

# LAVRY

## LATENCY KILLER - SOLO

With LatencyKiller™ Technology



## MODEL LK-SOLO

HP Amp| 2x2 Loop Thru Mixer

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# Introduction

The Lavry Latency Killer – Solo (LK-Solo) is an extremely high-quality headphone amplifier capable of effortlessly driving a wide range of headphones from a stereo source, with precise and resettable control of the volume in half dB steps.

In addition, the LK-Solo can provide a latency-free mix of previously recorded material and “live” signals during recording and overdubbing with any computer-based Digital Audio Workstation (DAW). The musician can adjust the DAW and his/her own sound levels separately, a useful tool for real-time applications.

By mixing signals in Analog rather than Digital, the unit 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-Solo accomplishes this without introducing any audible or measurable distortion, coloration, or noise to the recorded signal. This also means that the LK-Solo Volume settings only impact the headphone Cue-Mix, and thus have no effect on the recorded signal.

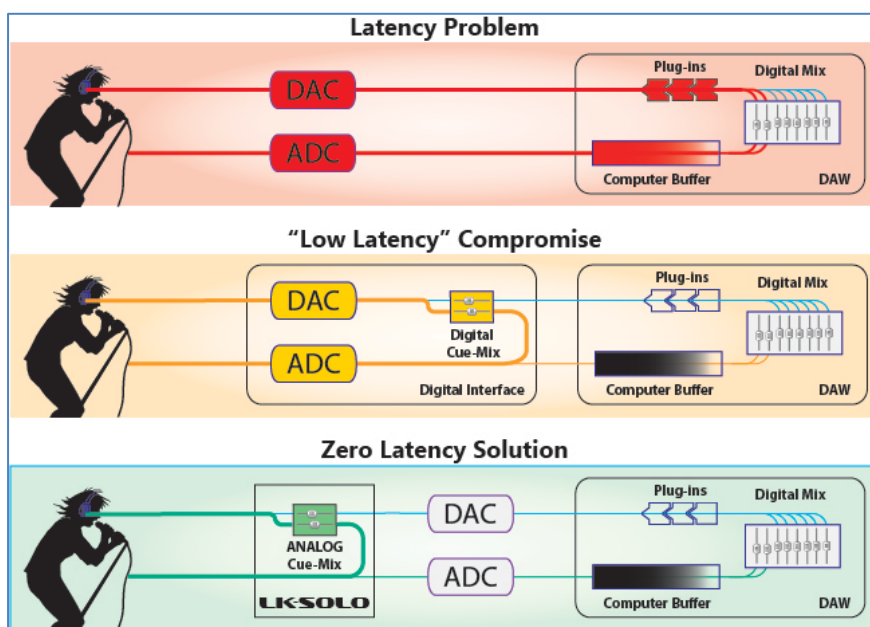


Figure 1 – Headphone Latency in Digital Recording

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.

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.

Unlike these “low latency” systems, the Lavry LK-Solo 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-Solo, and then from LK-Solo to the recording input normally used for this purpose. The LK-Solo is compatible with both line and professional signal levels.

## Layout

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

The stereo inputs can accept “+4” as well as “-10” level signals.

There are 2 operational modes for the LK-Solo. One mode adjusts the volume of both live inputs together, while the other mode adjusts them independently. Switching between modes is accomplished by pressing and holding the **SELECT** button.

## Front Panel

The Lavry LK-Solo has a simple user interface that consists of 2 pushbuttons, one column of LEDs, one rotary knob, and a numerical LED display.

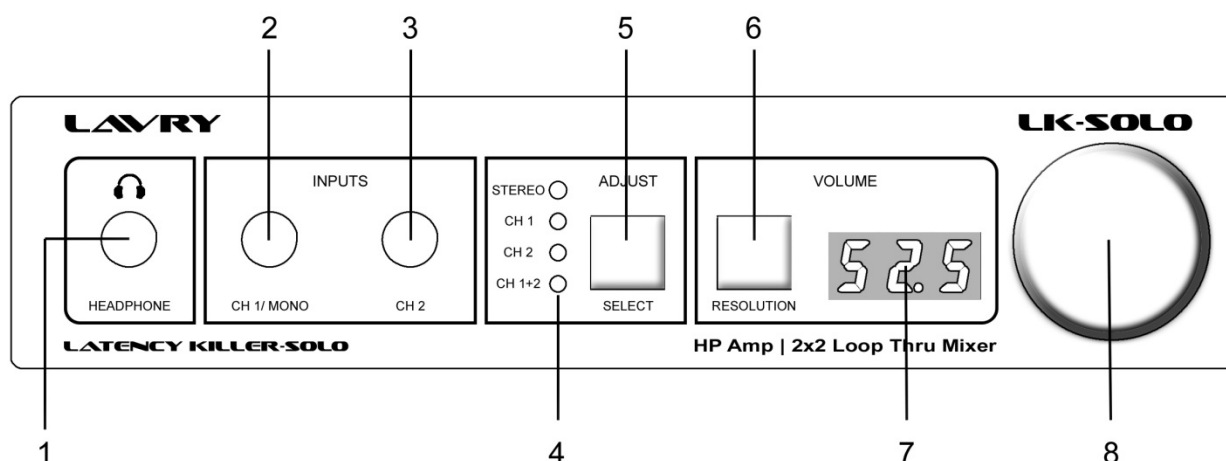


Figure 2- Front Panel Layout

1. Headphone Output	2. CH1/ Mono Input
3. CH2 Input	4. Selection Indicator LEDs
5. Select Button	6. Resolution Button
7. Volume Level Display (dB)	8. Rotary Encoder Volume Control Knob

## HEADPHONE OUTPUT

This ¼" headphone output works with a wide range of headphones. The unit provides protection against “pops” or “thumps” when the unit is turned on or off.

## CH1/MONO INPUT

This ¼" input receives **CH1** when recording two channels. When nothing is connected to the **CH2 Input**, **CH1** is routed to *both* **CH1** and **CH2** of the headphone mix as a MONO input.

## CH2 INPUT

This ¼" input receives **CH2** when recording two channels.

## SELECTION INDICATOR LEDs

Each LED in this group of 4 indicates a possible selection for the **Rotary Knob**, and has an adjacent label printed to the left of each LED. The LEDs correspond (from top to bottom) to the following Volume control selections: **STEREO**, **CH1**, **CH2**, **CH1+2**.

## SELECT BUTTON

Pressing and releasing this button selects which of the Volume settings the **Rotary Knob** currently controls as indicated by the corresponding **Selection Indicator LED**.

There are 2 operational modes for the LK-Solo. In one mode, **STEREO** and **CH1+2** are used. In the other mode, **STEREO**, **CH1**, and **CH2** are used.

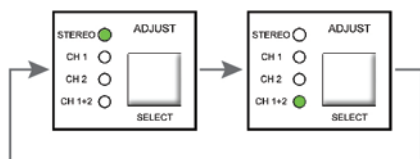


Figure 3 – Select order of Mode 1

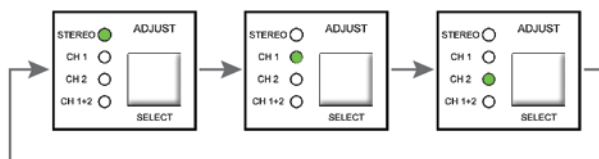


Figure 4 – Select order of Mode 2

Pressing and holding this button displays the current input mode of the unit by flashing all of the **Selection Indicator LEDs** corresponding to the inputs which are currently in use.

After holding the select button for approximately 5 seconds, the LK-Solo will switch to the opposite Mode. At this time, the STEREO Volume setting will remain unchanged, but the other source Volumes will be reset to zero.

## RESOLUTION BUTTON

This button toggles the Volume adjustment step size of the **Rotary Knob** between 3dB and ½dB.

## VOLUME DISPLAY

This 3 digit display reads out the relative Volume level (dB) of the current selection. The minimum level is “00.0” and the signal is **Muted**. The maximum level is “66.0”.

## ROTARY ENCODER VOLUME CONTROL KNOB

Rotation of the Rotary Knob adjusts the Volume of the selected signal in the Headphone Cue mix, as indicated by the **Volume Display**. Clockwise rotation increases the selected Volume, and Counterclockwise rotation decreases the selected Volume. The size of the Volume adjustment of a rotational step is controlled by the **Resolution Button**.

LK-Solo Volume settings do not affect the recorded signal. They only control the headphone cue mix.

## Rear Panel

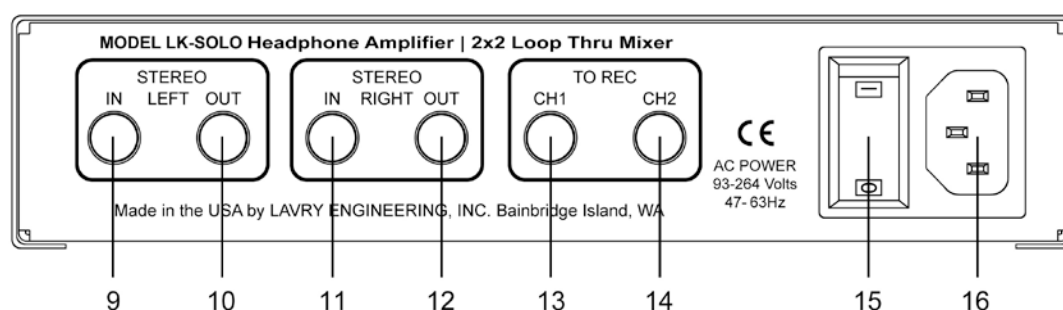


Figure 5 - Rear Panel Layout

9. Stereo Input Left	10. Stereo Output Left
11. Stereo Input Right	12. Stereo Output Right
13. CH1 Output	14. CH2 Output
15. Power Switch	16. AC Power Connector

### STEREO INPUT LEFT

This ¼" input receives the left analog output of the DAW or of any stereo source.

### STEREO OUTPUT LEFT

This ¼" output is hardwired to **Stereo Input Left**, allowing an unbroken connection from the left analog output of the DAW to the destination (i.e. monitor controller, mixer, etc.).

### STEREO INPUT RIGHT

This ¼" input receives the right analog output of the DAW or of any stereo source.

### STEREO OUTPUT RIGHT

This ¼" output is hardwired to **Stereo Input Right**, allowing an unbroken connection from the right analog output of the DAW to the destination (i.e. monitor controller, mixer, etc.).

### CH1 OUTPUT

This ¼" output is hardwired to the **CH1/Mono Input** on the front panel, allowing an unbroken connection from the CH1 /Mono Source to the analog input of the DAW.

## CH2 OUTPUT

This ¼" output is hardwired to the **CH2 Input** on the front panel, allowing an unbroken connection from the CH2 source to the analog input of the DAW.

## POWER SWITCH

The power switch is a two position rocker switch.

## AC POWER CONNECTOR

This unit accepts AC Power in the range of 93-264 Volts at 47-63 Hertz. Adjustment to AC power input in this range is automatic; there are no settings to change.

## Caution

**DO NOT OPEN THE LK-SOLO:** Attempting to open the enclosure may result in damage to the unit. There are no user-serviceable parts inside.

**AVOID HEARING & HEADPHONE DAMAGE:** It is strongly recommended that you REDUCE THE VOLUME TO A LOW LEVEL BEFORE CONNECTING YOUR HEADPHONES. This is especially important for 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.

## Setup 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-Solo must be powered on when the system that it is connected to is in use. Distortion may result to signals passing through the LK-Solo when it is not powered.

Muting unused inputs will minimize headphone noise.

## Setup for Playback Listening

This simple set-up allows the LK-Solo to function as a headphone amplifier.

1. Connect the AC power plug to the LK-Solo and to your AC power socket.
2. Power on the LK-Solo.
3. Set all input Volumes to zero.

4. Connect the DAW main stereo monitor outputs to **Stereo Input Left** and **Stereo Input Right**.
5. Connect headphones to the **Headphone Output**.
6. Select **STEREO**.
7. Play a track and raise the **STEREO** Volume level of the LK-Solo to comfort.

**(Optional) Adding External Monitoring:** Connect the **Stereo Output Left** and **Stereo Output Right** of the LK-Solo to a monitor system. This signal is not affected by the LK-Solo Volume settings and is the same (un-attenuated) level as the DAW main stereo output.

While connected to the LK-Solo, it is important that the external monitoring controller be powered on, even when it is not in use.

The connection between the output of the DAW and the input of the monitor system is uninterrupted. If the output of the DAW uses balanced cables, then the output of the LK-Solo must also be connected to the monitor system with balanced cables. Conversely, if the output of the DAW uses unbalanced cables, then the output of the LK-Solo must also be connected to the monitor system with unbalanced cables.

## SOURCE SIGNAL ROUTING AND CONTROL

The LK-Solo has two front panel inputs for recording source connection: **CH1/MONO** and **CH2**.

The **CH1/MONO Input** can serve as a MONO input when only one source is to be recorded. When there is nothing plugged into the front panel **CH2** input, the signal is routed from the **CH1/MONO** input to both the **CH1** and **CH2** inputs. Due to the direct connection between the front and rear panel jacks, when a mono signal is routed to both **CH1** and **CH2** inputs, the same signal will appear on both **CH1** and **CH2** outputs.

## PANNING

The effective panning of the source signal or signals is controlled by the routing in the following manner:

- 1.) When only one source is connected to the front panel **CH1/MONO** input, the signal is routed to **CH1** and **CH2**, resulting in the signal appearing in the headphone mix with CENTER panning when the Volume is adjusted using the **CH1+2** setting.
- 2.) When two channels are connected to the front panel **CH1** and **CH2** inputs, the **CH1** signal will appear in the headphone mix with LEFT panning and the **CH2** signal will appear with RIGHT panning. With individual sources, the individual **CH1** and **CH2** settings would typically be used to control the Volume. For stereo sources, the **CH1+2** setting allows easy adjustment of both channels at the same time

## Setup for Mono Recording

1. First, complete all steps listed in the section titled **Setup for Playback Listening** included previously in this chapter of the manual.
2. Press and hold **SELECT**. If the unit is in the correct Mode, then the 2 LEDs corresponding to **STEREO** and **CH1+CH2** will be illuminated. If not, continue to hold **SELECT** until the mode switches.
3. Select **CH1+CH2**, and lower the Volume to zero.
4. Connect live signal source to **CH1 Input/ Mono Input**.
5. Connect **CH1 Output** to the analog record input of your DAW. Use balanced cables for balanced signals or unbalanced cables for unbalanced signals.
6. Raise the Volume of **CH1+2** to the optimal level.

## Setup for Recording Two Sources

1. First, complete all steps listed in the section titled **Setup for Playback Listening** included previously in this chapter of the manual.
2. Press and hold **SELECT**. If the unit is in the correct Mode, then the 3 LEDs corresponding to **STEREO**, **CH1**, and **CH2** will be illuminated. If not, continue to hold **SELECT** until the mode switches.
3. Select **CH1** and lower the Volume to zero.
4. Select **CH2** and lower the Volume to zero.
5. Connect one live signal source to **CH1/Mono Input**.
6. Connect the 2nd live signal source to **CH2 Input**.
7. Select **CH1** and raise the Volume to the optimal level.
8. Select **CH2** and raise the Volume to the optimal level.

## Setup for Stereo Recording

1. First, complete all steps listed in the section titled **Setup for Playback Listening** included previously in this chapter of the manual.
2. Press and hold **SELECT**. If the unit is in the correct Mode, then the 2 LEDs corresponding to **STEREO** and **CH1+CH2** will be illuminated. If not, continue to hold **SELECT** until the mode switches.
3. Select **CH1+2** and lower the Volume to zero.
4. Connect a live stereo signal source to the **CH1/Mono Input** and to the **CH2 Input**. Use balanced cables for balanced signals or unbalanced cables for unbalanced signals.
5. Connect **CH1 Output** and **CH2 Output** to the analog record inputs of your DAW. Use balanced cables for balanced signals or unbalanced cables for unbalanced signals.
6. Select **CH1+2** and raise the Volume to the optimal level.

## Recording with the LK-Solo

Recording with the LK-Solo requires the same operational techniques used with “low latency” overdubbing systems. The performer 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-Solo 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.

### INPUT MONITORING IN RECORD

Some 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. For more information, please visit the following URL:

<http://lavryengineering.com/pdfs/lavry-working-with-protools-and-the-lavry-latency-killer.pdf>

**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 software’s manual.

# Specifications

For detailed technical specifications, visit the following URL: <http://www.lavryengineering.com/lk-solo.html>

## Input Signals

The LK-Solo inputs accept both “+4” professional line level and “-10” (consumer) line level signals. Inputs may be either balanced or unbalanced.

When an input signal is not in use, it is advisable to mute the Volume for that signal to prevent additional noise from entering the headphone mix.

## Output Signals

With the exception of the Headphone output, each of the outputs of the LK-Solo is hard-wired to an input. As such, the output signals are identical to their respective input signals. Therefore, the levels are unattenuated, and the balance/unbalanced wiring of the output cables should be the same as that of their respective input cables.

## Headphone Output

The headphone output is designed for a maximum output level of +18 dBu. An appropriate adapter can be used to connect headphones with a 1/8” (mini) plug.

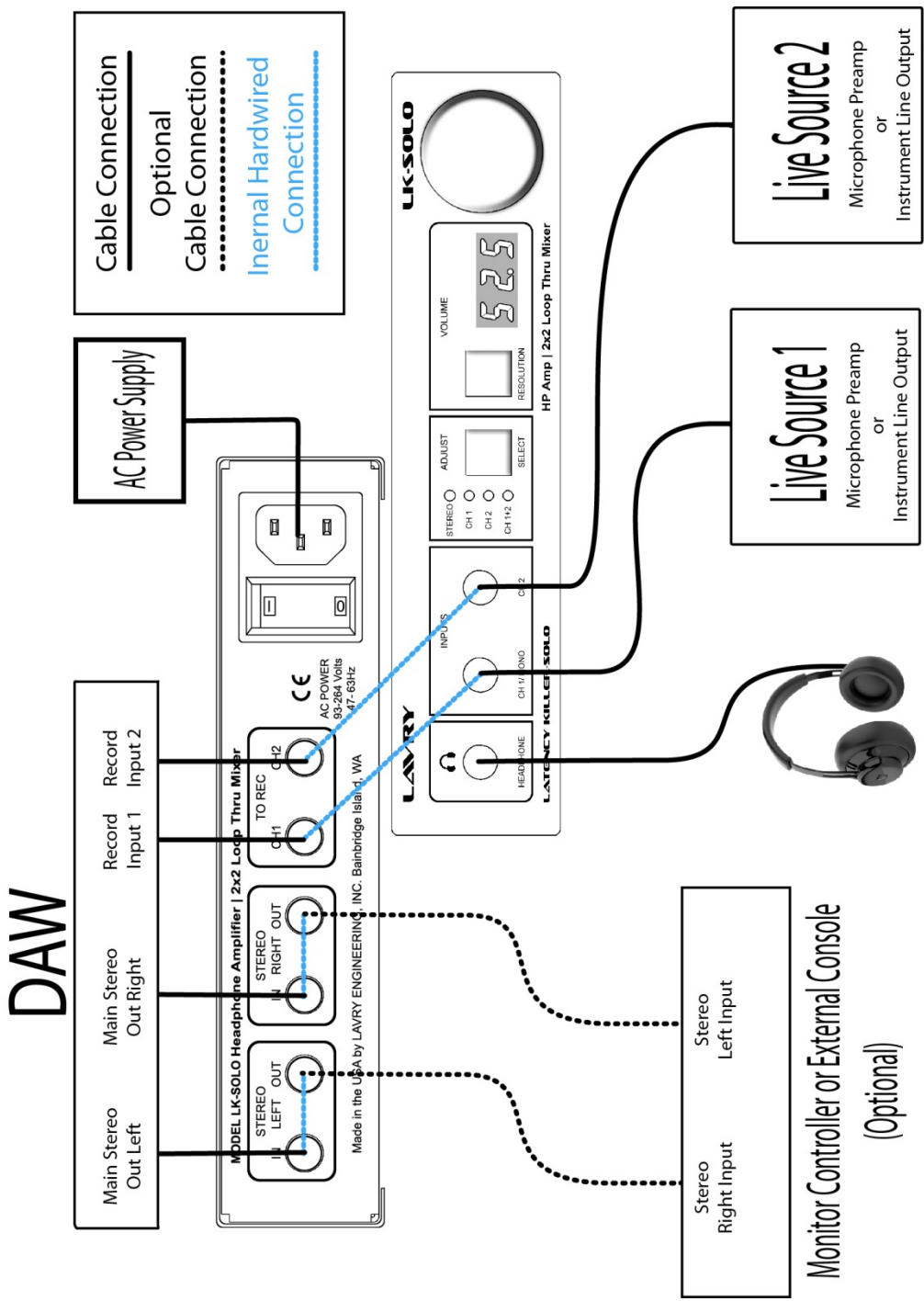
## AC Power

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

## Physical

- Dimensions: 8”W x 1.75”H x 10.75” D (front panel to rear panel connectors; front panel knob adds 5/8”)
- An optional Rack Mount Kit is available which can be used to mount any combination of two LavryBlack 1/2 rack units in a 1U 19” rack space. Please note that this kit cannot be used to rack mount a single LK-Solo. Weight: Unit ~5lbs.
- Shipping weight: ~6 lbs.

# Appendix 1 – Connection Diagram



## Limited Warranty – Lavry LK-Solo

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.

This warranty is extended only to an original purchaser of the product from Lavry Engineering, or an authorized reseller of Lavry Engineering. Products that are purchased from unauthorized resellers do not have any warranty coverage. A valid purchase receipt or other valid proof of purchase will be required before warranty service is provided. This warranty only covers failures due to defects in materials or workmanship and does not cover damages which occur in shipment or failures resulting from accident, misuse, line power surges, mishandling, maintenance, alterations and modifications of the product, or service by an unauthorized service center or personnel. Lavry Engineering reserves the right to deny warranty service to products that have been used in rental, service bureau, or similar businesses.

This limited warranty gives you specific legal rights. You may have others which vary from state/jurisdiction to state/jurisdiction.

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