX. RTN. (return) TO MAIN CONTROL. Signals patched into the AUX. INPUT jack and/or the TAPE INPUT jacks are sent to the main bus via this control. This control determines how much of the AUX. or TAPE input signal appears in the main mix. Use this for tape playback or as a second return input.

I. TAPE/AUX. RTN. TO MON. (monitor). Signals patched into the AUX. INPUT jack and/or the TAPE INPUT jacks are sent to the monitor bus via this control. This control determines how much of the AUX. or TAPE input signal appears in the monitor mix.

J. REVERB RETURN TO MAIN CONTROL. This control determines how much of the signal from the reverb system is added to the main mix.

K. REVERB RETURN TO MON. CONTROL. This control determines how much of the signal from the reverb system is added to the monitor mix. Many vocalists like to hear some reverb on their voices in the monitor system; be aware that due to the increased gain, reverb in the monitors increases the likelihood of feedback in the monitor system.

L. MAIN MASTER LEVEL CONTROL. This is the master level control for the main mix. It controls the signal level present at the MAIN OUTPUT jack. If nothing is patched into the MAIN OUTPUT jack or the PWR. AMP INPUT jack, the MAIN MASTER control will also determine the power amplifier input levels.

M. MONITOR MASTER LEVEL CONTROL. This is the master level control for the monitor mix. It controls the signal level present at the MONITOR OUTPUT jack.

N. MAIN OUTPUT. Signals from each of the channels are combined with reverb, effects, auxiliary, and tape input signals to form the final main mix. The overall level of the mix is controlled by the MAIN MASTER level control and this mix appears at the MAIN OUTPUT jack. The mix is passed on to the power amplifier. Inserting a plug into the MAIN OUTPUT jack does not interrupt the normal signal flow. This jack is useful for recording a live performance, and for inserting signal processing equipment into the signal path.

O. MONITOR OUTPUT. Signals from each of the channels (as determined by the channel MONITOR control) are combined on the monitor bus, fed into the monitor summing amplifier, and sent to the MONITOR OUTPUT jack. The signal level present at this output is determined by the monitor master (MON. MASTER) level out control.

P. EFFECTS OUTPUT. Signals present on the channel effects/reverb bus are mixed in the effects/reverb summing amplifier and controlled by the REV./EFF. SEND LEVEL control. This mix is then sent to the EFFECTS OUTPUT jack. This output may be used to drive external effects (echo units, phase shifters, flangers, digital delays, etc.). The return signal from the effect may be patched into the mixer through the AUX INPUT jack, or by way of a preamp channel 1/4" input jack. Use of a preamp channel as a return gives you the ability to shape the frequency response of the signal

using the HIGH and LOW controls; however, care must be taken to ensure that the EFF./REV. control on that channel is turned all the way down - otherwise a feedback loop will exist which will cause oscillation and possible damage to your speakers. Care must be taken to ensure that the amplitude of the return signal is not too great for the preamp channel input; an input pad may be used if needed. (See section "Cords and Cables, Input Pads".)

Q. PWR. AMP (power amp) INPUT. Under normal circumstances, the power amplifier receives its input from the MAIN OUTPUT signal. However, by inserting a 1/4" phone plug into the PWR. AMP INPUT jack, the normal signal path is broken and any signal carried by the phone plug becomes the power amplifier's input. This allows the power amplifier to be used independently from the rest of the LX powered mixer. Possible uses of this feature include dedicating the power amp to the monitor system while employing an auxiliary power amplifier for the mains, or using the LX power amp as one of the two power amplifiers in a biamped system (this would require the addition of an external crossover, and another amplifier).

R. AUX. INPUT. This input is generally used as a return from an external signal-processing device (flanger, phase shifter, etc.). Signals present at this input are routed to the main bus by way of the TAPE/AUX. RTN. TO MAIN level control, and to the monitor by the TAPE/AUX. RTN. TO MON. control. It is possible to use the AUX. INPUT as a line level preamp channel, however it lacks the preamp channels' tone and effects send controls.

S. TAPE IN. Patching the output of a stereo tape deck into the phono (RCA) tape input jacks produces a mono signal in the main and/or monitor mix. This is useful for playing music during breaks in the performance or for the playback of prerecorded music tracks for vocal accompaniment. The TAPE IN signal levels are controlled by

the TAPE/AUX RTN. TO MAIN level control, and are also fed to the monitor bus by the TAPE/AUX RTN. TO MON. level control.

T. REVERB/EFF. SEND LEVEL CONTROL. This controls the level of the mix, created by the settings of the channel EFF./REV. controls, that appears at the EFFECTS OUTPUT jack.

U. POWER L.E.D.. The red L.E.D. (Light Emitting Diode) is the front panel "power on" indicator.

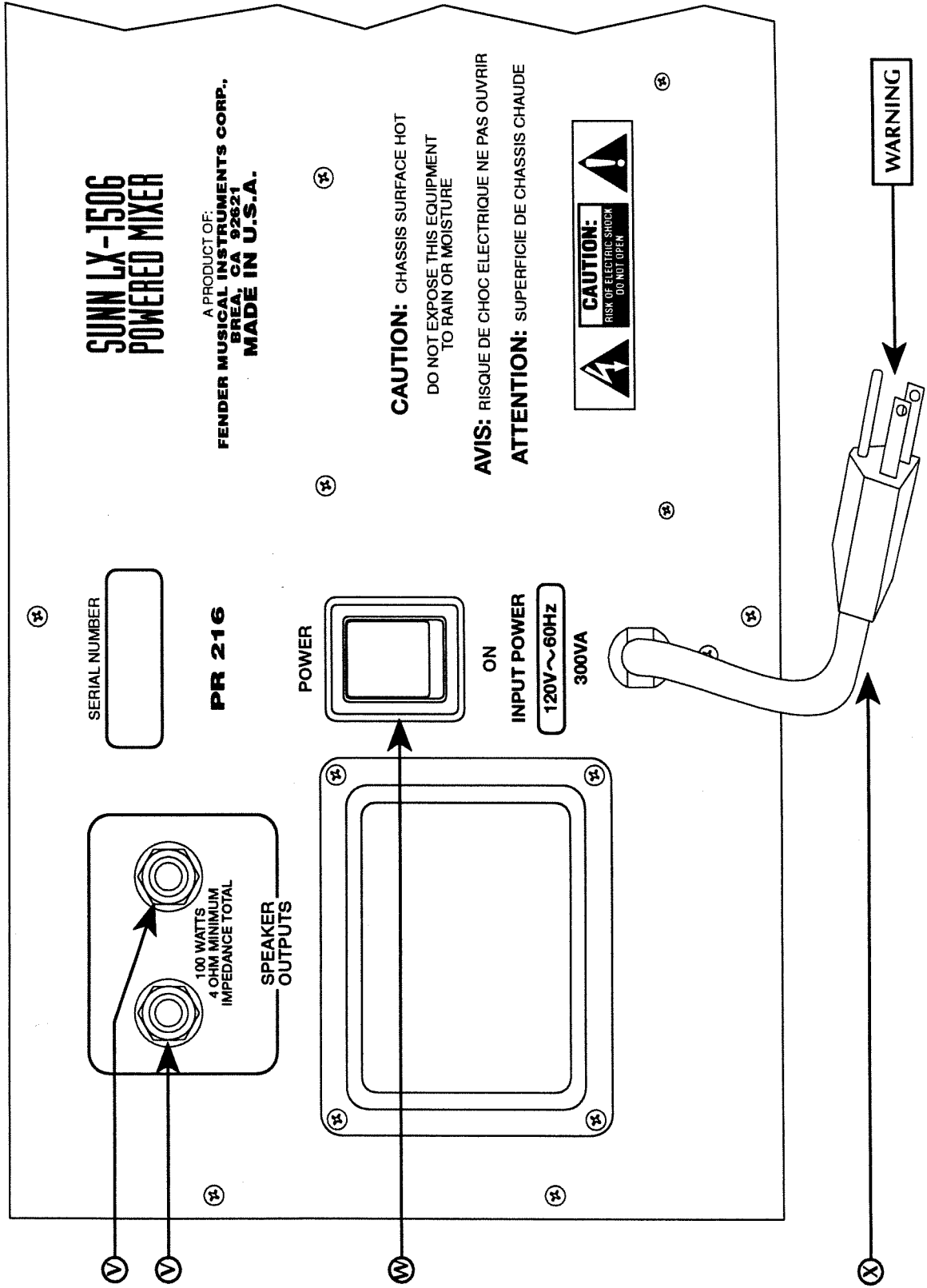
BACK PANEL

V. SPEAKER OUTPUT JACKS. These are the speaker outputs for power amplifier. The LX1504 and LX1506 power amplifiers can drive a 8 ohm load to 70 watts, and 4 ohm load to 100 Watts. **DO NOT** connect loads with impedances lower than 4 ohms to the SPEAKER OUTPUTS, as this may result in amplifier overheating which will cause the LX mixer to eventually "turn off" for a period of time. (To calculate the speaker impedance, see **Figure 3**.) In addition, be sure that the speaker cable you use is of adequate gauge; otherwise, power will be lost in the wire instead of being delivered to the speaker, and the damping factor will be impaired (see **Figure 2**).

W. POWER SWITCH. AC POWER to the LX powered mixer is turned on and off by a rocker switch located on the back panel. If you have any external signal processing devices patched to the system, turn them on first to avoid pops in the loudspeakers. Also, when you turn on the mixer, make sure that the MAIN MASTER is down. This eliminates the risk of the system immediately feeding back when it is turned on, and also minimizes turn-on pops.

X. LINE CORD WARNING! Do not remove the grounding prong of the AC plug. To do so risks exposure to potentially lethal voltages and voids the warranty.

BACK PANEL



SETUP AND OPERATION

Figure 1 illustrates the simplest way to set up your PA system.

INITIAL CONTROL SETTINGS. When you first set up the sound system, initial settings are critical for arriving at a satisfactory mix quickly. Often, to the distress of many soundmen, the show must begin without a preliminary sound check. The following recommendations should help to alleviate some of the soundman's headaches.

Set the channel high frequency and low frequency controls to their mid positions; set the Main and Monitor master controls to their mid positions. Set all other controls to zero.

LEVEL CONTROL. Adjust the level controls to the approximate level you desire, with a mix that you feel will be acceptable.

MONITOR CONTROLS. Most groups like to hear their voices in the monitors; some also like to hear certain instruments as well (keyboards, guitars, and so forth). A good initial MONITOR control setting is straight up. Assuming that the various vocalists use similar miking techniques and sing at similar volumes, the levels appearing in the monitor mix should be fairly matched. Further adjustments can be made as needed.

CHANNEL EQUALIZATION. For starters, most vocal, keyboard and other full range signals are best left flat (controls at 0, or straight up). For signals having a great deal of low frequency content, such as drums and bass guitars, the LOW control should initially be backed off slightly (rotated to the left) from the straight up position to reduce boominess. Naturally, all controls should be set to achieve the most pleasing sounds, but the settings listed above should help in achieving good results quickly. In general, extreme settings cause the sound to be unnatural and should be avoided.

CORDS AND CABLES.

MICROPHONE CORDS. On the LX mixers, use balanced two-conductor shielded cable for all long runs. Balanced systems are capable of rejecting noise introduced from such sources as cash registers, electric motors and triac-controlled lights. If a balanced cable is connected to an unbalanced output (e.g., a keyboard mixer output) or microphone, use a direct box or balancing 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, use the shortest cables possible and keep them away from AC power mains, lighting cables and speaker wires. If you want the quietest system possible, you should follow these rules with balanced lines as well.

SPEAKER CABLES. Use two conductor zip cord to connect the amplifier outputs to your speakers. The gauge of the wire is important; wire that is too light in gauge reduces damping factor (the ability of the amplifier to control the motion of the speaker) and also consumes power (the power from the amplifier heats up the wire instead of going to your speakers.) To calculate the proper gauge wire for your system use **Figure 2**. To calculate your speaker impedance, use **Figure 3**.

INPUT PADS. If input signal levels are too great, the input stage may be overdriven and cause distortion. The solution in such cases is to use an input pad. A 30 dB pad can be made by using a Switchcraft connector (part #S3FM) with the resistor network shown in **Figure 4**.

PATCHING. Figures 5 through 7 show possible ways of patching external equipment into the LX mixer. They are by no means the only patches possible. If you want to try a patch that is not illustrated, consult the Block Diagram on the back page to determine if your patch is possible. When patching external equipment into the signal chain, best results will be obtained by following these rules:

Use the highest quality patch cords available and keep them as short as possible.

Avoid patching a bus output back into its input (an example of this is patching a Digital Delay from the EFFECTS OUTPUT and returning it to the input of a channel which has its EFF./REV. control turned up); doing so may result in oscillation (possibly inaudible) that can damage loudspeakers and create distortion.

Do not use a mic level effect, such as an effect intended for guitar, with a line level signal, such as the Main or Monitor output. Doing so may overdrive the mic level effect and cause distortion.

SPECIFICATIONS

GAIN

	AT MAIN OUT	AT SPEAKER JACK
Gain, LO Z in	47dB	71dB
HI Z in	27dB	51dB
Aux in	14dB	38dB
Tape in gain	14dB	38dB
Power amp in	—	24dB

CHANNEL EQUALIZER

Low frequency range:	+ / - 15dB at 100 Hz.
High frequency range:	+ / - 15dB at 10 kHz.

POWER AMPLIFIER

Power output:	100 Watts,into 4 Ohms. 70 Watts,into 8 Ohms.
Frequency response:	20Hz to 20kHz +0dB, -1.5dB, at 4 Ohms.
Damping factor:	80, at 1kHz using an 8 Ohm load.
Sensitivity:	1.4 Volts required for 100 Watts at 4 Ohms. 1.6 Volts required for 70 Watts at 8 Ohms.
Signal to noise ratio:	90dB

OVERALL SIGNAL TO NOISE RATIO (Mixer input to speaker output)

Main at full clockwise, all tone controls set to "flat" all channels at zero, and reverb at zero: 82dB

GENERAL

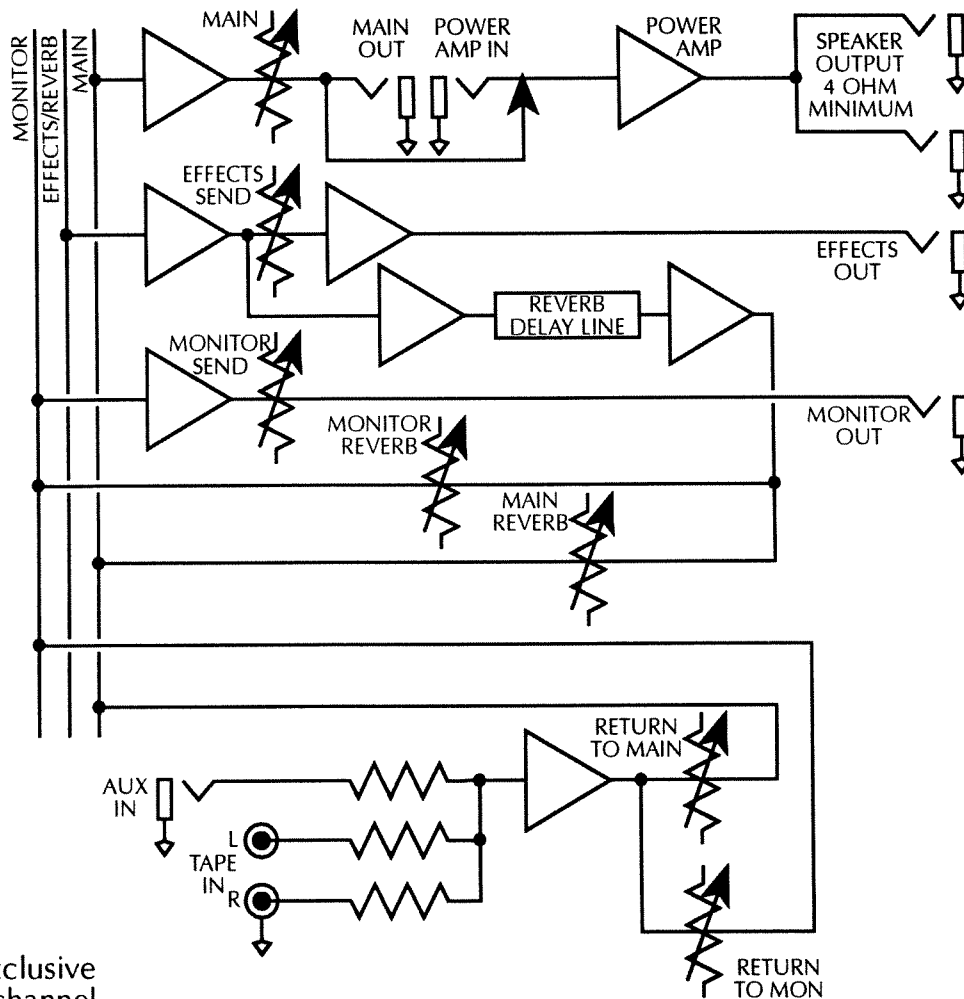
Dimensions:	Height:	9 inches	(22.9cm)
	Width:	19-3/4 inches	(50.2cm)
	Depth:	12-1/8 inches	(30.8cm)
	Weight:	27 Lbs.	(12.3 Kg)

UPKEEP AND SERVICE

The SUNN LX powered mixers have been designed to give years of trouble free service. With a few precautions you can help to insure it's continued reliable service.

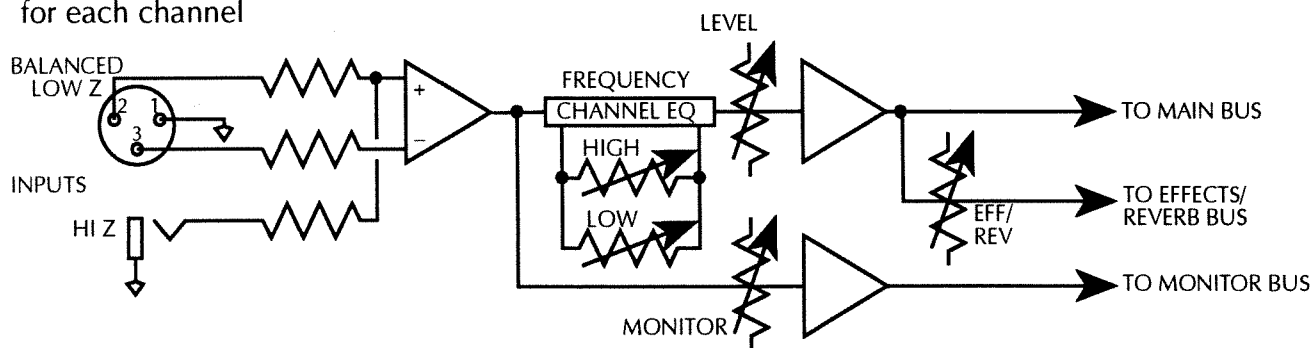
- Do not obstruct the rear panel or mount it in a cabinet without proper ventilation. It needs air circulation for proper cooling.
- Transport the mixer with care.
- Periodically inspect the mixer for damage which may occur during transportation.
- If you leave the mixer set up when you are not using it, protect it from dust with a soft cover.
- DO NOT SET FOOD OR BEVERAGE on the LX powered mixer - this cannot be overemphasized. Spilling a drink can be the quickest way to ruin a potentiometer (fader, level control) or switch.
- When using the mixer outdoors, protect it from moisture (rain, sprinklers, beer, etc.).

BLOCK DIAGRAM



Signal path exclusive of individual channel

Signal path typical for each channel



A product of:
FENDER MUSICAL INSTRUMENTS CORP.
 1130 Columbia Street, Brea California 92621