

The background of the page is a technical drawing in a reddish-brown ink. It features a grid of lines, some solid and some dashed, forming a rectangular structure. To the right of this structure, there are several circular elements, some with internal patterns, and a small '8' symbol. Below the main title, there are several curved lines and a large arrow pointing to the left, suggesting a mechanical or structural component.

MIXER
SAMSON[®]

MPL 1502

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Congratulations on purchasing the Samson MPL 1502 stereo mixer! Although this unit is designed for easy operation, we suggest you first take some time to go through these pages so you can fully understand how we've implemented a number of unique features.

In this manual, we'll provide you with an overview of the MPL 1502 features, followed by a guided tour of its front and rear panels. Then we'll describe how the MPL 1502 should be connected to your existing equipment (including wiring diagrams) and talk about the important topics of gain structure and grounding techniques. Next, we'll cover a number of specific MPL 1502 features (such as panning, equalization, auxiliary sends and returns, and channel inserts) in detail. Finally, we'll wrap things up with a series of applications notes describing how you can use the MPL 1502 for both live performance and recording. You'll also find a warranty card enclosed—please don't forget to fill it out and mail it so that you can receive online technical support and so we can send you updated information about other Samson products in the future.

SPECIAL NOTE: Should your unit ever require servicing, a Return Authorization number (RA) is necessary. Without this number, the unit will not be accepted. Please call Samson at 1-800-372-6766 for a Return Authorization number prior to shipping your unit. Please retain the original packing materials and, if possible, return the unit in its original carton and packing materials.

MPL 1502 System Features

“MPL” stands for “Microphone/Program/Line” and the name describes the broad range of signals which can be handled by this powerful stereo mixer. In fact, the compact design of the MPL 1502 belies an extraordinary versatility. Add excellent sound quality to the equation, and you've got a product which is equally useful as a live performance mixer, keyboard submixer, or even for simple recording purposes (you'll find descriptions of each of these applications at the conclusion of this manual). Here are some of the MPL 1502's main features:

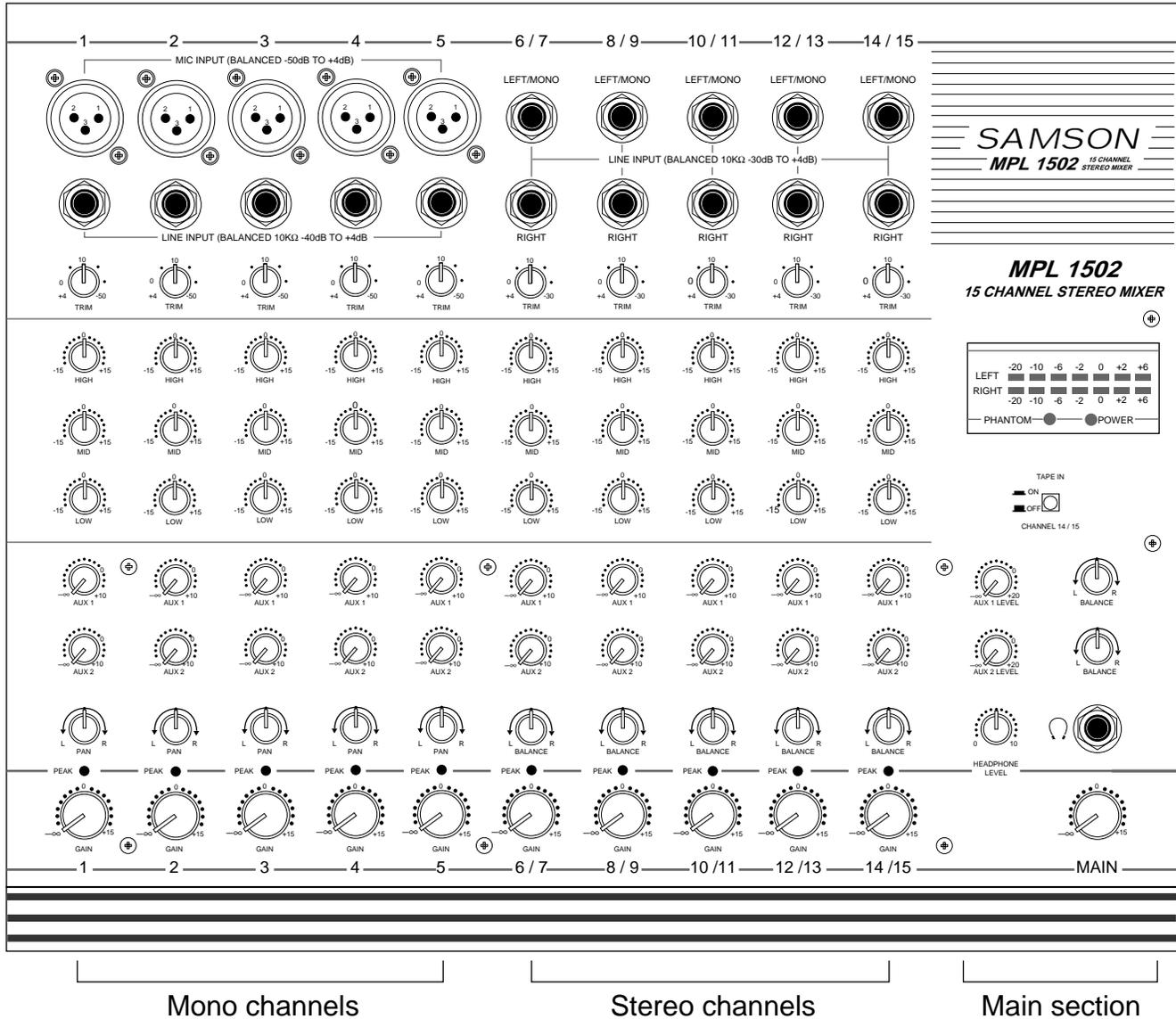
- Fifteen input channels, including five stereo channels. The five monophonic channels provide electronically balanced inputs that can be used for microphone or line-level input, and the five stereo channels are ideal for line-level sources such as outboard signal processors; CD players; tape or cassette recorders; stereo drum machines; and keyboards and MIDI tone modules.
- An electronically balanced main stereo output for connection to a power amplifier.
- A dedicated tape input/output that allows direct recording of a live performance and playback of prerecorded material.
- Two auxiliary sends and two stereo auxiliary returns (which can be used as four monophonic returns). Both sends are post-fader and post-equalizer.

Introduction

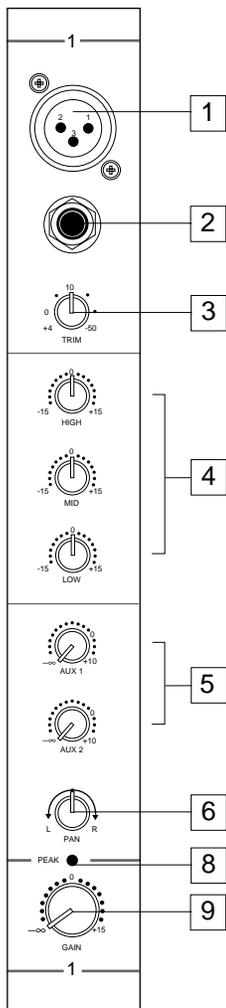
- Independent 3-band equalization for each channel, with 15 dB of cut or boost for low (80 Hz) and high (10 kHz) frequencies, and 12 dB of cut or boost for the mid-range (800 Hz) frequency.
- Constant level pan controls for placing each monophonic channel in the left-right stereo spectrum, as well as balance controls for each stereo channel and Aux return that allow you to blend the relative levels of stereo inputs.
- Channel inserts are provided for each of the 5 monophonic input channels, enabling you to use outboard signal processors such as outboard equalizers, compressor/ limiters, or noise gates in a standard “effect loop.”
- Input trims for each channel are continuously adjustable from +4 to -50 dB, making it possible to use the MPL 1502 with a wide variety of signal sources and outboard equipment.
- Center detents for all gain, pan, balance, and EQ controls, making it easy to use the MPL 1502 even in low-light situations such as live performance.
- Peak input LEDs for each channel, showing you when an input signal is overloading or near overloading (these illuminate -5 dB prior to distortion).
- The provision of 48v phantom power makes it possible to plug high-quality condenser microphones directly into the MPL 1502, without the need for expensive and cumbersome external power supplies.
- A seven-segment front-panel meter that allows you to view at a glance the continuous main stereo output level.
- An independent front-panel headphone jack with dedicated volume control.
- With accessory rack ears, the MPL 1502 can be mounted in any standard 19” rack (taking six rack spaces), making it easy to integrate into any existing system.
- Last but certainly not least, affordability. The MPL 1502 has been designed from the ground up to provide versatility and excellent sound quality at a cost-conscious price.

Guided Tour - Overview

The following illustration shows an overview of the front panel of the MPL 1502:



Guided Tour - Mono and Stereo Channels



1: Mic inputs (1 - 5) - Provided in monophonic channels only. Use these electronically balanced XLR jacks to connect microphones to any of the MPL 1502's five mono channels (channels 1 - 5). These are intended to accept signal from low-level, low-impedance mics but can also be used for signal from other sources (such as direct injection boxes) if the channel's Trim control is turned down. **WARNING:** Do not turn Phantom power on if signal sources other than microphones are connected to any of these inputs. Also, do not connect a channel's microphone input if you already have something connected to its line input; each channel is designed to accept only one source or the other.

2: Line inputs (1 - 15) - Use these standard 1/4" jacks to connect line-level sources such as synthesizers, drum machines, CD players, tape decks, or effects processors to any of the MPL 1502's fifteen mono or stereo channels. The line input jacks for monophonic channels (channels 1 - 5) are electronically balanced, so you should use balanced three-conductor cabling and Tip/Ring/Sleeve (TRS) plugs wherever possible (unbalanced two-conductor plugs can also be inserted into these inputs, but you'll get better signal quality and less outside noise and hum if you use balanced lines). The line input jacks for stereo channels (channels 6 - 15) are unbalanced. When connecting only one monophonic signal to stereo channels, use the left (even-numbered) input; the MPL 1502 will then treat that channel as if it is a mono channel, allowing the signal to be panned (using the Balance control)—see the "Using Pan/Balance" section on page 18 for more information. The "Connecting The MPL 1502" section on page 10 provides more information on how best to use channel inputs. **WARNING:** Do not connect a channel's line input if you already have something connected to its microphone input; each channel is designed to accept only one source or the other.

3: Trim (black) - This knob determines the input level of the connected mic or line signal. In stereo channels, it determines the input level of both the left and right inputs. Continuously adjustable from +4 dB to -50 dB (for mono channels) or +4 dB to -30 dB (for stereo channels), the input trim is at unity gain (no boost or cut) when set to the "0" (9 o'clock) position. The input signal is boosted when the trim is turned to the right of "0" and attenuated when turned to the left of "0." For information on how to properly set this for each channel, see the section on page 14 entitled "Setting The Correct Gain Structure."

4: Equalizer (blue) - These knobs determine the amount of boost or attenuation in each of three frequency areas. The high and low frequency knobs provide 15 dB of cut or boost at 10 kHz and 80 Hz, respectively, while the mid frequency knob provides 12 dB of cut or boost at 800 Hz. The low and mid frequency controls utilize a resonant ("bell") peaking curve, while the high frequency control utilizes a shelving curve. In stereo channels, EQ settings affect both the left and right inputs, although the signals remain separate. A center detent in each knob (at the "0" position) indicates no boost or attenuation (that is, flat response). As each knob is turned clockwise from the "0" position, the frequency area is boosted; as it is turned counterclockwise from the "0" position, the frequency area is attenuated. For more information on the application of EQ, see the "Using Equalization" section on page 19.

5: Auxiliary sends (light gray) - These knobs allow you to route signal to either or both of the MPL 1502's two monophonic Auxiliary outputs. These are typically used to create submixes (for example, a headphone cue mix) and to feed signal from single or multiple channels to outboard effects devices. At the "0" (2 o'clock) position, the signal is routed with unity gain (that is, no boost or attenuation). As each knob is turned clockwise from the "0" position, the signal is boosted; as it is turned counterclockwise from the "0" position, it is attenuated. Both Aux send 1 and Aux send 2 are *post-fade*; that is, the level of the signal is determined by the channel's input trim, its EQ settings, and the position of its gain control.

Guided Tour - Mono and Stereo Channels

6: Pan (white) - Provided in mono channels only. This knob allows you to place the input signal anywhere in the left-right stereo spectrum, while keeping the overall signal level constant. When the knob is placed at its center (detented) position, the signal is sent equally to both left and right outputs. When moved left of center, less signal is sent to the right output (making the sound appear left of center) and when moved right of center, less signal is sent to the left output (making the sound appear right of center). To route a signal hard left or right, place the pan knob either fully counterclockwise or fully clockwise.

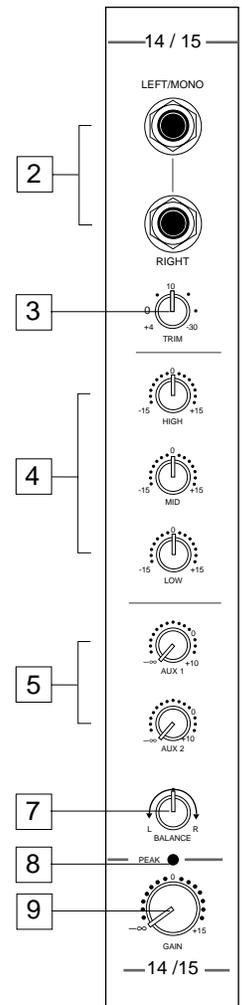
7: Balance (dark gray) - Provided in stereo channels only. When both inputs (even-numbered and odd-numbered) are connected to a stereo channel, the even-numbered input signal is automatically panned hard left and the odd-numbered input signal is automatically panned hard right. In this case, the “Balance” knob controls the relative levels of the paired input signals. When the knob is placed at its center (detented) position, both signals are at equal strength. When moved left of center, the even-numbered channel remains at the same strength but the odd-numbered channel is attenuated; when the knob is moved right of center, the odd-numbered channel remains at the same strength but the even-numbered channel is attenuated. When placed fully counter-clockwise, only the even-numbered channel is heard (panned hard left); when placed fully clockwise, only the odd-numbered channel is heard (panned hard right).

In stereo channels where only the even-numbered input is connected, the Balance knob functions the same as a mono channel Pan control; see #6 above for details. For more information, see the “Using Pan/Balance” section on page 18.

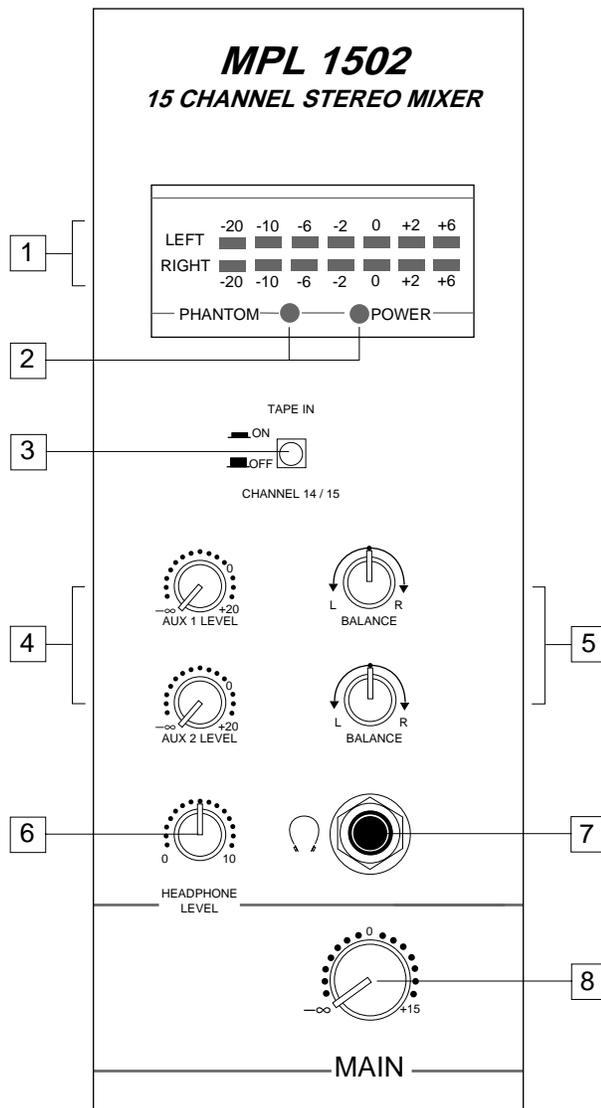
8: Peak LED (red) - This warning light indicates an overload situation. It lights whenever a channel’s signal is 5 dB short of clipping. To stop it from lighting (and eliminate the accompanying sonic distortion), turn down the channel’s Trim knob (see #3 above) or reduce the amount of equalization boost. See the “Setting the Correct Gain Structure” and “Using Equalization” sections in this manual (pages 14 and 19) for more information.

9: Gain (green) - In mono channels (or in stereo channels where only the odd-numbered input is connected), this knob determines the signal level being sent to the main output as well as affecting the signal level being sent to both Aux send. In stereo channels, this knob simultaneously controls the level of both the even-numbered and odd-numbered inputs (the *relative* levels of the two can be adjusted with the Balance knob, as described above). In practice, you will use the channel gain controls to continuously adjust the levels of the various signals being blended together by the MPL 1502. The center-detented “0” position of the knob indicates unity gain (no level attenuation or boost). Moving the knob counterclockwise from the “0” position (towards “-∞”) causes the signal to be attenuated (at the very bottom, it is attenuated infinitely—in other words, there is no sound). Moving it clockwise from the “0” position (towards “+15”) causes the signal to be boosted by as much as 15 dB.

For best signal-to-noise ratio, all gain controls for channels carrying signal should generally be kept at or near the “0” position. Channels that are unused should have their gain controls kept fully counterclockwise at their “-∞” (minimum) level. See the “Setting the Correct Gain Structure” section on page 14 for more information.



Guided Tour - Main Section



1: Meter - This seven-segment bar meter shows the continuous output level of the main stereo output. For optimum signal-to-noise ratio, try to adjust all levels so that program material is usually at or around 0 VU, with occasional but not steady excursions to the red +2 or +6 segments. See the "Setting the Correct Gain Structure" section on page 14 for more information.

2: Meter LEDs - These show the status of various conditions within the MPL 1502. The left LED (labeled "Phantom") lights steadily red when phantom power is being supplied to all 5 mic inputs (see the "Guided Tour - MPL 1502 Rear Panel" section on page 8 for more information). The right LED (labeled "Power") lights steadily red when the MPL 1502 is powered on.

3: Tape In / Channel 14/15 switch - When pressed in (the "on" position), the signal arriving at the rear panel tape inputs is automatically routed to stereo channel 14/15, with the signal connected to the channel 14/15 line inputs disconnected and the channel 14/15 Trim control made inactive (the tape input signal is automatically given unity gain). When this switch is out (the "off" position), channel 14/15 operates normally and the tape input signal is not heard.

4: Stereo Auxiliary Return Level (gray) - These knobs determine the input level of signal arriving via the MPL 1502's two stereo Auxiliary returns. Each return is at unity gain (no boost or attenuation) when set to the "0" (2 o'clock) position. The input signal is boosted when the knob is turned to the right of "0" and attenuated when turned to the left of "0." For information on how to properly set these, see the sections in this manual entitled "Setting the Correct Gain Structure" and "Using the Aux Sends and Returns" (pages 14 and 20).

5: Stereo Auxiliary Return Balance (white) - These knobs determine the relative levels of the left and right input signals connected to the MPL 1502's two stereo Auxiliary returns. When the knob is placed at its center (detented) position, both left and right input signals for that Aux return are at equal strength. When moved left of center, the left input signal remains at the same strength but the right input signal is attenuated; when the knob is moved right of center, the right input signal remains at the same strength but the left input signal is attenuated. When placed fully counter-clockwise, only the left input signal is heard (panned hard left); when placed fully clockwise, only the right input signal is heard (panned hard right). These "radical" positions are useful when you are using a stereo Aux return as two mono returns—see the "Using the Aux Sends and Returns" section on page 20 for more information.

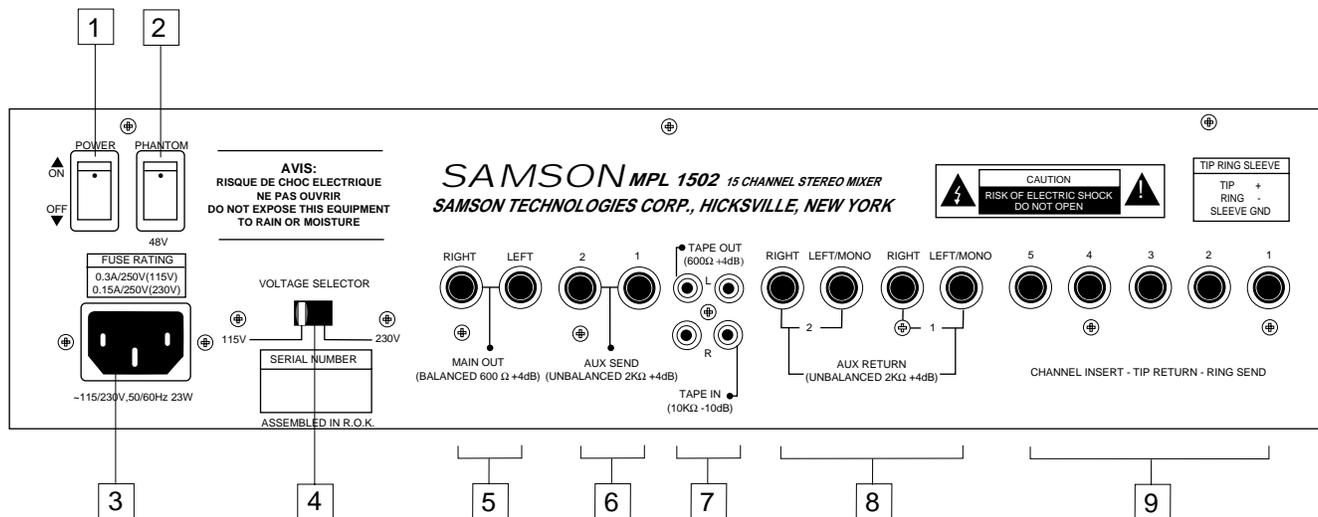
When only the left input of an Aux return is connected, its Balance knob functions as a constant level Pan control, allowing you to continuously place the incoming signal anywhere in the left-right stereo field.

6: Headphone Level (blue) - This knob sets the level of the signal sent to the headphone jack (see #7 below). **WARNING:** To avoid possible damage to connected headphones (or, worse yet, to your ears!), always turn this all the way off (to the fully counterclockwise "0" position) before plugging in a pair of headphones—then raise the level *slowly* while listening. The Headphone Level has no effect on the final Main Mix output level.

7: Headphone jack - Connect any standard stereo headphones to this jack (via a standard 1/4" TRS plug) for private monitoring of the main stereo output. The built-in MPL 1502 headphone preamp delivers 150 mw at 30 ohms.

8: Main Mix (green) - This knob determines the final output signal level—you can think of this as being the "master fader." Signals from all channels and Auxiliary returns are routed here just before leaving the MPL 1502 via its left and right main output jacks. The center detented "0" position of the knob indicates unity gain (no level attenuation or boost). Moving the knob counterclockwise from the "0" position (towards "-∞") causes the signal to be attenuated (at the very bottom, it is attenuated infinitely—in other words, there is no sound). Moving it clockwise from the "0" position (towards "+15") causes the signal to be boosted by as much as 15 dB. For more information, see the "Setting The Correct Gain Structure" section on page 14.

Guided Tour - Rear Panel



1: Power on-off switch - As you may have guessed, this is what you use to turn the MPL 1502 on and off. To avoid potential damage to your speakers, turn the mixer on *before* you turn on any connected power amps—and turn it off *after* the power amps are turned off.

2: Phantom switch - When this switch is turned on, the MPL 1502 delivers 48 volts of phantom power to pins 2 and 3 of all XLR microphone connectors (mono channels 1 - 5). **WARNING:** Only turn this on or off with the MPL 1502 powered down. Use phantom power **only** when one or more condenser microphones are connected to the MPL 1502 (these microphones will correctly load the input in order to “drain off” the phantom power voltage). Before turning phantom power on, be sure to disconnect all non-microphone signal sources (such as direct injection boxes) from the XLR mic jacks. Phantom power will generally have no adverse affect on connected dynamic microphones; however, **we strongly recommend that you refer to the owners manual of your microphone to determine whether or not it requires 48 volts phantom power. We cannot assume responsibility if you damage a mic by incorrectly applying MPL 1502 phantom power.** If you’re not sure that one or more connected mics require 48 volts phantom power, leave this switch OFF.

3: AC input - Connect the supplied standard 3-pin “EEC” plug here.

4: Voltage selector - Set this to the left (“115 V”) position for operation in the United States and Canada. Set this to the right (“230 V”) position for operation in other countries. This will normally be preset correctly at the factory and will require no adjustment unless you use the MPL 1502 in a country other than the one in which you purchased the unit.

5: Main out (L, R) - These are the MPL 1502's main outputs. You'll usually use these to connect the MPL 1502 to a power amp and speakers. The Main out jacks are electronically balanced, so you should use balanced three-conductor cabling and TRS plugs wherever possible (unbalanced two-conductor plugs can also be inserted into these outputs, but you'll get better signal quality and less outside noise and hum if you use balanced lines). See the "Connecting the MPL 1502" section on page 10 for more information.

6: Aux Sends (1, 2) - These unbalanced 1/4" outputs allow you to route signal from each of the two discrete Aux Sends to external devices such as effects processors. Both Aux sends are post-fade and post-EQ. See the "Using the Aux Sends and Returns" section on page 20 for more information.

7: Tape In/Out (L, R) - Use these two sets of dual RCA input jacks to connect the inputs and outputs of a tape player to the MPL 1502. When the front panel "Tape In / Channel 14/15" switch is pressed in, the input signal connected here appears at stereo channel 14/15, at unity gain (during this operation, the channel 14/15 trim control has no effect). From there, it can be equalized if necessary and routed to either or both Aux sends. The tape output signal is a duplicate of the Main output, at unity gain. See the section in this manual entitled "Guided Tour - MPL 1502 Main Section" (page 6) for more information.

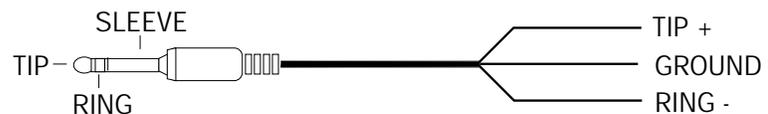
8: Aux Returns (1, 2) - These unbalanced 1/4" inputs allow you to route signal from external devices such as effects processors to either of the two stereo Aux Returns. See the "Using the Aux Sends and Returns" section on page 20 for more information.

9: Channel inserts (1 - 5) - Use these to insert an external effects processor (such as outboard equalizer, compressor/limiter or noise gate) into any of the MPL 1502's five mono channels in an "effects loop" configuration. These jacks accept 1/4" TRS plugs, with the ring carrying the send signal and the tip carrying the return signal. Normally, this will be connected to a Y-cord; see the "Connecting The MPL 1502" section on page 10 for more information and a wiring diagram.

Connecting The MPL 1502 - General Suggestions

The actual connections you'll make to and from the MPL 1502 will vary according to the environment you use it in and the particular equipment you have. In the "MPL 1502 Applications" sections at the rear of this manual, you'll find some suggested setups. Here are a few basic rules concerning MPL 1502 connections that will apply in most situations:

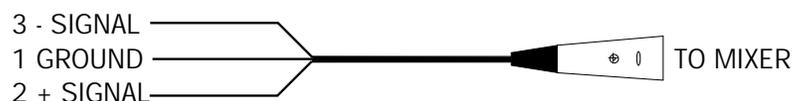
- In general, it's best to make all connections with the MPL 1502 and any connected power amplifiers turned off. If you must make connections with the power on, make sure that the Main gain control is completely down (turn the knob fully counterclockwise). Whenever powering down, turn the Main gain control completely down and turn off the main power amps *first*. Wait a few seconds for their power supplies to discharge and then turn off all connected equipment, turning the MPL 1502 off *last*.
- Try to use balanced connectors and cabling wherever possible. These kind of connections do a better job of rejecting extraneous noise and hum and generally provide a cleaner signal. Although the MPL 1502 will accept unbalanced connectors throughout, it specifically provides electronically balanced inputs for all mono line inputs (channels 1 - 5) and for its main outputs. The wiring diagram below shows how 1/4" TRS (Tip/Ring/Sleeve) connectors should be wired for use with these inputs and outputs:



Unbalanced cables use standard 1/4" phone connectors, wired as follows:

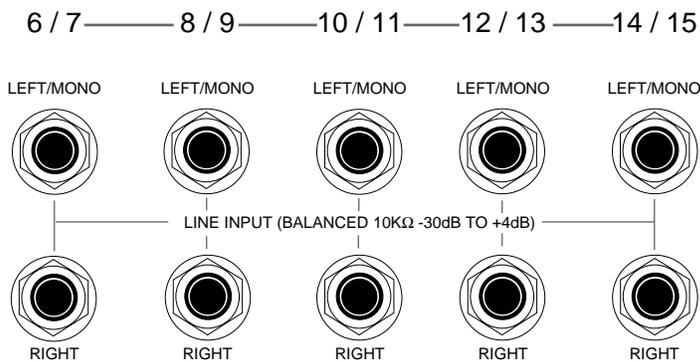


- Make one connection at a time and then monitor the incoming signal. If you hear a distinct hum or buzz, you may have a grounding problem with that particular device. See the section in this manual entitled "Grounding Techniques" for information on how to avoid grounding problems.
- NEVER connect a microphone and line level input to the same channel simultaneously—use one or the other. You can have some channels connected to microphones and others to line level signals (for example, you might want to plug mics into channels 1 - 3 and line level signals into the remaining channels)—just don't have both kinds of inputs connected to the *same* channel. The diagram below shows how your mic connectors should be wired:

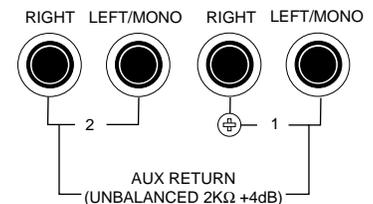


Connecting The MPL 1502 - General Suggestions

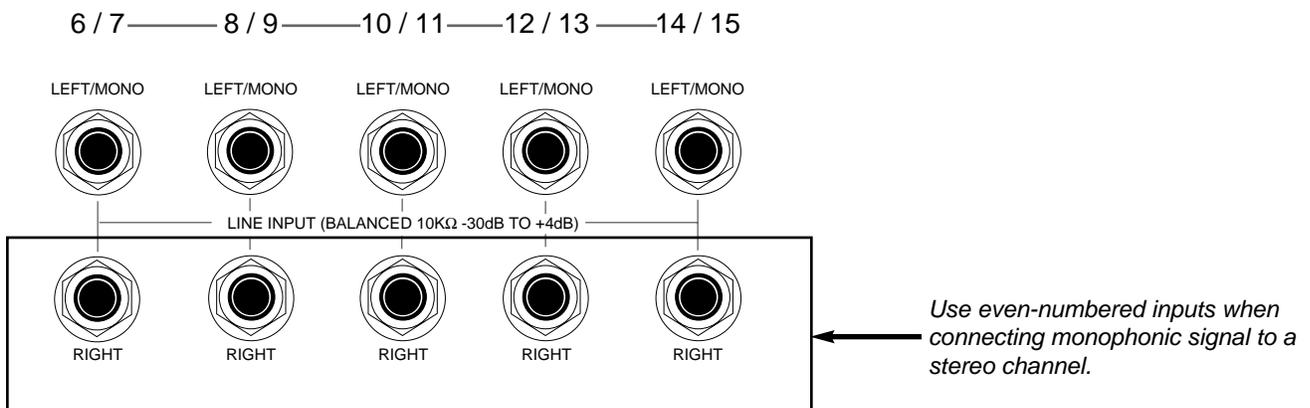
- For single-fader control over a pair of matched signals (i.e. the left-right outputs of a stereo effects processor, keyboard, drum machine, tone generator, CD player, or tape recorder), use the MPL 1502's stereo input channels (6/7, 8/9, 10/11, 12/13, and 14/15). The Balance control in these channels will allow you to adjust the relative levels of the two inputs, and you can also equalize the stereo signal, with the same EQ settings applied to both inputs.



- There are two more “hidden” (or at least not so obvious) stereo inputs to the MPL 1502; these are the Auxiliary returns. Use these whenever you want to bring in a stereo signal that will not need to be equalized. Also bear in mind that the two stereo Auxiliary returns can also be used as four monophonic returns, with the Aux Balance controls giving you the ability to adjust the relative levels of the left/right inputs. If you're using the MPL 1502 in live performance to drive a mono PA system, you may not need to take the stereo returns from outboard effects processors.



- When connecting only one monophonic signal to a stereo channel, always use the left (even-numbered) input. When only the left input is connected in a stereo channel, the MPL 1502 treats that channel as if it is a mono channel and the signal can then be panned (using the Balance control). See the “Using Pan/Balance” and “Using the Aux Sends And Returns” sections in this manual (pages 18 and 20) for more information.



Connecting The MPL 1502 - General Suggestions

- Signals that are likely to require “in-line” processing (such as compression/limiting or expansion/noise gating) should be connected to channels 1 - 5, since these channels provide an insert connection.

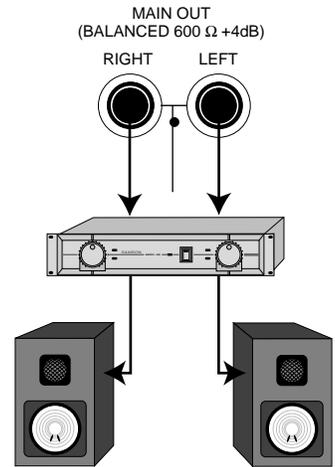
Insert cables (sometimes called “Y-cords”) should terminate in standard 1/4” TRS jacks (ring to send and tip to return), wired as follows:



Setting Up and Using The MPL 1502

Setting up your MPL 1502 is a simple procedure which takes only a few minutes:

1. Remove all packing materials (save them in case of need for future service) and decide where the unit is to be physically placed—it can be used on a tabletop or optionally mounted in any standard 19" rack, requiring six rack spaces.
2. Before even plugging the unit into an AC socket, begin by connecting the MPL 1502 main outputs into a power amp and the amp into loudspeakers. It is never a good idea to power up any amplifier that is not connected to loudspeakers.
3. Next, make the signal input connections to the mic or line inputs of the various channels. **WARNING:** Do not connect a channel's line input if you already have something connected to its microphone input, or vice versa; each channel is designed to accept only one source or the other.
4. Turn all channel trim and gain controls as well as the Main gain control fully counterclockwise, to their " $-\infty$ " setting. Then connect the EEC main power cord and plug the MPL 1502 into any grounded AC socket.
5. Turn on the rear panel Power switch—the "Power" LED in the meter section will light up.



Setting the Correct Gain Structure

You're now ready to establish the correct gain structure—the key to getting the best performance from the MPL 1502, or from any mixer, for that matter. This is a simple procedure that ensures optimum input and output levels so that no unnecessary noise (caused by too low a signal) or overload distortion (caused by too high a signal) is created. Here's a step-by-step description of how to do so:

- a. With all connections made (as described above) but with *the power amplifier and MPL 1502 off*, start by setting the power amplifier volume to minimum. On the MPL 1502, turn all channel gain controls fully counterclockwise (to their “-∞” position), and then set the Main gain control to its “0” position.
- b. Set all channel input trim knobs to their fully counterclockwise (+4) position.
- c. Set all channel equalizer and pan/balance knobs as well as both Aux return balance knobs to their center detent “0” positions.
- d. Set all channel Aux send knobs and both Aux return level knobs to their fully counterclockwise (“-∞”) position.
- e. Turn on all devices connected to channel line inputs and Aux returns and set their level controls to unity gain or, if there is no unity gain indicated on their output control, to maximum. If you've got outboard effects processors connected to Aux returns, make sure they are sending completely “wet” (processed) signal, with no “dry” (unprocessed) signal mixed in.
- f. If any condenser microphones are connected to the MPL 1502, turn on the rear-panel Phantom switch.* Then turn on the MPL's rear-panel Power switch—the Power LED in the meter section will light up. Finally, turn on the power amplifier.
- g. Play an instrument connected to one of the MPL 1502's line inputs** and, while doing so, slowly raise the corresponding channel gain control to the center detented “0” position—you should see the MPL meter begin to move. Now carefully adjust the input trim control for that channel so that the “0” segment in the meter lights frequently and the “+2” segment lights only occasionally. If the incoming signal seems too hot even with the input channel trim all the way at its minimum (+4) setting, you may need to lower the output level of the instrument, though this will rarely occur. Conversely, if the signal is too low even with the input channel trim all the way up, something's definitely wrong: in all likelihood, the connecting audio cable is faulty.
- h. Once you've set the optimum level in step (g) above, continue playing the instrument and slowly raise the power amplifier volume until you reach the level you want to hear.
- i. Repeat step (g) above for each instrument connected to the MPL 1502 channel line inputs.

* *CAUTION: Before turning phantom power on, be sure to disconnect all non-microphone signal sources (such as direct injection boxes) from the mic jacks.*

** *If you're using an instrument such as electric guitar or bass, we recommend that you connect it to the MPL 1502 with a direct injection box to ensure correct impedance.*

Setting the Correct Gain Structure

j. The procedure for setting optimum microphone levels is virtually identical; sing or speak into the mic at the level you expect to use in performance while slowly raising the gain control for that channel to its center detented “0” position. Then carefully adjust the input trim control for that channel while watching the meter, until the “0” segment lights frequently and the “+2” segment lights only occasionally. You should expect that microphone inputs will require rather more in the way of input trim boost than line inputs.

k. If you have any outboard signal processors connected to the Aux send and return jacks on the rear panel, follow this step. Because outboard effects processors can sometimes be quite noisy, it’s particularly important to maximize the amount of signal being sent to them via the MPL 1502 Aux sends. The idea is to drive these devices as hot as possible (short of overloading them) and then to use the corresponding Aux return level to carefully adjust the amount of processed signal being blended with the dry signal. To set optimum Aux send levels, use a channel that has already had its gain structure adjusted in step (g) or (j) above. Turn both Aux send knobs for that channel to their “0” (unity gain) position and then play the instrument (or sing into the microphone) connected to that channel. Adjust the input levels of connected outboard effects processors so that their meter shows incoming signal normally in the 0 vu range (with only occasional higher excursions). Then it’s time to optimize the Aux return levels. While continuing to play your instrument (or continuing to sing into the microphone), slowly raise each Aux return level control until you hear the desired amount of processed signal added to the dry signal. For more information, see the “Using the Aux Sends and Returns” section on page 20.

l. The gain structure is now correctly set—you’ve optimized the level of all signals coming into and out of the MPL 1502, and the end result will be minimum noise and distortion and maximum clean sound. You’ll now find that the majority of your mixes can be accomplished with most channel gain controls at or near their center detented “0” (unity gain) position and that the channel peak LEDs rarely if ever light (remember, if they do light, it means that something is distorting!). If you need to make adjustments to the overall level, use the level control of your power amplifier.

If you encounter difficulty with any aspect of setting up or using your MPL 1502, you can call Samson Technical Support (516-932-1062) between 9 AM and 5 PM EST.

Grounding Techniques

Hum and buzz are the biggest enemies you face when interconnecting a large number of different pieces of equipment to a central audio mixer. This is because each piece of equipment may operate at a marginally different voltage (this difference is called *potential*) and, when two devices at slightly different potential are physically connected with audio cabling, the end result can be nasty, extraneous noise (mind you, connecting two devices at *very* different potential can result in a major electrical shock!).

However, there are several steps you can take to avoid grounding problems. First, assuming you have an isolated electrical circuit that can handle the electrical demands of your mixer and all connected audio equipment (these needs will usually be modest), you should always plug your mixer and all connected equipment into the same circuit. If possible, nothing else but this equipment should be connected to that circuit. If you can't do this, at least avoid plugging your mixer and audio equipment into the same circuit that is already powering things like heavy machinery, air conditioners, heaters, refrigerators, washing machines, neon signs or fluorescent light fixtures. One particular culprit that will almost certainly create problems is the standard light dimmer (the kind that uses silicon controlled rectifiers). Where low-level lighting is desired, use incandescent fixtures with autotransformer-type dimmers (sometimes called *Variacs*) instead—these cost considerably more than the standard dimmer you'll find at your local hardware store, but are well worth the extra expense.

Three-prong plugs (such as the one used by the MPL 1502) should always be used as is; don't use adapters to lift the ground (unless you're using a "star ground network"—see below). If you hear hum or buzz from a device that uses a two-prong plug (or an external two-prong AC/DC adapter), you can try reversing the plug in the socket. If that doesn't work, you may need to physically ground that device's chassis by connecting a wire (called a *strap*) from it to a grounded piece of metal such as rack ears. Some pieces of equipment have a screw-type ground post to which the strap can be connected; if not, you can attach some kind of metallic binding post to the case itself. If you are using rack-mounted audio devices and are experiencing hum or buzz, there's a simple test to determine the source of the problem: while keeping all devices powered on and connected with audio cabling, physically remove each device, one by one, from the rack. If the hum disappears when a particular device is removed, you'll know that device is the culprit.

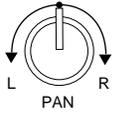
We also recommend that you use balanced audio cabling and connectors wherever possible. The MPL 1502 provides electronically balanced inputs for all line channel inputs and for its main outputs. The wiring diagram in the "Connecting The MPL 1502" section of this manual (page 10) shows how 1/4" TRS (Tip/Ring/Sleeve) connectors should be wired for use with these inputs and outputs.

In addition, you can minimize possible interference by planning your audio, electrical, and computer cable runs so that they are as far apart from one another as possible and so they don't run parallel to one another. If they have to cross, try to ensure that they do so at a 90° angle (that is, perpendicular to one another). In particular, try to keep audio cabling away from external AC/DC adapters.

If you're using the MPL 1502 in a fixed location such as a recording studio, you may want to invest the time and money into creating a *star ground network*. This is by far the best technique for avoiding grounding problems. It involves using a formidable ground source such as a cold water pipe or a copper spike driven into the earth. A thick grounding cable is connected to that source and then brought to a central distribution point; from there, individual cables are connected to each piece of equipment. This setup also requires that you lift the ground plug of all three-prong AC connectors, so there is the possibility of danger if it is done incorrectly. We strongly recommend that you contract with a qualified professional to carry out this or any kind of electrical work.

Another, less common problem you may encounter is that of *oscillation* (a ringing tone), which, apart from being annoying, is potentially dangerous to your speakers. This is generally caused either by poor outside wiring or by returning a signal out of phase (most commonly from an outboard signal processor). If audible oscillation occurs, try isolating each input signal by turning down all other inputs. If one signal alone is causing the problem, you should be able to eliminate the oscillation by reversing that signal's phase (many signal processors have a switch that allows you to do this).

Using Pan/Balance



The final Main output of the MPL 1502 is stereo—that is, there are two discrete output jacks, labeled “left” and “right,” which will normally be routed to two discrete speakers.* Because of this, you will usually be working with a stereo field that ranges from hard left to hard right. The Pan control in each mono channel (and the Balance control in each stereo channel, when only the left [even-numbered] input is connected) allows you to place each individual sound at any point within this left-right field, while keeping the overall level constant.



You can use stereo panning creatively in a variety of ways: For example, you might want to have guitars coming from one speaker and keyboards from another, or you might use panning to “spread” the signal from a piano miked with two microphones—one over the bass notes (panned left) and the other over the treble notes (panned right). By turning a Pan knob while a signal is present, the sound appears to move in space (a process known as *dynamic panning*)—this can be particularly effective when applied to sound effects.

In live performance, you may want to resist the temptation to pan anything completely hard left or right, since some members of the audience not seated in the center of the venue may miss some signal altogether. In these circumstances, you’re best to use modest panning, with signals routed no further than the 9 o’clock and 3 o’clock positions.

In stereo channels where both inputs are connected, the even-numbered input signal is automatically panned hard left and the odd-numbered input signal is automatically panned hard right. The Balance knob in these channels controls the *relative levels* of the two input signals. When the knob is placed at its center (detented) position, both the even-numbered and odd-numbered channels are at equal strength. When moved left of center, the signal of the even-numbered channel remains the same but the signal of the odd-numbered channel is attenuated; when the knob is moved right of center, the the signal of the odd-numbered channel remains the same but the signal of the even-numbered channel is attenuated. When placed fully counter-clockwise, only the even-numbered channel is heard; when placed fully clockwise, only the odd-numbered channel is heard.

In the stereo Aux return section, the Balance control works in a similar fashion. When both inputs are connected, the left signal is automatically panned hard left and the right signal is automatically panned hard right. The Balance knob controls the relative levels of the two signals. When the knob is placed at its center (detented) position, both the left and right signals are at equal strength. When moved left of center, the left input signal remains the same but the right input signal is attenuated; when the knob is moved right of center, the right input signal remains the same but the left input signal is attenuated. When placed fully counter-clockwise, only the left input is heard (panned hard left); when placed fully clockwise, only the right input is heard (panned hard right).

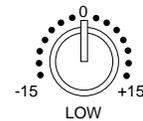
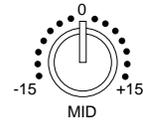
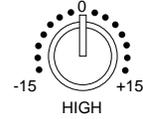
If you connect different monophonic devices (such as effects processors) to both the left and right inputs of an Aux return, you can use the Aux Balance control to blend the relative contribution of each. If you turn the Balance knob fully counterclockwise, you’ll hear only the device connected to the left Aux input; if you turn it fully clockwise, you’ll hear only the device connected to the right Aux input. For more information, see the “Using Aux Sends and Returns” section on page 20.

* You can, of course, also use the MPL 1502 monophonically—simply route the same signal to both the left and right outputs.

Using Equalization

One of the most exciting aspects of using a mixer such as the MPL 1502 is the ability to shape a sound, using a process called *equalization*. But there are few areas of sound engineering more misunderstood than equalization, and, just as good EQ can really help a sound, bad EQ can really hurt it, so read on...

Every naturally occurring sound consists of a broad range of pitches, or *frequencies*, combined together in a unique way. This blend is what gives every sound its distinctive tonal color. The EQ section in a mixer allows you to alter a sound by boosting or attenuating specific frequency areas. The MPL 1502 provides independent three-band equalization controls for each of its five mono and five stereo input channels. Each EQ knob is labeled with the maximum amount of cut or boost provided (± 15 dB in the case of the high and low frequencies and ± 12 dB in the case of the middle frequency).

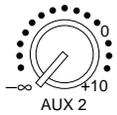
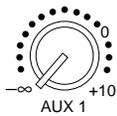


We provided these particular frequency areas because they have maximum impact on musical signals—that’s why they are sometimes known as “sweet spots.” When an EQ knob is in its center detented position (“0”), it is having no effect. When it is moved right of center, the particular frequency area is being boosted; when it is moved left of center, the frequency area is being attenuated. The high EQ control employs what is known as a *shelving* curve, where only frequencies above the specified area are affected. The low and mid frequency controls employ what is known as a *peaking resonant* curve (sometimes known as a *bell* curve), where frequencies both above *and* below the specified area are affected.

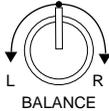
In most instances, the best way to approach equalization is to think in terms of which frequency areas you need to attenuate, as opposed to which ones you need to boost (boosting a frequency area also has the effect of boosting the overall signal; too much EQ boost can actually cause overload—with the accompanying Peak LED warning!). Be aware of the phenomenon of *masking*, where loud sounds in one frequency range obscure softer sounds in the same range; by cutting EQ “notches” in a loud signal, you can actually make room for a softer one to shine through. And try not to think of EQ as a miracle worker—no amount of equalization can put a singer in tune or remove the distortion from an overloaded input signal! The key is to get the signal right in the first place, by using correct gain structure and mic placement.

Although the specific EQ you will apply to a signal is very much a matter of personal taste, here are a few general suggestions: Boosting the low frequency of instruments such as bass drums or bass guitar will add warmth and make the sound “fatter”; conversely, you may want to attenuate the low frequency component of instruments such as cymbals, high-hats, and shakers so as to “thin” them out. The mid-range control is particularly effective for vocals—attenuating it can give a vocal performance more of an “FM-radio” feel, while boosting it can help a vocal cut through dense instrumentation. Be careful not to boost high frequencies too much or you risk adding hiss to the signal, though just a touch can help add “shimmer” to an acoustic guitar, ride cymbal, or high-hat. Finally, because the MPL 1502 high EQ utilizes a shelving curve, attenuated settings can be used to reduce hiss (which is composed almost exclusively of high frequencies).

Using Aux Sends and Returns



The MPL 1502's two Auxiliary sends allow you to combine the signal from multiple channels and send the resulting mix to external devices such as effects processors. When an Aux send knob is at the "0" position, the signal is routed with unity gain (that is, no boost or attenuation). As it is turned clockwise from the 0 position, the signal is boosted; as it is turned counterclockwise from the 0 position, it is attenuated. Both Aux sends are *post-fade*; that is, the level of the signal is determined by the input trim, the EQ settings, and the position of the channel gain control. In other words, raising or lowering the input level of the channel will affect the send level as well.

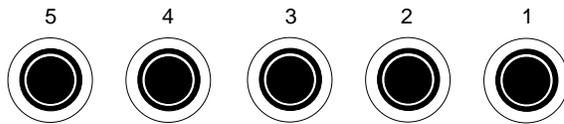


The MPL 1502 also provides two stereo Auxiliary returns. These allow you to return signal from outboard devices, either in stereo pairs or monophonically (many popular effects processors provide a single mono input but have two stereo outputs). In practice, you'll probably want to use the Auxiliary returns to bring in signal from connected effects processors. If the effects processors have stereo outputs, they should be connected to both the left and right Auxiliary return inputs so that their stereo integrity is retained. If they have mono outputs, you can route them to either the left or right inputs and then use the Auxiliary return Balance control to adjust the relative level of each paired signal. In this way, you can actually connect up to four monophonic devices to the MPL 1502's Aux return section.

Each of the stereo Auxiliary returns is somewhat similar to a stereo channel, except that a signal being brought into to a stereo channel can be equalized if necessary and optionally sent on to other outboard devices (via Aux sends or channel inserts).

Using Channel Inserts

In addition to using Auxiliary sends and returns to access outboard devices, the MPL 1502 also provides *channel inserts* for the first five (mono) input channels. These should be used when you want to affect just one channel's signal, as opposed to signal from several channels—most often, this will be for dynamic processing purposes (such as outboard equalization, compression/limiting, or noise gating). You can also use the channel insert sends as post-eq (but pre-fade) *direct outputs*, if you need to route a single monophonic signal to an external device such as a tape deck.



CHANNEL INSERT - TIP RETURN - RING SEND

The channel insert jacks on the rear panel accept 1/4" TRS plugs, with the ring carrying the send signal and the tip carrying the return signal; this will normally be connected to a Y-cord (see the "Connecting The MPL 1502" section in this manual for a wiring diagram). This configuration is sometimes known as an "effects loop," since the signal is sent and returned over the same cable.

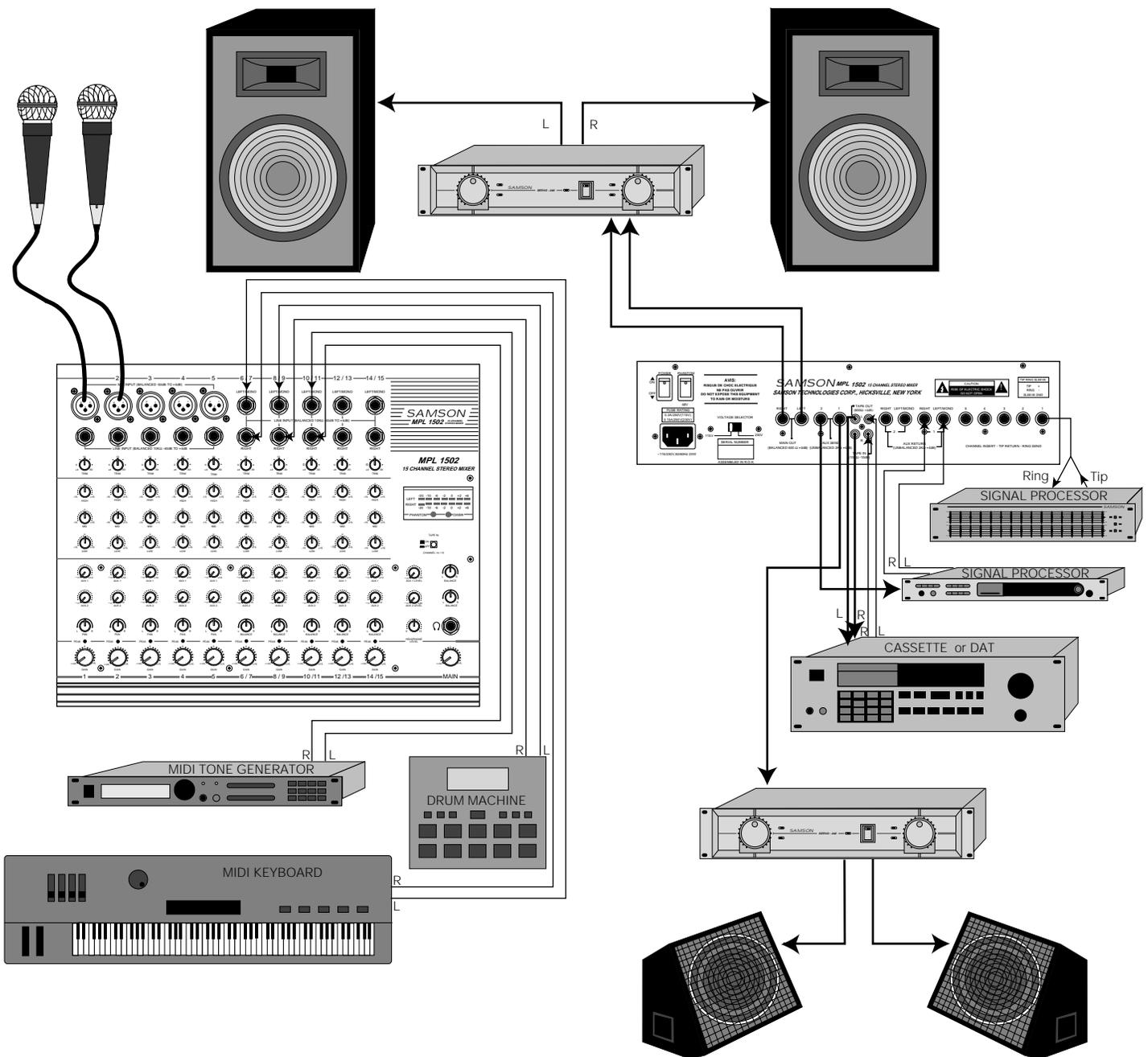
If nothing is plugged into the channel insert jacks, they have no effect—but if you connect them to a passive device like a patchbay, you'll need to *normal* (permanently connect) or *half-normal* (connection is made unless overridden by a patch cord) the send to the return. The insert signal is returned just before the channel fader. For this reason, you'll have to be careful to set the output of external devices connected this way to unity gain.

Applications

Here are four suggested applications for the MPL 1502; bear in mind that your particular circumstance may dictate changes in these suggested signal connections and routings.

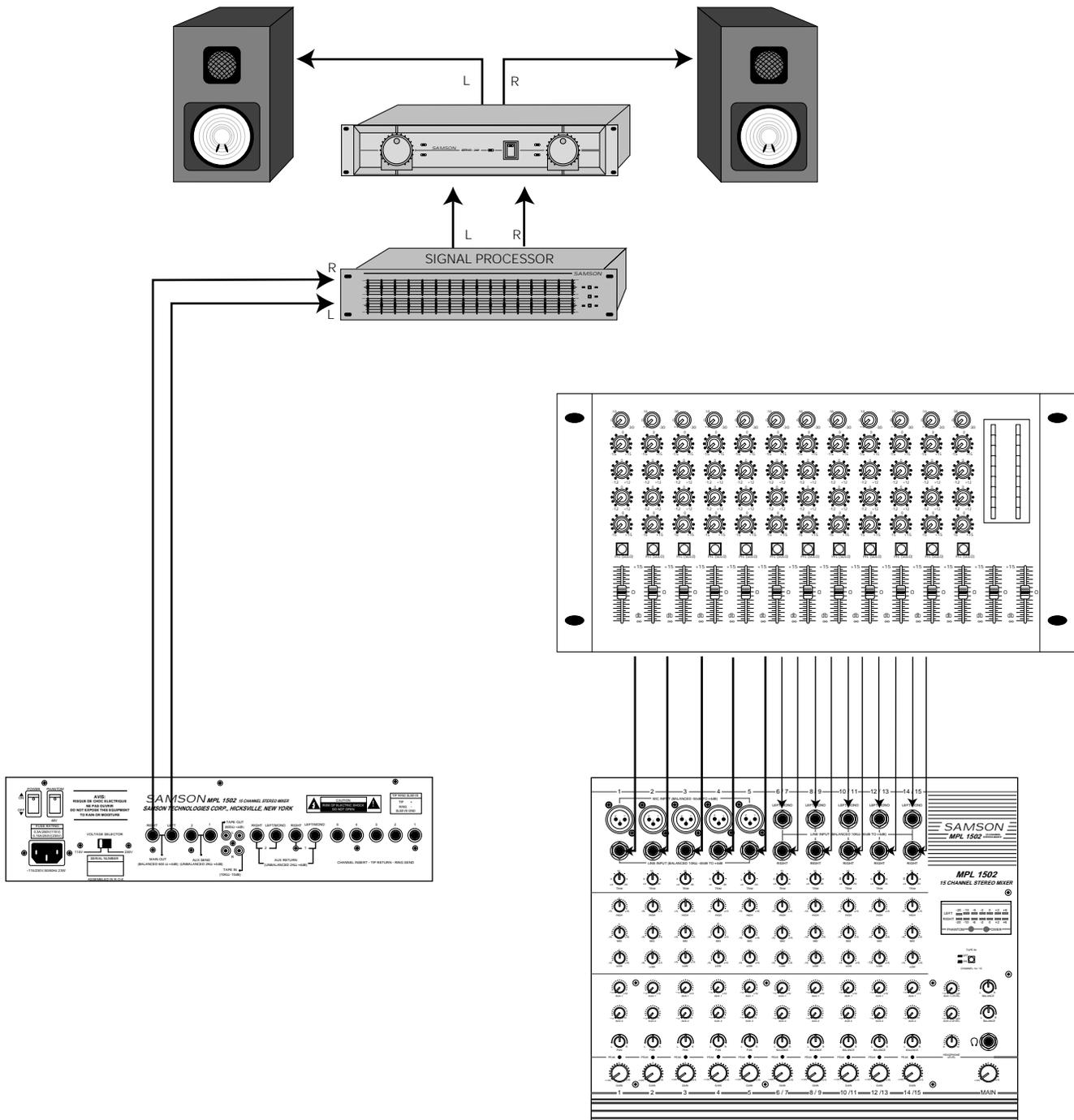
Application 1 - Using The MPL 1502 As A Main Live Mixer

The main connections here involve routing the MPL 1502's Main output to the input of a power amplifier, and, from there, to PA speakers. Microphones and monophonic line level signals requiring insert processing are connected to mono channel inputs, while stereo line level signals are connected to stereo channel inputs. A tape deck is connected to the rear panel tape in/outs (making it easy to record the gig) and, for playback, the signal is returned to stereo channel 14/15 by setting the "Tape In / Channel 14/15" to the "on" position (pressing it in). Signal processors are connected to Aux send 2 (and either or both Aux returns) and to channel inserts as required. A submix from Aux send 1 is connected to the input of a second power amplifier driving onstage monitor speakers so that performers can receive a monitor mix independent of the house mix.



Application 2 - Using The MPL 1502 As An Onstage Monitor Mixer

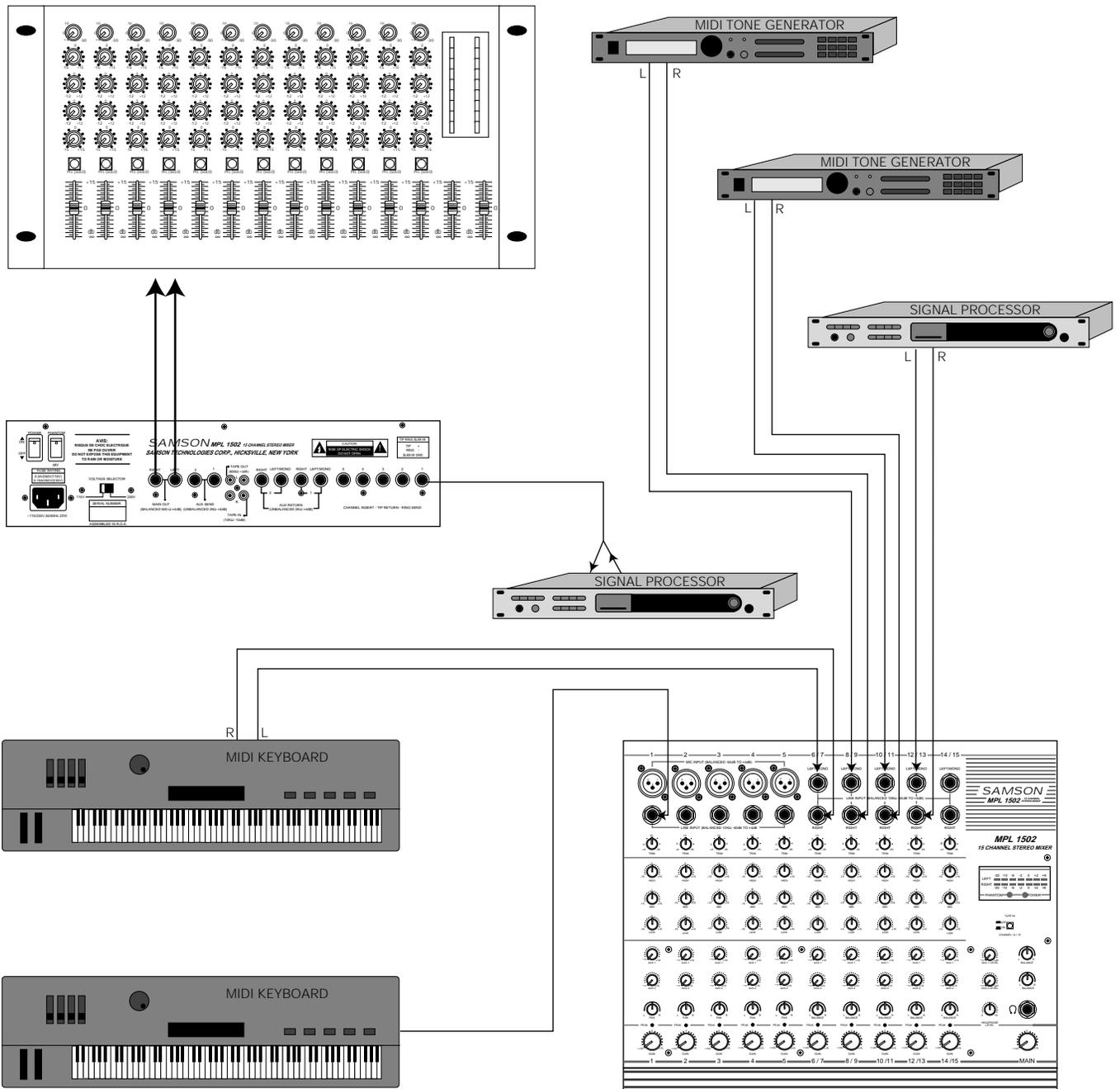
Here, the MPL 1502 is receiving monophonic signal into its line inputs from the direct channel outputs of a main live mixer. Its Main output is connected to an outboard signal processor (typically an equalizer) prior to being routed to an amplifier and onstage monitors. This allows the overall mix to be adjusted in order to eliminate feedback and ringing problems.



Applications

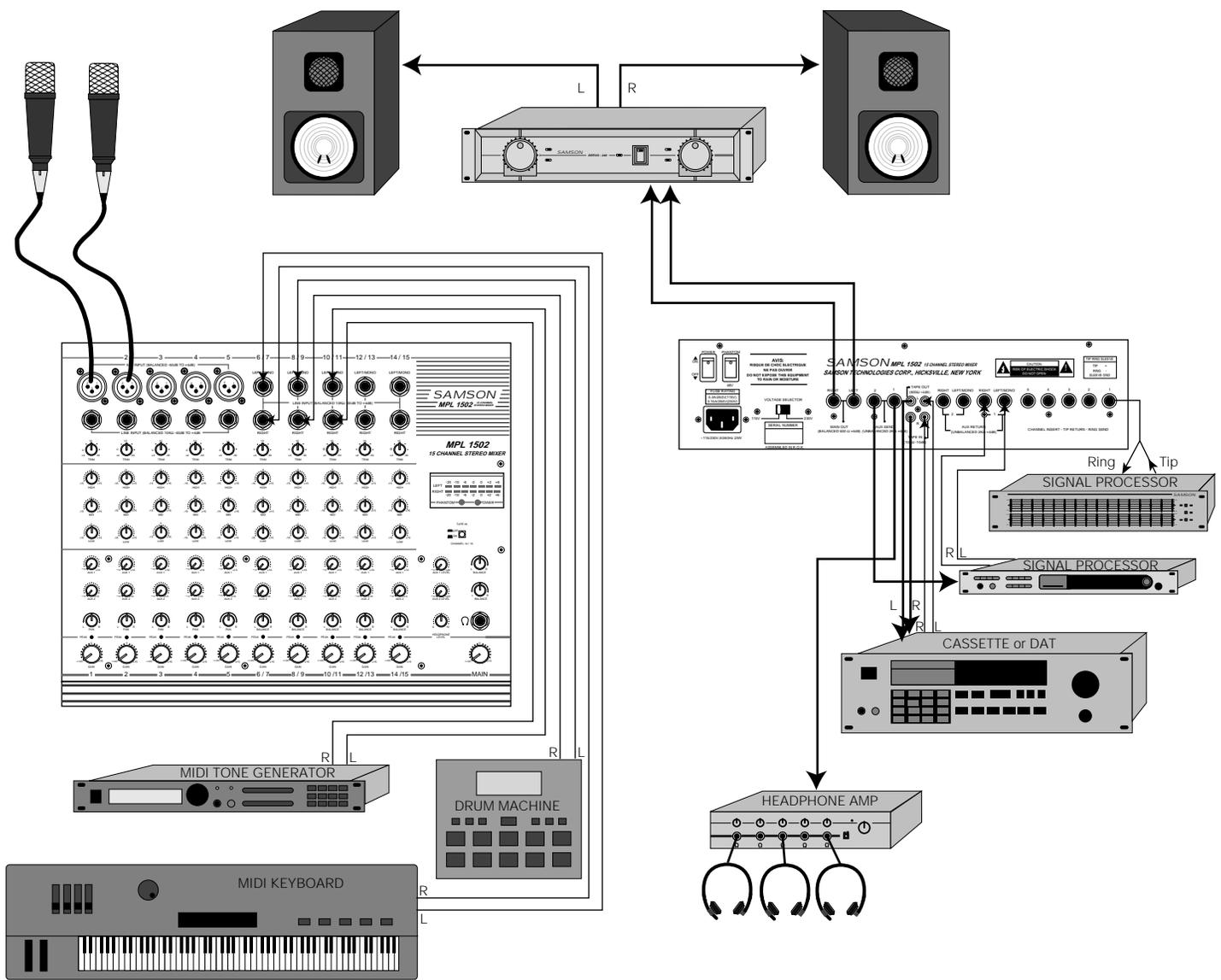
Application 3 - Using The MPL 1502 As A Keyboard Submixer

Here, various keyboards and MIDI tone generators are connected to the mono and stereo line inputs of the MPL 1502. Signal processors are connected to Aux sends and returns and to channel inserts as required. The Main output can then be routed to a stereo input channel of a live performance or recording mixing console, with the performer having complete control over the blend of signals being provided to the sound engineer.



Application 4 - Using The MPL 1502 For Recording

You can also use the MPL 1502 for making simple recordings—for example, when recording a rehearsal or practice session direct to open-reel two-track, cassette, or DAT recorder. Connect the MPL 1502 tape outputs to the inputs of the two-track tape recorder, and connect the Main outputs to a power amplifier driving the control room speakers. The two tape recorder outputs are then returned to the MPL 1502 tape inputs. Microphones and monophonic line level signals requiring insert processing are connected to mono channel inputs and stereo line level signals are connected to stereo channel inputs. Signal processors are connected to Aux send 2 (and either or both Aux returns) and to channel inserts as required. A submix from Aux send 1 is connected to the input of a second power amplifier driving cue headphones so that performers can receive a headphone mix independent of the main control room mix.



Specifications

- 1. Frequency Response** (0 dB = 1.0 V RMS)
17 Hz to 30 kHz \pm 1.5 dB at +4 dB
- 2. Equivalent Input Noise**
Ch. 1 - Ch. 5 Mic input -128 dB (A filter, 150 Ω shorted)
Ch. 1 - Ch. 15 Line input -131 dB (A filter, input shorted)
- 3. THD+N** (unity gain, 20 Hz - 20 kHz) Less than 0.03 %
- 4. Input Level**
Ch. 1 - Ch. 5 Mic input -50 dBV to +4 dB (10 k Ω , balanced XLR)
Ch. 1 - Ch. 15 Line input -40 dBV to +14 dB
(10 k Ω , balanced stereo phone jack)
Aux return 1 - 2 +4 dB (47 k Ω , unbalanced phone jack)
- 5. Maximum Input Level**
Ch. 1 - Ch. 5 Mic input +17 dB
Ch. 1 - Ch. 15 Line input +27 dB
- 6. Trim gain range** 0 dB to +54 dB
- 7. Channel fader range** +15 dB to -80 dB
- 8. Aux send gain range** +10 dB to -75 dB
- 9. Crosstalk**
Ch-to-Ch (1 kHz) -80 dB
Stereo Ch L/R (1 kHz) -65 dB
- 10. Standard Output Level**
Main Out +4 dBV (balanced, 600 Ω loaded)
Aux Out +4 dBV (unbalanced, 2.2 k Ω loaded)
Headphones 150 mW (30 Ω loaded)
- 11. Maximum Output**
Main Out +22 dBV (balanced, 600 Ω loaded)
Aux Out +22 dBV (unbalanced, 2.2 k Ω loaded)
Tape Out +22 dBV (unbalanced, 600 Ω loaded)
- 12. Tone Control**
High 10 kHz \pm 15 dB
Mid 800 Hz \pm 12 dB
Low 80 Hz \pm 15 dB
- 13. Dimensions** 13.8 in (w) x 10.4 (d) x 3.2 (h)
350 mm (w) x 264 (d) x 82 (h)
- 14. Weight** 7.7 lbs • 3.5 kg