LAVRY

LK-1

MODEL LK-1
LATENCY KILLER™

REAL TIME HEADPHONE CUE MIXER

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Table of Contents

Headphone Safety Precautions

Due to the high power of the headphone amplifiers, it is strongly recommended that the HEADPHONE VOLUME be reduced to a low level prior to connection of headphones designed for portable battery powered devices including “ear buds.” Failure to do so can result in damage to the headphones and possible hearing damage if the user has them on/in their ears at that time. Even if your headphones are not very efficient, it is still recommended that the Volume be reduced prior to connection, and that the headphones be disconnected when not in use.

Introduction

The Lavry Latency Killer™ removes all latency from a headphone cue-mix by allowing the user to mix signals in analog rather than digitally. This negates delay from conversion and digital processing while using the included high-quality headphone outputs.

By employing a passive *hard-wired* signal path from the analog source inputs to the outputs used to feed the DAW, the LK-1 accomplishes this without introducing any audible or measurable distortion, coloration, or noise to the recorded signal. This also means that the LK-1 Volume and Pan settings only impact the headphone Cue-Mix, and thus have no effect on the recorded signal. In a similar manner; outboard Effects can be added to the "live" signal in the Cue-mix without any change to the recorded signal. The LK-1 provides Effects Return outputs to record the effects on separate tracks; if desired.

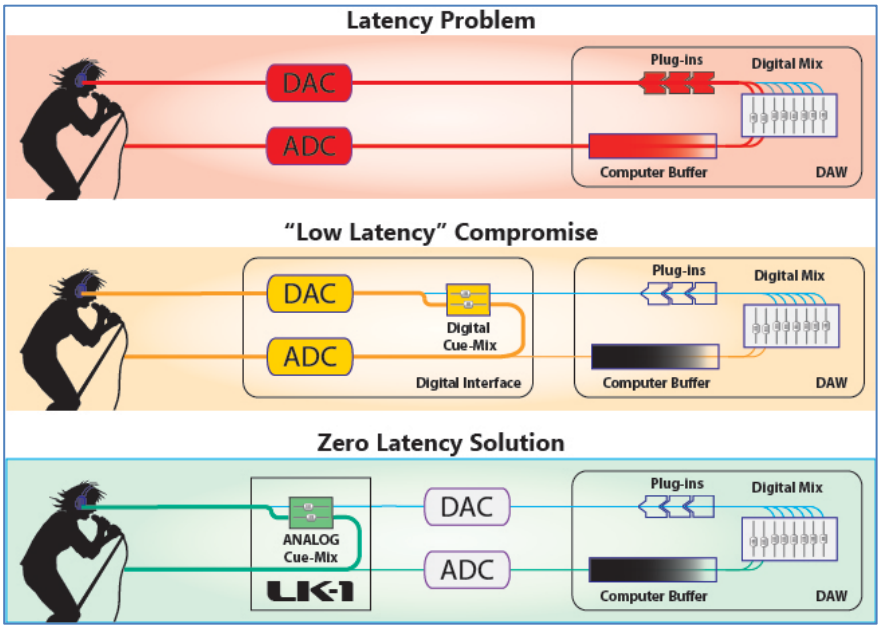


Figure 1 – Headphone Latency in Digital Recording

All digital audio recording systems introduce time delay between signal arrival and playback. In computer based DAW systems this can be a combination of converter delay, and computer processing.

In order to reduce latency, some systems utilize a digital mixer between the ADC output and the DAC input and mute the recorded signals in the DAW. This effectively bypasses the computer's contribution to the latency. However, the converter delay remains. Most of these systems also prevent the use of effects in the cue-mix.

Unlike these "low latency" systems, the Lavry LK-1 completely bypasses the entire latency problem (both the converter delay and the computer delay). It does so by mixing the live sound signal (prior to conversion) with the DAW output.

In this manual, the term "live signal" refers to the signal to be recorded. This signal is fed to the LK-1, and then from LK-1 to the recording input normally used for this purpose. The LK-1 is compatible with both line and professional signal levels.

Layout

This section gives an overview of the controls and connectors of the LK-1. More detailed information is written in later chapters of this manual.

The buttons that are illuminated in green indicate which signal the rotary knob currently controls. The buttons that are illuminated in blue indicate which selections are available within a group. More detailed information on group hierarchy is written in the section titled "Basic Operation."

Front Panel

The Lavry LK-1 has a simple user interface that consists of nine illuminated pushbuttons, one rotary knob, and an LED display. The buttons are arranged in functional groups from left to right: ***Headphone***, ***To ADC***, ***Signal***, and ***Function***.

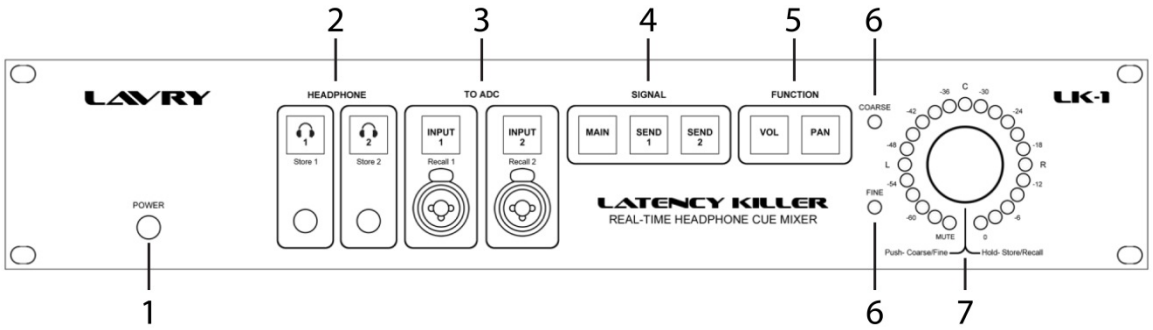


Figure 2- Front Panel Layout

1. Power Switch	**2. Headphone Outputs 1 & 2**
3. Source Inputs 1 & 2	**4. Signal Selection Group**
5. Function Selection Group	**6. Coarse/Fine Indicator LEDs**
7. Rotary Encoder with Level & Pan Indicator LEDs	

Power Switch

The power switch is a pushbutton that remains in the depressed position when "On."

Headphone Outputs 1 & 2

The buttons are labeled $_{1}$ for Headphone 1 and $_{2}$ for Headphone 2. Each section consists of a lighted push button and a ¼" headphone output. Each of the headphone amplifiers has a separate Volume control.

Headphones with 1/8" "mini" plugs can be connected using an adapter.

Source Inputs 1 & 2

Inputs 1 & 2 are combo connectors which can accept either XLR or ¼" plugs. For convenience, the main analog source for recording can be plugged into these connectors instead of the corresponding rear panel connectors.

Above each connecter there is a push-button used for selection.

Do not connect an input at both the front panel and rear panel at the same time.

Signal Selection Group

Main

This button is used to select the "live" signal of either Source Input for Volume and Panning adjustment in the headphone mix.

Send 1 & Send 2

These buttons are used to select an Effects Send for either Source input, for Volume and Panning adjustment.

Function Selection Group

Volume

This button selects the Volume function for control by the rotary encoder.

Pan

This button selects the Pan function for control by the rotary encoder.

Coarse/Fine Indicator LEDs

The Volume setting is in 3dB steps when in COARSE mode and in ½ dB steps when in FINE mode. The mode toggles every time the rotary knob is pressed and released. Two LEDs labeled "Fine" and "Coarse" display the current setting.

Rotary Encoder with Level & Pan Indicator LEDs

A single knob controls a stepped rotary encoder used for all Volume and Pan settings.

The circular array of LEDs surrounding the knob display either Volume or Pan settings for the currently selected signal.

When a Volume setting is selected, the LEDs display the Volume in 3dB increments. The lowest Volume setting is Mute, designated by a red LED. The highest Volume setting is 0 dB.

When a Pan setting is selected, the LEDs display the Pan position. "L," "C," and "R" indicate left *only,* center, and right *only* pan settings.

Rear Panel

The rear panel has four groups of audio connections in addition to the AC power input connector. All references “left-to-right” are as seen facing the rear panel. All of the LK-1’s inputs employ “Combo” connectors which can accept either XLR or ¼” plugs.

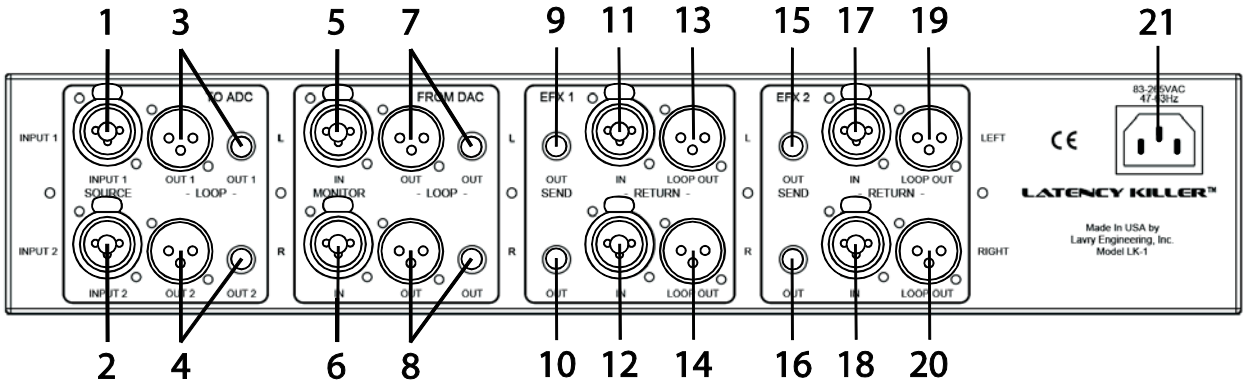


Figure 3- Rear Panel Layout

1. Source Input 1	**2. Source Input 2**
3. Source LOOP Out 1	**4. Source LOOP Out 2**
5. Monitor Input 1	**6. Monitor Input 2**
7. Monitor LOOP Out 1	**8. Monitor LOOP Out 2**
9. Effects Send 1 Left Output	**10. Effects Send 1 Right Output**
11. Effects Return 1 Left Input	**12. Effects Return 1 Right Input**
13. Effects Return 1 Left LOOP Output	**14. Effects Return 1 Right LOOP Output**
15. Effects Send 2 Left Output	**16. Effects Send 2 Right Output**
17. Effects Return 2 Left Input	**18. Effects Return 2 Right Input**
19. Effects Return 2 Left LOOP Output	**20. Effects Return 2 Right LOOP Output**
21. AC Power Input	

To ADC

The 1st group on the left is used to connect the live sound to the LK-1 and to the ADC inputs of the DAW.

Source Input 1 & 2

These combo connectors accept either XLR or ¼” plugs. They accommodate both professional and line level audio gear.

The front panel input 1 & 2 connectors are “hard-wired” to the rear panel connectors. Analog sources can be connected to either the front panel or rear panel connectors, *but not both at the same time!*

When using the ¼" Input of a combo connector, the LK-1 boosts the signal to the headphone mix and EFX Send signals by 12dB; Clipping can occur if the ¼" inputs are fed a professional level signal. If your source has a "+4" professional level T.R.S. output; a T.R.S. to Male XLR adapter cable should be used to make the connection to the TO ADC input.

Source Loop Out 1 & 2

Either the XLR or ¼" connectors are used to feed the analog inputs of the ADC/DAW.

These connectors are "hard-wired" to the Source Input connectors through the LK-1.

From DAC

The 2nd group is used to monitor the main stereo mix output of the DAW.

Monitor Input 1 & 2

These combo connectors accept either XLR or ¼" cables from the analog outputs of a DAW's DACs. The gain of this input is fixed in the headphone cue mix.

The ¼" "FROM DAC" inputs can accept "+4" as well as "-10" level signals.

Monitor Loop Out 1 & 2

Either the XLR or ¼" connectors are used (optionally) to feed the analog output of a DAW's DACs to other monitoring equipment without having to disconnect the LK-1 from a system.

These connectors are "hard-wired" to the Monitor Input connectors.

EFX 1

The 3rd group, "**EFX 1**" (Effects 1) allows the LK-1 to connect to a stereo effects unit (e.g., hardware multi-effects processor).

Effects Sends Left & Right

These ¼" connectors feed the inputs of a stereo effects unit.

If the effects unit has XLR inputs, then standard ¼" T.R.S. to XLR adapter cables can be used. For ¼" connections, T.R.S. cables can be used. For effects units with unbalanced ¼" inputs, ¼" T.S. cables are OK.

Effects Returns Left & Right

These combo connectors accept either XLR or ¼" cables from the stereo output of that effects unit.

> The ¼" EFX input can accommodate "+4" as well as "-10" level signals.

Effects Loop Out Left & Right

These XLR connectors are used (optionally) to feed additional inputs to the DAW for recording EFX in parallel to the "dry" analog source signal connected to the TO ADC input.

EFX 2

This group is functionally identical to but separate from the **EFX 1** group.

Controls

This section assumes that you have read, and are familiar with the contents of the **Layout** section.

> No LK-1 Volume or Pan settings affect the recorded signal. They only control the cue mix.

Basic Operation

Operation at a Glance

The rotary knob controls either the Volume or Panning of a signal in the Headphone Cue mix. The green illuminated buttons indicate which control is currently selected.

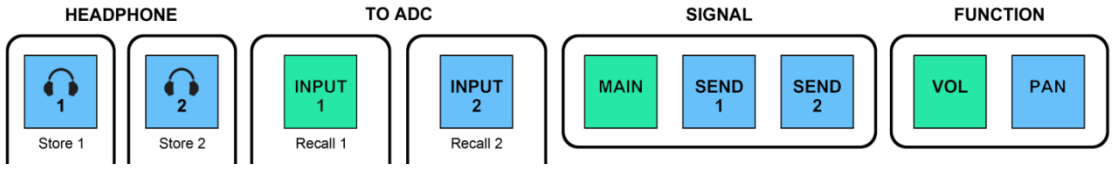


Figure 4 - Input 1 Selected

The LK-1 buttons are divided into groups and those groups are arranged in hierarchies from left to right.

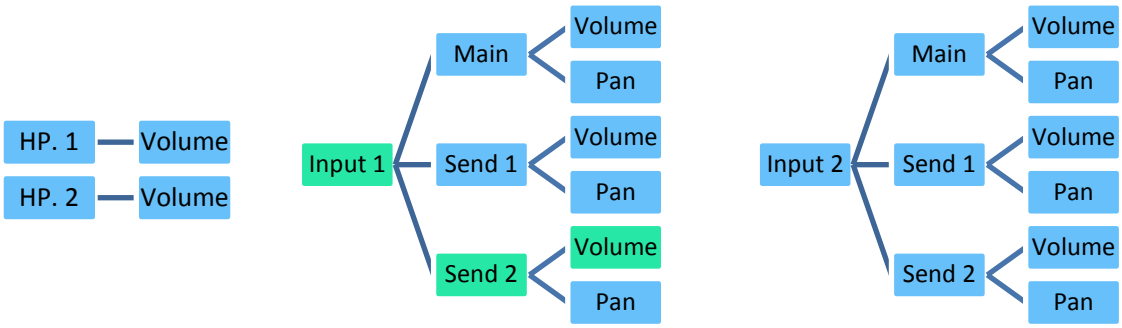


Figure 5- Control Hierarchy; Current Selection: Volume of Send 2 of Input 1

Only one button per group can be selected at a time. The blue illuminated buttons can be pressed to turn them green (changing which setting the knob controls).

The Headphone Group

Each headphone amplifier has its own Volume control. Press the button above a headphone jack to enable Volume control of that headphone.

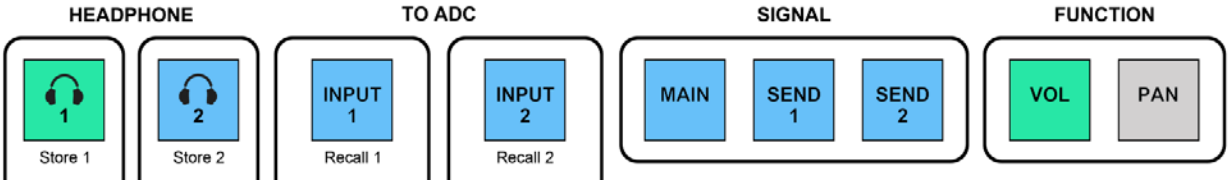


Figure 6 - Headphone 1 Volume Selected

When a headphone is selected, the Volume button in the Function Group will be illuminated in green. Rotating the knob will allow you to adjust your headphone Volume. The 'Pan' button in the Function group is not illuminated. The Pan of each signal is controlled independently in the mix.

The Headphone buttons are also used to store user presets. Read more in the "Store and Recall" section.

"TO ADC" – The Source Input Group

Pressing the Input 1 or Input 2 button on the front panel selects a source input. That input button will turn green. Each input has two connectors: one beneath the button on the front panel, and one on the rear panel. When an input is selected, the knob controls a signal in the headphone mix determined by the **Signal Group selection**.

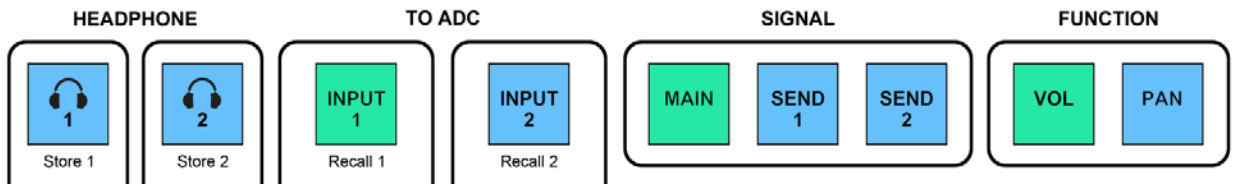


Figure 7- Input 1 Selected from "TO ADC" Group

The Input buttons are also used to recall user presets. Read more in the "Store and Recall" section.

The Signal Group

Once you have selected a Source input, the Signal Group allows you to select one of three signals: MAIN, EFFECTS SEND 1, and EFFECTS SEND 2. MAIN is the "live" signal, heard without Effects in the cue mix. The knob can now adjust either the Volume or Pan of this signal in the headphone mix as determined by your selection in the **Function Group.**

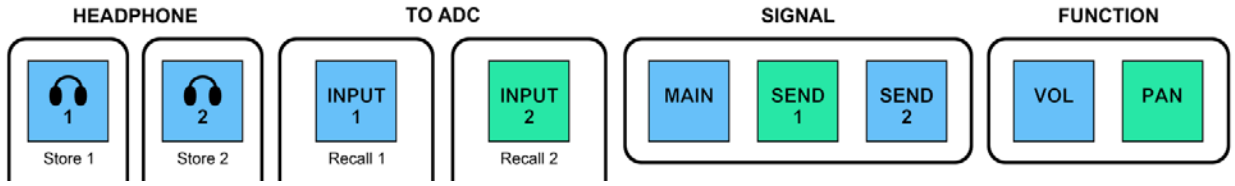


Figure 8 –Send 1 Selected from Signal Group

The Function Group

When a signal is selected, the Function Group allows you to choose whether the knob adjusts Volume or Pan of that signal in the headphone mix.

Adjusting Volume

When **Volume** is selected in the **Function Group**, the rotary knob controls the Volume of either a signal in the headphone mix, or the Volume of a headphone output; Operation of the knob is the same in either case. Rotating the knob clockwise increases Volume, and rotating it counterclockwise decreases Volume.

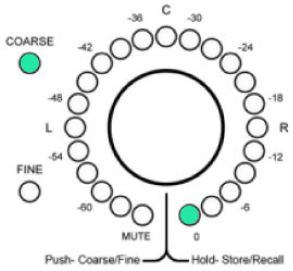


Figure 9 - Volume set at 0dB in COARSE mode

The current Volume is indicated by which LED is lit in the circular array around the knob. When the Volume is muted, the red LED (designated "MUTE") is lit. The maximum Volume is 0dB.

Because the knob is a rotary encoder, once the Volume reaches the top or bottom of the range, the knob will continue to turn, but no further Volume adjustments are made.

Each green LED in the circular array represents a 3dB range in Volume.

When in COARSE mode, each rotary step will change the Volume by 3dB, and move the indicator light by one LED in the array.

When in FINE mode, each rotary step will change the Volume by ½dB. Each FINE step will cause the indicator light to flash once, until the Volume has crossed a 3dB threshold, which will move. the indicator light by one LED in the array. Six FINE adjustments are equal to one COARSE adjustment.

For more detailed information on the Volume setting in FINE mode; please see Appendix 1.

To toggle between COARSE and FINE modes, press and release the rotary knob. The mode is displayed by two LEDs to the left of the knob, labeled “COARSE” and “FINE”.

When an adjustment is made in FINE mode and you switch back to COARSE mode, the FINE “offset” is retained. This makes it possible in COARSE mode, to return the Volume to exactly the same FINE adjustment setting by simply returning the indicator light to the same position in the circular array.

Adjusting Pan

When **PAN** is selected in the **Function Group**, the rotary knob controls the Pan of the selected signal in the headphone mix. Rotating the knob clockwise pans right, and rotating it counterclockwise pans left. While PAN is selected, the unit is locked in FINE mode.

The Pan can be selected from 13 possible positions from left to right. The position is indicated by an LED between “L” (Left channel only) and “R” (Right channel only) in the circular array around the knob. The topmost LED designated “C” indicates Centered Pan.

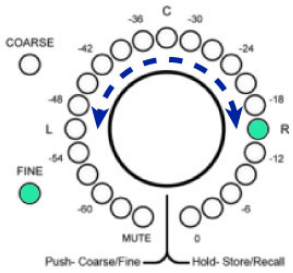


Figure 10- Pan at Rightmost Position

Store and Recall

All settings are automatically recalled whenever the unit is powered on. However, the LK-1 also allows the user to store and recall up to 2 presets.

The Headphone 1 & 2, and Input 1 & 2 buttons double as the Store and Recall buttons. Beneath each button is a label indicating its secondary function. From left to right, these read: “Store 1”, “Store 2”, “Recall 1”, and “Recall 2”.

To store or recall: Push and hold the rotary knob and then push and release the Store or Recall button. Only release the rotary knob after releasing the Store or Recall button.

Set-Up and Use

This section assumes that you have read the **Layout** section of the manual, and are familiar with the basic operation of the front panel controls as well as the input and output connections.

The LK-1 must be powered when the system that it is connected to is in use.

Before either plugging or unplugging a ¼ inch cable to INPUT 1 or INPUT 2, be sure to turn down the MAIN Volume for that Input.

It is recommended that the user ALWAYS confirms that the HEADPHONE Volume is turned down prior to making connections or using the LK-1. This is particularly important for very efficient headphones or earbuds designed for use with battery powered portable devices. It is also recommended that headphones be disconnected when not in use.

The Minimum Setup

This simple set-up allows the performer and engineer to listen to the playback of the previously recorded tracks from the main stereo output of the DAW, mixed with the "live" input from the performer in real time:

1. Connect the DAW main stereo monitor outputs to the **FROM DAC/Monitor Input(s)** of the LK-1.
2. Connect a live signal source to **INPUT 1 or INPUT 2.** Use the XLR connection for "+4" professional line level sources and the ¼" connection for "-10" consumer line level sources.
3. Connect the **TO ADC/Loop Out** to a record input of your DAW. This can be an ADC external to your DAW. The **Source Input** is hard-wired to **Loop Out.** Use balanced cables for balanced signals.

Preparing to Record

1. Turn down the Volume of the headphones.
2. Set the main mix fader of the recording software to a "normal" setting and start playback.
3. Raise the Headphone Volume to a comfortable listening level.
4. Play/Sing music and adjust the Volume of the live inputs as desired.
5. Play/Sing music and adjust the Pan position of the live sound in the mix.

Adding Effects Units

Effects can be added to the "live" input in the Cue-Mix, without affecting the recorded signal. The LK-1 offers two stereo Effects Sends and Returns for connection to external Effects units.

The Effects Sends are Unbalanced. The LK-1 accepts Balanced or Unbalanced Effects Returns.
The Effects Return signals are available through the Effects **LOOP OUT** connectors. This enables the recording of the Cue-Mix effects to additional-tracks.

Adjusting the Cue-Mix Effects

Each Source Input can be heard with up to two stereo effects. The Volume and Pan of each effect can be adjusted independently.

1. Select INPUT 1 or INPUT 2.
2. Select SEND 1 or SEND 2.
3. Play/Sing live music and adjust the Volume and Pan of the Effect as desired.

Use of Reverb and Digital Delay (DDL) are common methods of making it easier for a performer to hear them-selves above the mix.

(Optional) Adding External Monitoring

Connect the FROM DAC/Loop Out of the LK-1 to a monitor controller or console which has a Volume control. This signal is not affected by the LK-1 Volume settings and is the same (un-attenuated) level as the DAW main stereo output.

These paths are hard-wired, so use the correct Balanced/Unbalanced cables that are compatible with the DAW.

An adapter cable can be used to connect the LK-1 Headphone output to a line level input. For details, see the Headphone Output 1 and Headphone Output 2 section under "Input & Output Connections."

Recording with the LK-1

Recording with the LK-1 requires the same operational techniques used with "low latency" overdubbing systems. The performer(s) will not monitor their "live" signal through the DAW.

The recording software input channels must be set to remain in "playback mode" and NOT switch to "input monitor" when the channels enter RECORD. Otherwise; an "echo" or "flange" effect will be heard when the "live" and input monitor signals mix in the LK-1 headphone cue mix.

When performing a punch-in, it is recommended that the previously recorded track segment be trimmed to end either at the punch-in point or shortly thereafter. This will prevent the performer from hearing the previously recorded track beyond the punch-in point. If a section is being replaced, the section can also simply be muted, if the software allows.

To add effects to the "dry" live sound, connect the LK-1 to one or two outboard effects units. For continuity; the outboard effects can also be recorded on "scratch tracks" so they will play back during overdubbing along with the dry tracks. These effects tracks can be discarded after the recording is complete, or saved and used in place of (or in addition to) plug-in effects in the final mix.

Some recording programs may *not* offer the ability to disable input monitoring during record; requiring a modified approach. Please see Appendix 2 for more detailed information.

What Happens at the Punch-in Point

Like the MAIN source signals; the Effects will be heard only on the "live" signals and not on the previously recorded tracks. There are two ways to address this issue:

1. Apply plug-in effects to the recorded tracks. This technique uses fewer channels but differences between the plug-in effects and outboard effects can cause sonic discontinuity at the punch-in point.
2. Using additional inputs, the outboard effects can be recorded on separate tracks, in addition to the "dry" overdub tracks. These effects tracks can be either discarded and replaced with plug-in effects once the overdubbing is complete; or retained and used with (or in place of) plug-in effects in the final mix.
   Recorded outboard effect tracks should be treated the same as the live tracks: RECORD input monitoring should be disabled and segments should be trimmed before punch-in. Most recording software allows snapping to either the cursor or a marker; so playing up to the punch-in point and stopping to position the cursor or marker there will make snapping the ends of the recorded tracks to that point relatively easy. Placing a marker can save time, if the process needs to be repeated for any number of reasons. This is especially true if the software automatically re-positions the cursor when you click on the end of the segment to re-size it!

Storing a Setup

Once you have a set-up that works well, you can store your settings in one of the user presets.

The Headphone Volumes settings are also stored in each user preset. Before recalling settings, take care not to damage your hearing. If you are unsure about the Headphone Volume, take your headphones off and/or reduce the Volume of your DAW stereo mix output before pressing Recall.

Input & Output Connections

+4 and -10 Level inputs

The LK-1 provides XLR and ¼" connections for use with both "+4" professional line level and "-10" (consumer) line level equipment, with some considerations:

➢ In some cases; adapter cables may be needed. They are marked (below) with this symbol: ➢

For convenience, when the ¼" input is used; the LK-1 boosts "-10" level TO ADC Source Input signals by 12dB in both the headphone cue mix and the Effects Sends. However, due to the use of hard-wired circuitry to absolutely minimize signal degradation; it does not affect the level of signals sent via the TO ADC Loop Outputs for recording.

Using the FROM DAC Monitor ¼" inputs also does not boost the level of the signal in the Headphone Cue Mix. Similarly; the Effects Return ¼" inputs do not boost the level of the Effects Return signal in the Headphone Cue Mix.

Balanced and Unbalanced connections

In order to minimize signal degradation, there are a number of signal paths that have multiple connectors "hard-wired" together. For balanced signals, use balanced cables.

The Effects **SEND** outputs are unbalanced ¼" connections; but T.R.S. cables can be used to feed balanced inputs for increased noise rejection.

Three conductor T.R.S. ¼ plugs are also recommended on ¼" to XLR adapter cables to feed EFX devices with XLR inputs.

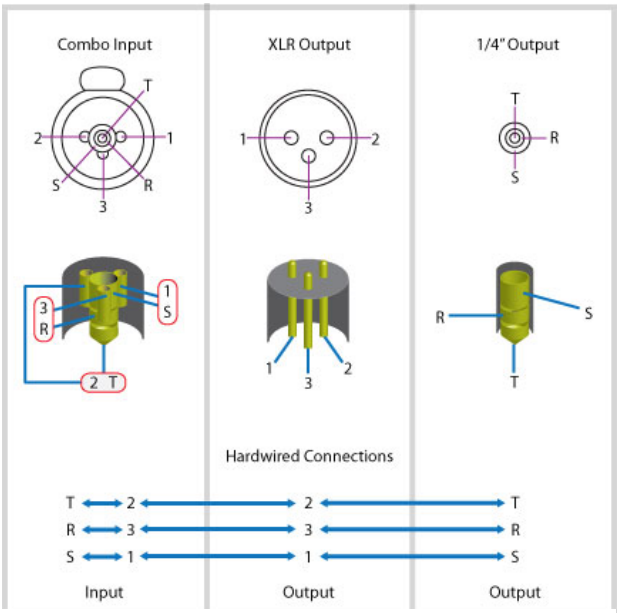


Figure 11 - Hard-wired Connectors

TO ADC/LOOP OUT

- Use the TO ADC/Source Input Combo connectors for XLR or ¼" balanced or unbalanced Line level source connection. Use on either the Front ***or*** Rear panel connectors; but ***never both*** front and rear at the same time. Use of microphones requires microphone preamplifiers like the Lavry MP10 or LavryBlue Microphone Preamplifier.
- Use the XLR input for "+4" professional level sources. XLR inputs accept professional level balanced signals with a maximum level of +24dBu, and unbalanced signals with a maximum level of +18dBu.

➢ Use XLR to TRS adapter cables for professional level TRS sources.

- Use ¼" input for "-10" (consumer) level sources. ¼" inputs accept balanced or unbalanced signals with a

maximum level of +12dBu (+9.8dBV).

- Loop Outputs utilize passive "hard-wired" balanced connection from both the front and rear panel TO ADC/Source Input connectors. The Loop Output XLR connectors are also hard-wired to the Loop Output ¼" connectors.
- The Loop Out signals are always the same level as the input; due to the passive connections.
- A very high impedance balanced input buffer is used to monitor the signal for the headphone cue mix, to avoid degradation of the recorded signal. The ¼" inputs automatically adds 12 dB of gain to the Source Input signal in the cue mix as well as the Effects Send signals; thus feeding the ¼" inputs a professional level signal can result in clipping distortion in the headphone mix and Effects Sends.

FROM DAC/LOOP OUT

- FROM DAC/Monitor inputs are combo connectors for XLR or ¼" balanced or unbalanced sources.
- Both XLR and ¼" inputs accept balanced signals with a maximum level of +24dBu and unbalanced signals with a maximum level of +18dBu, including any consumer level signals.
- Loop Outputs utilize passive "hard-wired" balanced connection for the FROM DAC/ Monitor Input to the FROM DAC/Loop Output connectors. The Loop Output XLR connectors are also hard-wired to the Loop Output ¼" connectors.
- The Loop Out signals are always the same level as the input; due to the passive connections.
- High impedance balanced input buffering is used for the signal feeding the headphone cue mix, to avoid degradation of the FROM DAC/Loop Output signal used for external monitoring.

EFFECTS 1 & EFFECTS 2 SENDS

- The SEND outputs are ¼" unbalanced signals on T.R.S. connectors, with +17dBu maximum output level.
- The output level is adjustable via the front panel SEND settings (always "PRE" the MAIN Volume setting).
- ➢ Use T.R.S. to XLR adapter cables to feed balanced or unbalanced XLR inputs.
- Use T.R.S. cables to feed balanced ¼" inputs. T.S. cables can be used to feed unbalanced ¼" inputs.

EFFECTS 1 & EFFECTS 2 RETURN INPUT/LOOP OUTPUT

- EFX1 & EFX2/Return Inputs are combo connectors for XLR or ¼" balanced or unbalanced sources.
- Both XLR and ¼" inputs accept balanced signals with a maximum level of +24dBu and unbalanced signals with a maximum level of +18dBu, including any consumer level signals.
- ➢ Loop Outputs are XLR connectors (only). Use XLR to TRS adapter cables to feed ¼" TRS balanced inputs.
- The Return Input XLR and ¼" connectors are hard-wired to the Return Loop Output XLR connectors.
- The EFX RETURN/Loop Out signals are the same level as the EFX Return/Input signals; due to the passive connection.
- High impedance balanced input buffering is used for the signal feeding the headphone cue mix.

HEADPHONE 1 & HEADPHONE 2 OUTPUTS

- Each headphone output has a Volume setting; 3dB steps in **coarse mode** and 1/2dB steps in Fine mode.
- Each output is driven by low impedance discrete high-powered amplifiers.
- Power On/Off muting relays protect against turn on/turn off "pops" or "thumps."
- Plug headphones with ¼" plugs directly into the front panel connectors, or use adapters for headphones with 1/8" mini-plugs.
- ➢ An adapter cable up to 5 meters in length can be used to feed the unbalanced stereo cue-mix signal from a headphone output to an external monitoring device. Standard ¼" "Insert" cables can be used for ¼" connections.

Specifications

A.C. POWER

Automatically adjusts to power inputs in the range of 83-265VAC, 47-63Hertz. No change of settings is necessary.

Physical

- The LK-1 is a 2U high 19” rack mount enclosure
- Dimensions: 19” W x 3.5” H x 11” D (front panel to rear panel connectors; front panel knob adds 5/8”)
- Weight: Unit ~11lbs.
- Shipping weight: ~14 lbs

Appendix 1 - Details on the Operation of the FINE Volume mode

FINE mode adds up to 2.5 dB to the 3dB COARSE steps. That added offset is retained when switching between FINE and COARSE mode. This makes it possible to get back to exactly the same FINE adjustment while in COARSE mode by returning to the same LED level indication.

Because most adjustments are made “by ear” while listening through the headphones; actual operation is more intuitive than it may seem based on this detailed explanation. The FINE setting “reset-ability” while in COARSE mode makes the LK-1 more user-friendly because you know that you are always returning to exactly the same listening level.

If at any time you wish to “zero the FINE offset” and return to a Coarse Volume step; simply turn the rotary encoder clockwise in FINE mode until the LED indication changes to the next higher step

Appendix 2 - Detailed Description of the Effects Feature

Each of the EFX can accommodate either one or both source inputs. Just like the MAIN signal, each EFX Volume and Pan can be adjusted independently.

For example, if a digital delay (DDL) unit is connected to EFX Send 1 and a Reverb unit is connected to EFX Send 2; the amount of DDL and Reverb heard in the cue mix could be adjusted individually for each SOURCE input using the SEND 1 and SEND 2 Volume and Pan settings for INPUT 1 *or* INPUT 2.

In the case of using two EFX processors separately, one for each SOURCE input; the INPUT 1/SEND 1 could be used to adjust the Volume and Pan settings for only INPUT 1. The Volume setting for INPUT 1/SEND 2 would be set to "Mute" in this case.

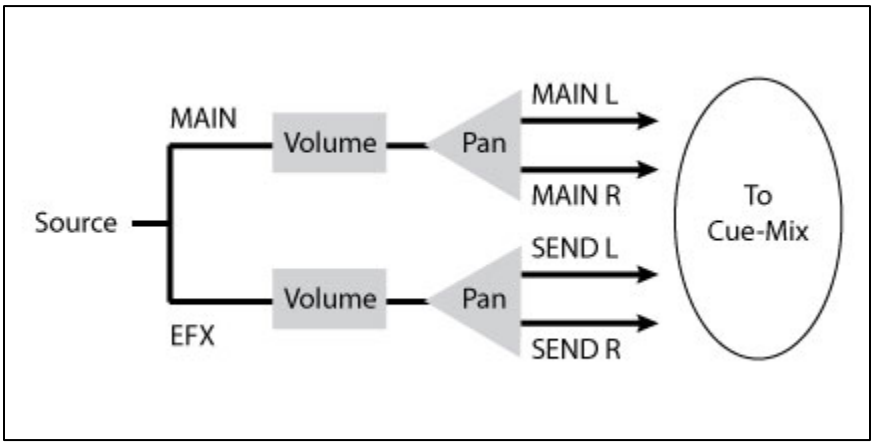


Figure 12- Separation of Settings for MAIN and EFX

Similarly for INPUT 2; the INPUT 2/SEND 1 Volume setting would be "Mute." The INPUT 2/SEND 2 setting would be used to adjust the Volume and Pan of the EFX for only INPUT 2 effects in the cue mix.

The EFX Volume and Pan settings are independent of the MAIN Volume and Pan settings. Independent EFX Volume adjustment serves to compensate for varying return signal levels from different hardware.

The Effects Sends' Volume and Pan settings are both independent of the MAIN Volume settings. If significant adjustments are made to the "live" signal using the MAIN Volume setting during overdubbing, it may be necessary to also adjust the Effects SEND volume setting for that input.

However, if adjustment is made externally to the LK-1 using the analog sources' output level; the MAIN and EFFECTS levels will be affected proportionally. One example of when this would occur is when setting the recording level by adjusting the microphone preamplifiers or instrument's output level.

Appendix 3 – Input Monitoring In Record

Programs such as ProTools do not offer the option of disabling Input Monitoring during record. In this case a second track can be used as the "record" track, with the fader all the way down or the "mute" enabled. After recording, "time locking" the newly recorded segment allows it to be moved to the "playback" channel before the next take. Please see "Working with ProTools and the Lavry Latency Killer" for more information.

Cakewalk- Turn off "Input Echo" to mute input monitoring.

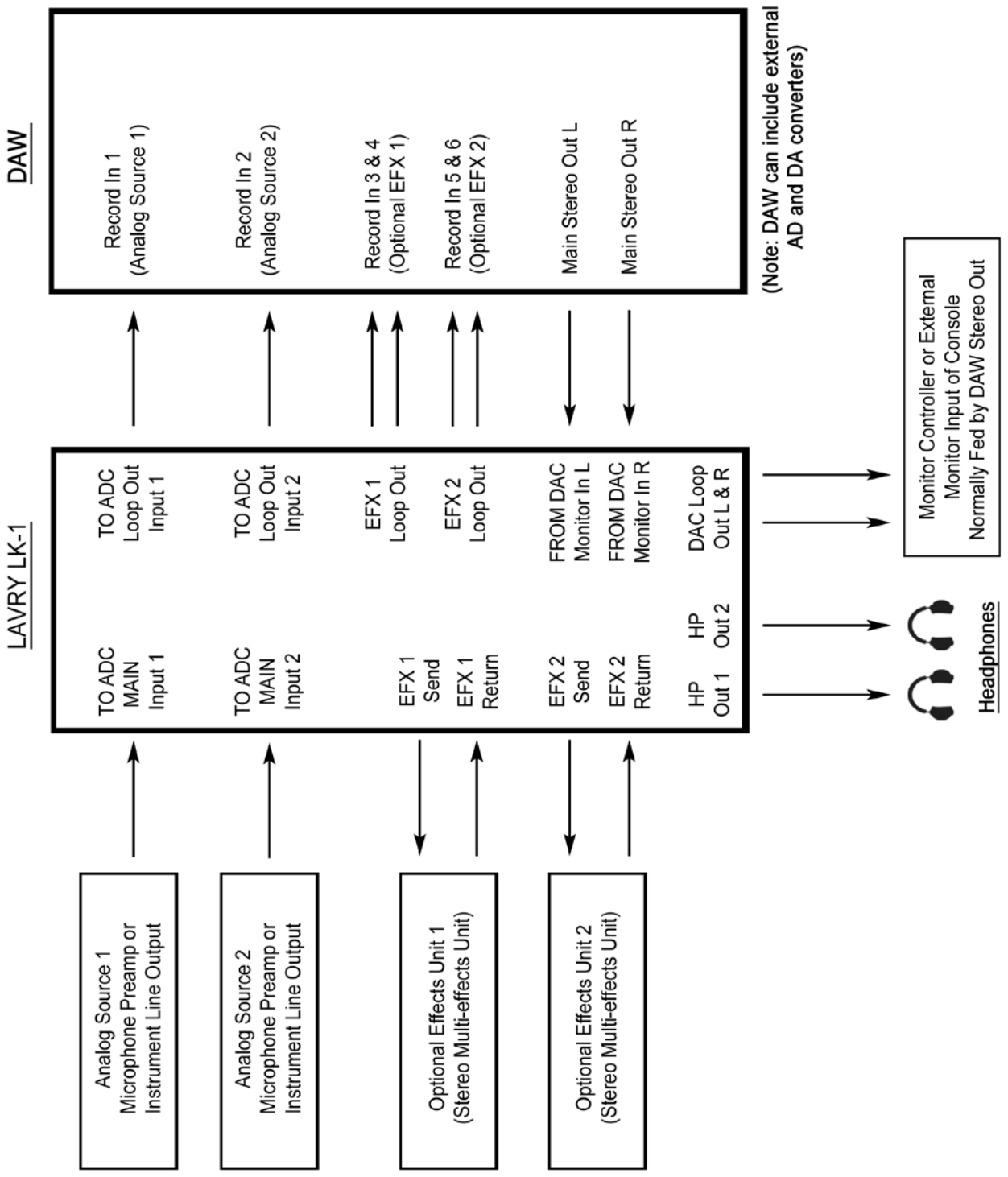
Reaper- Turn off Input Monitoring (Right-clicking on Input Monitor button of Mixer channel strip will show "Monitor track media when recording" checked).

Nuendo- Set Input Monitoring mode to "Manual" in Preferences VST page. Use button with speaker symbol to turn off input monitoring on channel strip.

Logic-
To disable "Auto Software Monitoring;" do one of the following:
1.) Choose Options > Audio > De-select Auto Input Monitoring from the main menu bar (or use the Toggle Auto Input Monitoring key command).
2.) Control-click (or right-click) the Record button in the Transport bar, and de-select the Auto Input Monitoring setting from the pop-up menu.

For other Digital Audio Workstation software, please consult your owner's manual.

Appendix 4 – Block Diagram of Workflow



Limited Warranty – Lavry LK-1

Subject to the conditions set forth below, for one year after the original purchase date of the product, Lavry Engineering will repair the product free of charge in the United States in the event of a defect in materials or workmanship.

Lavry Engineering may exchange new or rebuilt parts for defective parts. Please call the factory for an RMA number prior to shipment. No product will be accepted for warranty service without a pre-issued RMA number.

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