

MXR

System Preamplifier II

Operation Manual

## INTRODUCTION

The MXR System Preamp II has been designed to provide the ultimate in comprehensive stereo system control while maintaining exceptional sonic integrity. The System Preamp II offers the home audio enthusiast control capabilities and signal-routing flexibility previously restricted to recording engineers using sophisticated mixing consoles.

The System Preamp II serves as the central control unit in a high-quality component system. It allows the user to route two independent signal sources simultaneously to a monitor output, tape deck, or power amp and speakers. A Mix control can blend the two signals and provides the means to accomplish professional-sounding fades between program selections. A separate monitor channel, operating without affecting the main channel, features its own Select and Level controls. A versatile instrument input enables the signal from an electronic instrument or a microphone to be blended with program material. The controls and features are user oriented, offering exceptional flexibility and ease of use.

Like all MXR products, the System Preamp II reflects the latest advances in American audio technology. This innovative preamplifier has been designed with imagination, to provide the ultimate in flexible control for the creative audio enthusiast.

To ensure proper operation, we recommend that you first read this manual to familiarize yourself with the System Preamp II, its controls, and their functions and applications. Note that when actual labels are referenced, they will be indicated by all capital letters (e.g. the BALANCE control). The Circuit Description section is included for technical reference.

## INSTALLATION

The MXR System Preamplifier II can be easily incorporated into any component stereo system. The complexity of the installation depends on the user's individual system and how many of the preamp's features are utilized. The System Preamplifier II is the central control unit in the stereo system through which all signal sources are routed before being output to the power amplifier and speakers. A typical connection set-up is shown in Figure 1. Many variations are possible.

Considerable freedom is afforded the user in determining the optimum physical location of the System Preamplifier II. However, it is recommended that the preamp not be placed near (within approximately four inches) of a heavy-duty power transformer such as that found in a power amp to prevent hum from being induced in the sensitive phono preamp sections. The preamp may be rack mounted with optional rack-mount ears.

All connections to the System Preamplifier II (with the exception of the GND post discussed below and the front-panel INSTRUMENT and headphone jacks) are made with standard RCA-type phono plugs. The PHONO inputs accept a low-level signal and are designed to be used with any magnetic phono cartridge. A ground wire from the turntable should be connected to the rear-panel GND post to prevent hum. The front-panel INSTRUMENT Jack accepts a variable-level input signal through a standard two-conductor (mono) 1/4" phone plug. This input is designed to be used with a variety of monophonic sources such as a microphone or electrically-amplified musical instrument. All other inputs accept high-level signals. The TUNER input may be used with a wide variety of signal sources, including tuners, auxiliary tape decks, television and video tape recorder sound, and auxiliary phono preamps.

The Jacks labeled TAPE 1 and TAPE 2 are intended for use with tape decks, while the Jacks labeled LOOP 1 and LOOP 2 are intended for use with external signal processors. These assignments are flexible, however. Signal processors, as well as tape decks, may be used in the tape loops. Theoretically the processor loops may also be used for taping, but we recommend that their use be limited to their designated function to simplify operation of the System Preamplifier II. The designations IN and OUT are defined with respect to the System Preamplifier II. In other words, IN implies that the Jack receives a signal from an external source (tape deck or signal processor) and OUT implies that the Jack sends a signal to an external unit. Note that the signal level at the TAPE and LOOP OUT Jacks is not affected by the front-panel VOLUME or LEVEL control.

The output at the MAIN OUT Jacks will drive any basic power amplifier with an input impedance greater than 600 ohms. This output is controlled by the MAIN front-panel controls. The output at both the front-panel headphone Jack and the rear-panel MONITOR OUT Jacks is controlled by the MONITOR front-panel controls. The headphone Jack may be used with both low and high impedance headphones. The MONITOR OUT Jacks provide the same signal as the headphone Jack without the extra

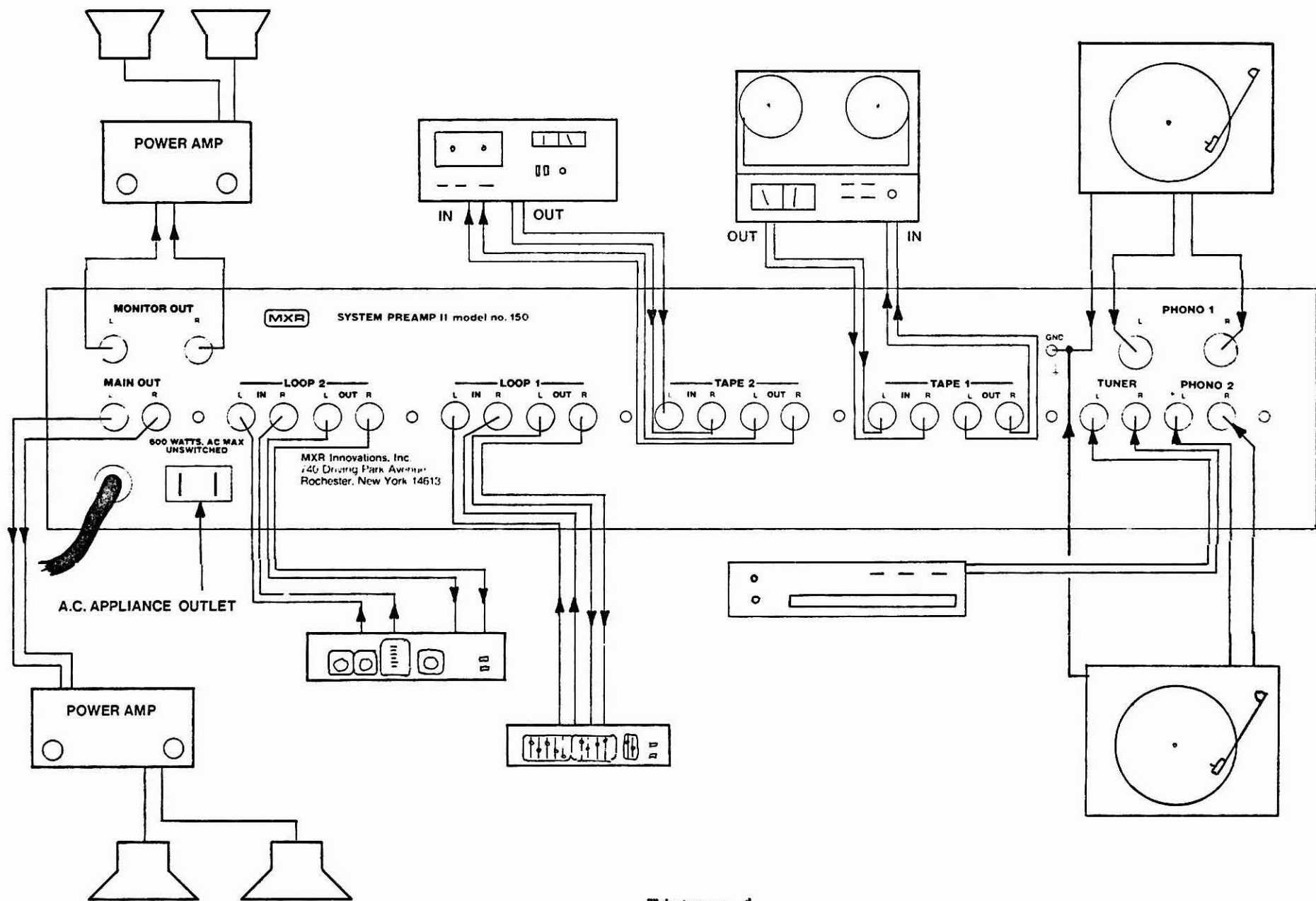


Figure 1

buffering necessary to drive headphones. The MONITOR OUT Jacks may be used with a separate power amplifier and speakers.

North American versions of the System Preamplifier II provide an AC convenience outlet on the rear panel. This outlet is unswitched and is ideal for use with a turntable which is usually best controlled by its own on/off switch. The total power consumption of any device(s) connected to this outlet should not exceed the maximum power rating of 600 watts.

The System Preamplifier II operates from a power source of between 110 and 125 volts AC, 50 - 60 Hz. Models manufactured for use outside the United States have been modified to comply with the required electrical specifications for the country of destination.

## OPERATION

The controls provided on the MXR System Preamplifier II are designed for maximum versatility and straightforward operation. Although the System Preamplifier II may have more controls than you're accustomed to seeing on a preamp, don't feel intimidated. A little time spent experimenting with the controls will be well worth the effort. The slight increase in complexity yields a new realm of control and signal-routing flexibility. The following discussion explains the function of each control.

### POWER

The switch labeled POWER turns the System Preamplifier II on or off. Before turning on the preamp, first turn the VOLUME control fully counterclockwise. There is a few second delay after power is applied before the unit is active. This protects the rest of the system from potentially damaging turn-on transients.

### INSTRUMENT Input and Level Control

The Jack and associated level control labeled INSTRUMENT are for use with a monophonic source. The mono input signal is routed to both the left and right channels. The level control determines the gain of an internal amplifier which can provide enough gain (up to 30 dB) to amplify a low-level source such as a microphone or electrically-amplified musical instrument (e.g. an electric guitar) to normal stereo system line levels. This feature (along with the MIX control described below) allows you to play or sing in accompaniment to your favorite songs. The INSTRUMENT input can also be used with higher-level monophonic sources (the audio output of a video tape recorder, for instance) with lower settings of the level control. When using the INSTRUMENT input, adjust the level control so that the instrument level is about the same as the level from the other input sources. Turning the control clockwise increases the level.

### A and B SOURCE Selection

The System Preamplifier II may be viewed as two separate preamps in one unit with versatile linking functions. Because of its dual nature, the System Preamplifier II allows a minimum of two signals to be processed and routed independently. There are two main stereo input buses, A and B, and two output sections, MAIN and MONITOR (discussed below). The controls labeled A and B SOURCE allow two separate stereo input signals to be independently selected from among the INSTRUMENT (mono), TAPE 2, TAPE 1, TUNER, PHONO 2, or PHONO 1 inputs.

## Subsonic Filter ( )

Pushing this button in enables a subsonic (low-cut) filter which works in conjunction with the PHONO 1 circuitry. The subsonic filter removes inaudible low-frequency information caused by tone arm resonance effects, turntable rumble, severely warped records, and acoustic feedback. This subsonic information has no musical content and wastes amplifier power, accentuates speaker non-linearities, and could potentially cause speaker damage. Figure 2 shows the response of the System Preamplifier II with the subsonic filter activated and also without filtering. The subsonic filter is designed to have a very sharp rolloff below 20 Hz and very little effect above this frequency.

The PHONO 2 circuitry incorporates a similar subsonic filter which is always activated.

## MIX Control

The System Preamplifier II's features include a mixing section which blends a portion of the selected A and B signals together to form a third signal bus. The MIX control adjusts the ratio of two signals. When turned fully counterclockwise to A, only the A signal is present on the mix bus. As the MIX control is rotated clockwise, the A signal level decreases as the B signal level increases. In the center position, the A and B signals are equal in level. When the control is rotated fully clockwise to B, only the B signal is present on the mix bus.

## T1 and T2 RECORD ASSIGN Switches

The System Preamplifier II provides very complete and useful, if somewhat unorthodox, taping facilities. The output to the rear-panel jacks labeled TAPE 1 OUT and TAPE 2 OUT is activated by depressing the T1 or T2 RECORD ASSIGN button, respectively. T1 and T2 may both be selected at the same time. The tape output signal always comes directly from the mix bus. Therefore, you can record input source A, input source B, or any proportion of the two, depending on the position of the MIX control. With either RECORD ASSIGN button in the out position, the corresponding output jacks are disconnected.

Note that the System Preamplifier II does not have the normal tape-monitoring and copy-direction switches. Instead there are more general and useful facilities. For example, to monitor the output signal from either of two tape decks, simply choose the appropriate position, T1 or T2, on either the MAIN or the MONITOR SELECT switch (discussed below). To copy from one tape deck to another, select the deck to be copied from with either the A or B SOURCE select control, make sure the MIX control is in the appropriate position, and push the RECORD ASSIGN button corresponding to the deck to be recorded on. You don't have to worry about inadvertently creating a feedback path by trying to record onto a tape deck selected as an input source (a situation which can easily occur with make-shift patching connections with less versatile preamps) since the System Preamplifier II disconnects

# TYPICAL LOW FREQUENCY RESPONSE OF SYSTEM PREAMP II

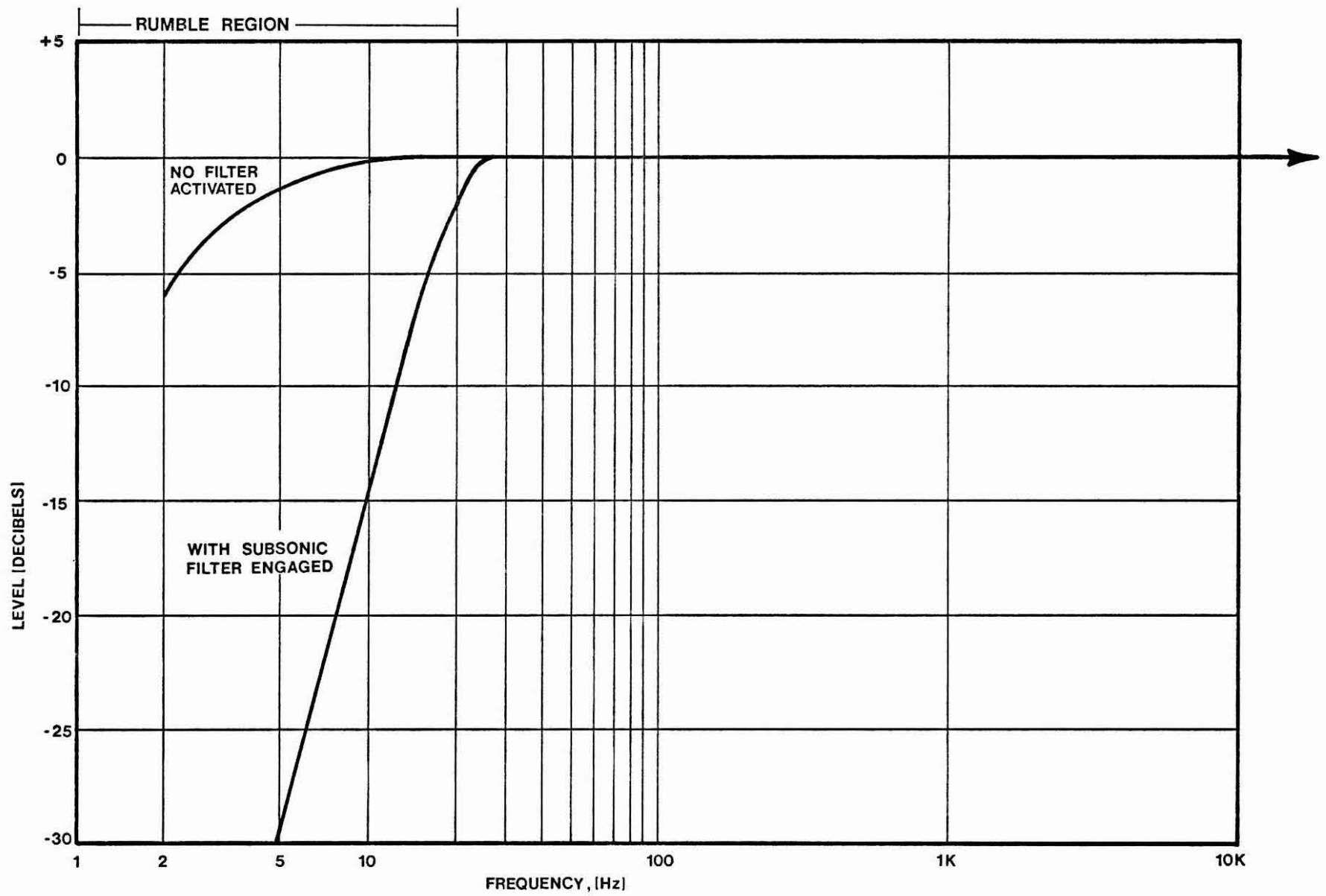


Figure 2

the tape inputs when the corresponding RECORD ASSIGN button is pushed.

### LOOP 1 and LOOP 2 Switches

In addition to the two tape loops, the System Preamplifier II has two independent processor loops for external signal processors such as equalizers and dynamic-range expanders. Each loop has two associated switches. Pushing the LOOP 1 IN/OUT button in inserts the signal processor connected in LOOP 1 into the signal path. With the button in the out position, the loop is bypassed. The LOOP 2 IN/OUT switch serves the same function for LOOP 2.

The specific location of each loop in the signal path is determined by the two other associated switches. Pushing the LOOP 1 A/MAIN button in (A position) places the LOOP 1 processor directly after the A SOURCE select control and before the mixing section. Pushing the button again returns it to the out (MAIN) position and places the processor after the MAIN SELECT control and before the LM and RM switches, BALANCE control, and VOLUME control. In this position, the LOOP 1 processor affects only the MAIN output. Pushing the LOOP 2 B/MIX button in (B position) places the LOOP 2 processor directly after the B SOURCE select control and before the mixing section. Pushing the button again returns it to the out (MIX) position and places the processor in the mix bus after the MIX control and before the MAIN and MONITOR SELECT controls and also before the T1 and T2 RECORD ASSIGN switches. Refer to the block diagram, Figure 8, in the Circuit Description section for a graphic representation of the alternate locations of the two processor loops in the signal paths of the System Preamplifier II.

### Left/Right Mono, Stereo/Reverse Switching

The two switches labeled LM (Left Mono) and RM (Right Mono) control the routing of the left and right channel signals. With both buttons in the out position, normal STEREO operation is obtained. Pushing just the LM button in routes the left channel input signal to both left and right output channels. The RM switch performs a similar function for the right channel input signal. With both buttons in, the left and right channels are interchanged for REVERSE operation. Note that summed-channel mono operation (left plus right) is not possible without external circuitry. The LM and RM switches affect both the MAIN and MONITOR output sections.

## MAIN Output Controls

As mentioned previously, the System Preamplifier II has two independent output sections. The MAIN output section incorporates the BALANCE and VOLUME controls found on more conventional preamps as well as a unique SELECT control. These controls have no effect on the MONITOR output section. The MAIN output section is normally used to drive a power amp and speakers.

### MAIN SELECT Control

The control labeled MAIN SELECT allows the MAIN output to be selected from among source A, source B, a variable MIX of the two sources, the T1 input, or the T2 input.

### BALANCE Control

It is important for realistic stereo imaging that the apparent sound level from both speakers be equal. The BALANCE control allows the listener to adjust the relative levels of the left and right channels to compensate for actual level differences or changes in listening position. The BALANCE control is designed so that the proper overall volume is maintained at all positions of the control, without the need to adjust the VOLUME control.

### VOLUME Control

The VOLUME control provides continuously variable adjustment of the MAIN output signal level in conjunction with the GAIN switch (discussed below). The control circuitry is configured such that the control directly affects gain rather than attenuating a high-gain signal. This allows the optimum dynamic range to be obtained with all settings of the control. The VOLUME control is specially selected for tracking accuracy between the two channels.

### GAIN Switch

The GAIN switch works in conjunction with the VOLUME control. With the button in the out (LOW) position, the maximum setting of the VOLUME control will provide unity gain (output level equal to input level) at the output of the preamp for line-level input signals. Pushing the button in selects the HIGH position which provides an additional 20 dB of gain. The System Preamplifier II will drive most power amps to normal listening levels with the GAIN switch in the LOW position. It is recommended that the switch be left in this position when possible to ensure the lowest possible noise. The HIGH gain position may be used in those occasional instances where a greater output level is needed.

## MONITOR Output Controls

The MONITOR output section incorporates its own SELECT and LEVEL control. These controls have no effect on the MAIN output section. The MONITOR output section may be used to drive a pair of headphones or a separate power amp and speakers or both.

### MONITOR SELECT Control

The MONITOR SELECT control functions in a manner identical to that of the MAIN SELECT control, allowing selection among A, B, MIX, T1, OR T2.

### MONITOR LEVEL Control

The MONITOR LEVEL control functions in a manner identical to the VOLUME control, providing continuously variable adjustment of the MONITOR output signal level.

### Headphone Jack

A front-panel stereo phone Jack is provided for monitoring or private listening with headphones. The LEVEL control varies the signal level at this output as well as at the MONITOR OUT Jacks on the rear panel. The headphone output is isolated from the rear-panel outputs by its own amplifier, capable of providing approximately 150 milliwatts, which is sufficient to drive most headphones (both low and high impedance) to adequate listening levels. Plugging headphones in does not disconnect either the MAIN or MONITOR outputs on the rear panel.

## APPLICATIONS

The following diagrams and notes present in a pictorial fashion a few of the many possible applications of the MXR System Preamplifier II that we've thought of. They are designed to demonstrate the use of the System Preamplifier II's unique features and to stimulate your thinking as to how you can best utilize these features in your own system. Experiment with the many system configurations and control settings possible, until you find the arrangement best suited to your requirements. The System Preamplifier II cannot be harmed by any combination of control settings.

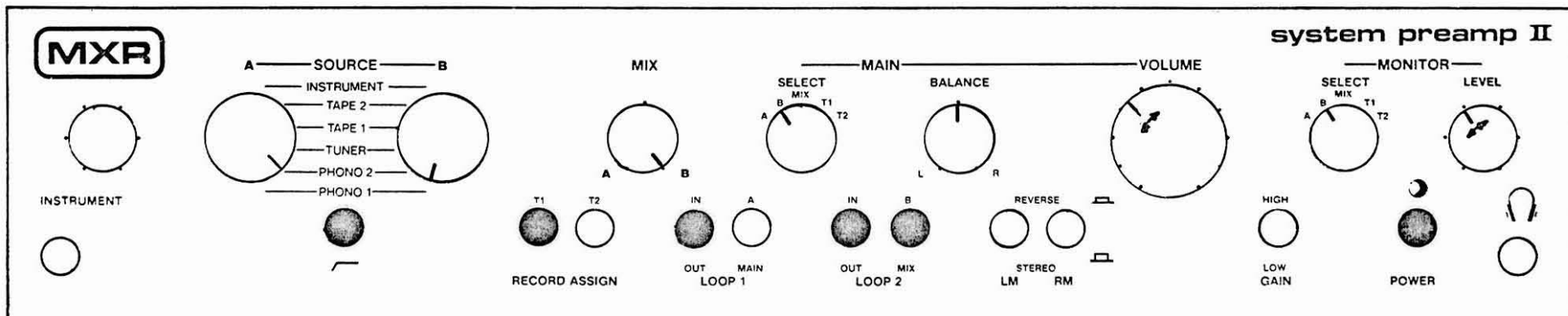


FIGURE 3

**OBJECTIVES:** Listen to expanded and equalized input from PHONO 1  
Record signal from PHONO 1 or PHONO 2 on tape  
Monitor PHONO 1, PHONO 2, or recordings with headphones

**CONTROL SETTINGS:** Refer to the diagram above. The following comments also pertain:

The signal to be recorded is assigned to the T1 tape loop  
With the MIX control at A, the A SOURCE selection (PHONO 2) may be recorded  
At B, the B SOURCE selection (PHONO 1) may be recorded

Pushing the LOOP 1 IN/OUT button in enables the expander  
Pushing the LOOP 2 IN/OUT button in enables the equalizer  
The MAIN output is expanded (LOOP 1 A/MAIN button in MAIN position)  
(If the button were in the A position, the PHONO 2 signal would be expanded before being recorded)  
The PHONO 1 signal is equalized before being recorded (LOOP 2 B/MIX button in B position)  
(If the button were in the MIX position, either PHONO 1 or PHONO 2 or variable mix would be equalized)

With the MONITOR SELECT control at A, the PHONO 2 signal may be monitored with headphones  
At B, the PHONO 1 signal may be monitored  
At T1, the signal being recorded may be monitored (assuming a three-head deck is used)

**CONNECTIONS:** Turntable 1 to PHONO 1 inputs  
Turntable 2 to PHONO 2 inputs  
Expander in LOOP 1  
Equalizer in LOOP 2  
Tape deck to TAPE 1 Jacks  
MAIN OUT Jacks to power amplifier and speakers  
Headphones to front-panel Jack

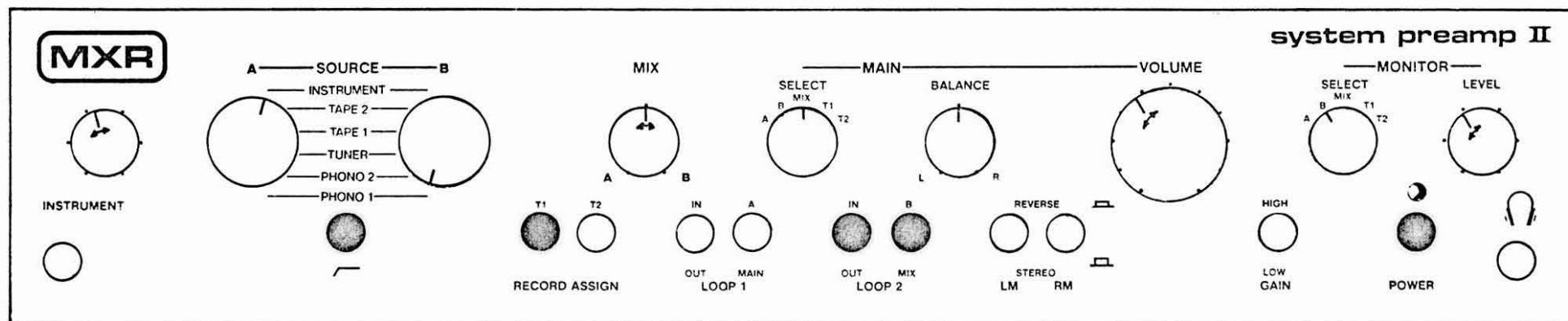


FIGURE 4

**OBJECTIVES:** Listen to equalized input from PHONO 1 mixed with guitar  
 Record mixed signal on tape  
 Monitor PHONO 1 with headphones

**CONTROL SETTINGS:** Refer to the diagram above. The following comments also pertain:

Set the INSTRUMENT level control for adequate guitar level

The MIX control selects the proportion of guitar or PHONO 1 (A = guitar, B = PHONO 1)  
 The PHONO 1 signal is equalized before being mixed (LOOP 2 B/MIX button in B position)

The signal to be recorded is assigned to the T1 tape loop  
 To monitor the recordings, set the MONITOR SELECT control to the T1 position

**CONNECTIONS:** Guitar to front-panel INSTRUMENT Jack  
 Turntable to PHONO 1 inputs  
 Equalizer in LOOP 2  
 Tape deck in TAPE 1 loop  
 MAIN OUT Jacks to power amplifier and speakers  
 Headphones to front-panel Jack

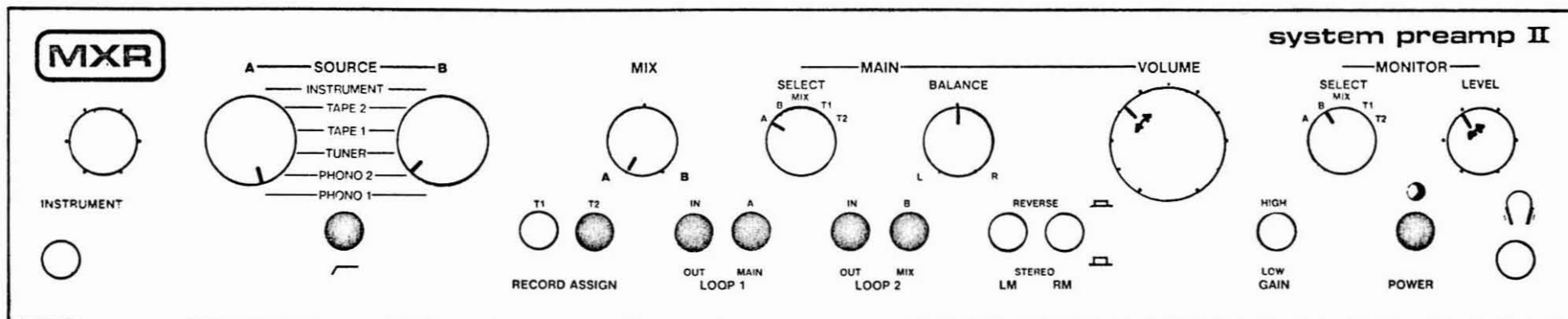


FIGURE 5

**OBJECTIVES:** Operate two separate stereo systems  
 Listen to equalized PHONO 1 in room 1  
 Listen to expanded PHONO 2 in room 2  
 Record signal from PHONO 1 or PHONO 2 on tape  
 Monitor PHONO 2 with headphones

**CONTROL SETTINGS:** Refer to the diagram above. The following comments also pertain:

The VOLUME control determines the level in room 1  
 The MONITOR LEVEL control determines the level in room 2

The signal to be recorded is assigned to the T2 tape loop  
 The MIX control determines the signal to be recorded  
 To monitor the recordings, set either SELECT control to the T2 position

**CONNECTIONS:** Turntable 1 to PHONO 1 inputs  
 Turntable 2 to PHONO 2 inputs  
 Equalizer in LOOP 1  
 Expander in LOOP 2  
 Tape deck in TAPE 2 loop  
 MAIN OUT Jacks to power amplifier and speakers for room 1  
 MONITOR OUT Jacks to power amplifier and speakers for room 2  
 Headphones to front-panel Jack

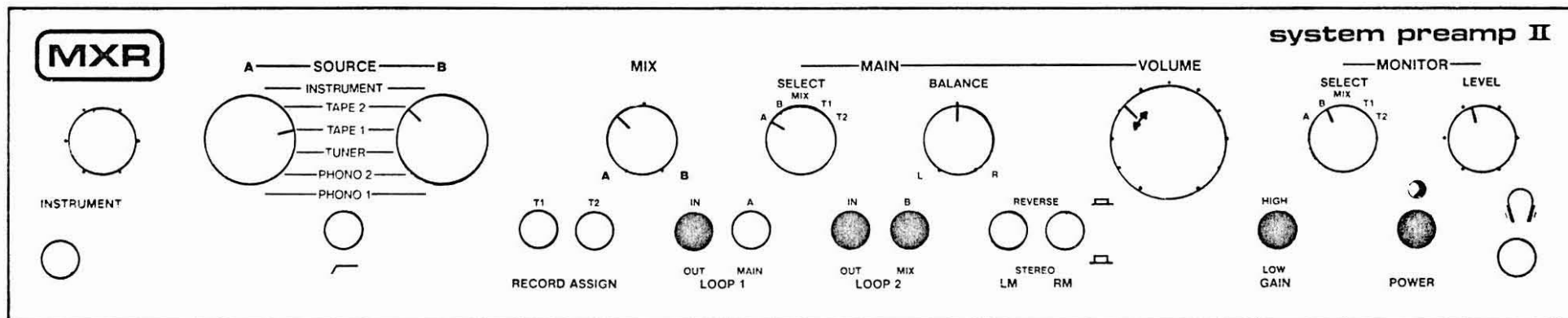


FIGURE 6

**OBJECTIVES:** Listen to Quad (4 channel) tape deck  
Process front and rear signals separately

**CONTROL SETTINGS:** Refer to the diagram above. The following comments also pertain:

The VOLUME control determines the front signal level

The MONITOR LEVEL control determines the rear signal level

The MIX control may be used to blend a portion of the rear signal in with the front signal or vice versa  
(Turn the appropriate SELECT control to the MIX position)

With this configuration you cannot record simultaneously.

Pushing either RECORD ASSIGN button in will disconnect the corresponding TAPE input  
(This prevents an undesirable feedback loop from being created)

**CONNECTIONS:** Tape deck front outputs to TAPE 1 inputs  
Tape deck rear outputs to TAPE 2 inputs  
Front signal processor in LOOP 1  
Rear signal processor in LOOP 2  
MAIN OUT Jacks to power amplifier and speakers for front signal  
MONITOR OUT Jacks to power amplifier and speakers for rear signal

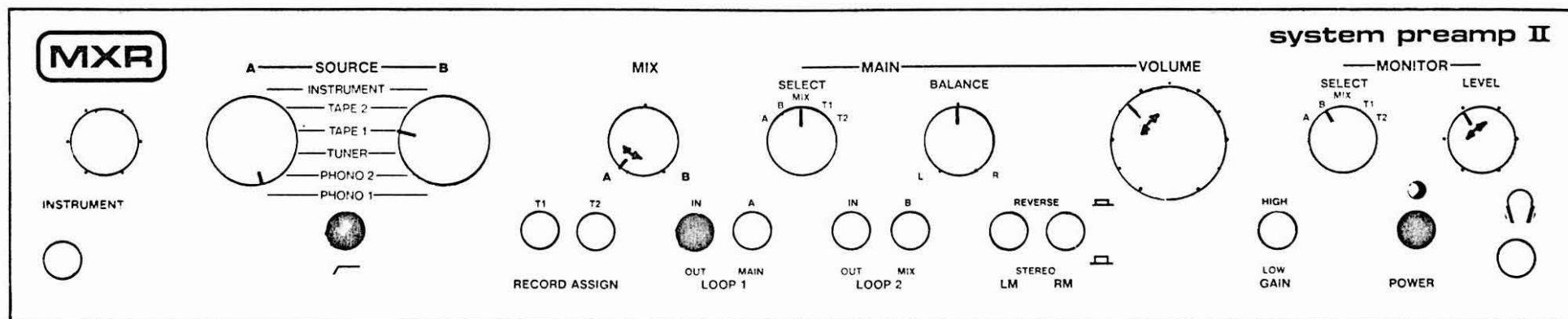


FIGURE 7

**OBJECTIVES:** Mix music in "D.J." style

Blend record to record, record to tape, or tape to tape

A microphone may also be used as one of the sources to blend to or from

(The microphone may be used while the other source is being "cued up")

Monitor source being cued up with headphones

Equalize the output signal

**CONTROL SETTINGS:** Refer to the diagram above. The following comments also pertain:

Set the INSTRUMENT level control for adequate microphone level

Set the A SOURCE control to the source to be blended from

Set the B SOURCE control to the source to be blended to

Turn the MIX control clockwise from A to blend (or "fade") from source A to source B

**CONNECTIONS:** Microphone to front-panel INSTRUMENT Jack

Turntable 1 to PHONO 1 inputs

Turntable 2 to PHONO 2 inputs

Equalizer in LOOP 1

Tape deck 1 in TAPE 1 loop

Tape deck 2 in TAPE 2 loop

MAIN OUT Jacks to power amplifier and speakers

Headphones to front-panel Jack

## CIRCUIT DESCRIPTION

The circuitry of the MXR System Preamplifier II incorporates the latest advances in audio integrated circuit technology. The primary design goal was to provide control flexibility without altering the signal in any undesirable way. Low distortion, wide bandwidth, very low noise, and, most importantly, sonic clarity are primary achievements of the design. The phase integrity of the signal is maintained at all times. All signal paths, from any input to any output, are non-inverting (in phase). The circuitry is constructed using a double-sided, military-grade, glass epoxy printed circuit (PC) board. Careful design and layout of the PC board minimizes crosstalk and optimizes pulse response, and a substantial ground plane provides shielding from stray fields. The following discussion highlights those characteristics of the internal circuitry not already mentioned. Refer to the block diagram, Figure 8, showing how each stage is interconnected.

The Phono Preamplifier section represents one of the most crucial areas in the design of a high-quality preamplifier. The RIAA equalization network is especially critical. This circuit accurately compensates for the equalization that is introduced during the cutting of a record by providing an exact complement to the recording equalization. Great care was also taken during the design stage to ensure reproduction of the very low and high frequencies beyond the limits of the RIAA standard. The Phono section also provides 40 dB of gain (at 1 kHz) with very low noise. These characteristics allow almost any phono cartridge to be used with the System Preamplifier II with excellent results.

The resistive loading of the phono cartridge is factory set to a value of 47 k ohms (+/- 5%) in keeping with the recommendations of most cartridge manufacturers. The capacitive loading is set at 200 picofarads (pf). This value represents a compromise between different manufacturer's recommended load capacitance and the type and length of cable connecting the phono cartridge to the preamplifier. The phono-loading capacitors may be changed by the user if desired. The following relationship may be used to determine the optimum value of preamplifier load capacitance (C):

$$C = (\text{recommended load capacitance}) - (\text{cable capacitance})$$

The cable capacitance may be determined by multiplying the nominal capacitance per unit length of the cable used times the length of the cable. Additional information concerning this modification may be obtained by contacting MXR.

The switchable subsonic filter is also incorporated in the PHONO 1 Preamplifier section to remove unwanted low-frequency information near its source. The filter is a three-pole Butterworth alignment with flat response in the passband and very sharp rolloff below 20 Hz (refer back to Figure 2). The PHONO 2 Preamplifier's subsonic filter has a similar low-frequency response but is non-switchable. Further response information is included in the Specifications section.

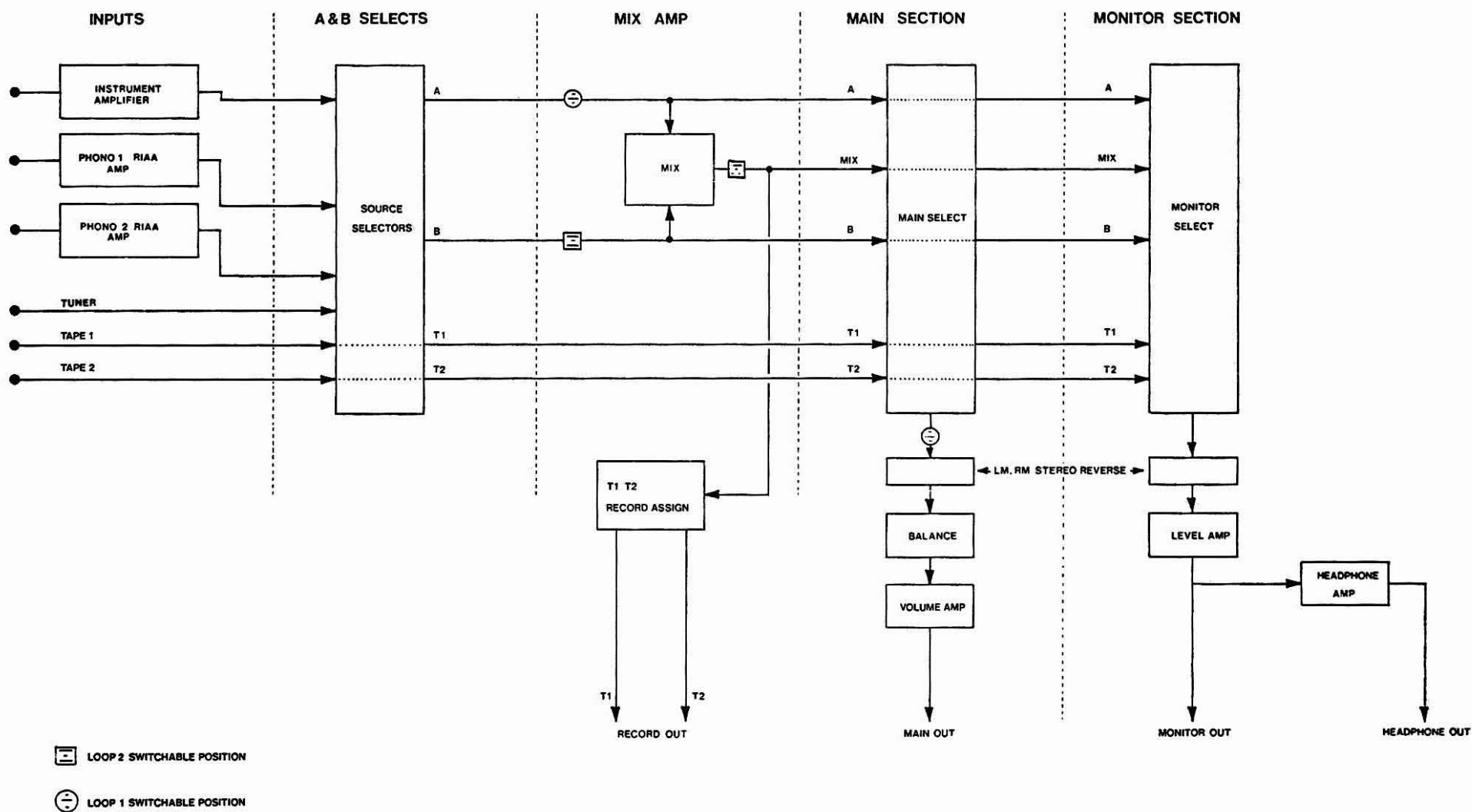


Figure 8

Another potential source of unwanted low-frequency information, besides that from the turntable - tonearm - cartridge combination, is hum from the internal power supply. The power supply in the System Preamplifier II is extremely well filtered and decoupled from the sensitive phono preamplifier sections to eliminate hum.

The INSTRUMENT input has its own gain stage whose high input impedance prevents any adverse loading effects on the source. The front-panel level control varies the gain from unity to 30 dB.

The System Preamplifier II's mixing circuitry is fully buffered to prevent any unintentional loading or crosstalk between the A and B signal buses. Also, the circuitry is designed so that when the MIX control is fully at A or B, the signal from the other bus will not be present at the mix output.

The MAIN output VOLUME control is in the feedback loop of an operational amplifier and therefore directly controls the gain of the amplifier. The MONITOR output LEVEL control is configured to provide variable attenuation of the signal from preceding stages. Also the MONITOR LEVEL control does not incorporate switch-selectable gain.

The headphone output is buffered from the monitor preamplifier outputs by its own amplifier, thus eliminating loading of the monitor outputs by low-impedance headphones. The System Preamplifier II has an output impedance (main outputs) of approximately 600 ohms which will allow it to drive any power amplifier with an input impedance of 600 ohms or greater.

Special muting circuitry in the System Preamplifier II eliminates turn-on and turn-off transients. FET's (Field-Effect Transistors), controlled by a time-delay circuit, shunt the signal outputs safely to ground until all on-off transients have occurred. This method totally eliminates the effects of in-line relay contacts or active switches on the signal during operation. Additionally, long-term reliability is greatly enhanced compared with designs using relays.

# SPECIFICATIONS

Maximum Input Level	Phono 1,2 Line	greater than 120 mv peak (1 kHz) greater than 1 volt peak (20 kHz) +16.9 dBV (7 volts rms)(20 Hz - 20 kHz)
Maximum Output Level		+16.9 dBV (7 volts rms)(20 Hz - 20 kHz)
Input Impedance	Phono 1,2 Line	47 k ohms 100 k ohms
Output Impedance	Main Monitor	approx. 600 ohms approx. 600 ohms
Headphone Output		150 mw into 200 ohms
Residual Noise	Phono 1,2 Line	better than 88 dB below 10 mv input (A weighted) better than 90 dB below 1 volt input (20 Hz - 20 kHz)
T.H.D.		less than .005% at 0 dBV (20 Hz - 20 kHz) (any input to output)
I.M.		less than .005% at 0 dBV (60 Hz/7 kHz, 4:1)
Frequency Response	Phono 1 Phono 2 Line	20 Hz - 20 kHz, +/-0.25 dB at 0 dBV 3 dB down at 5 Hz and 80 kHz 30 Hz - 20 kHz, +/-0.25 dB at 0 dBV 3 dB down at 20 Hz and 80 kHz 10 Hz - 40 kHz, +/-0.25 dB at 0 dBV 3 dB down at 10 Hz and 100 kHz
Subsonic Filter Response	Phono 1	-1 dB at 23 Hz, -3 dB at 19 Hz, -29 dB at 5 Hz
Gain	Phono 1,2 Line Inst.	40 dB (1 kHz) 0 dB/20 dB max. (selectable) 0 dB - 30 dB (via front-panel control)
Channel Separation		better than 60 dB (any input)
Power Requirements	Domestic: Foreign:	110 - 125 volts AC, 50 - 60 Hz, 80 ma, 10 watts 220 - 250 volts AC, 50 - 60 Hz, 40 ma, 10 watts

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