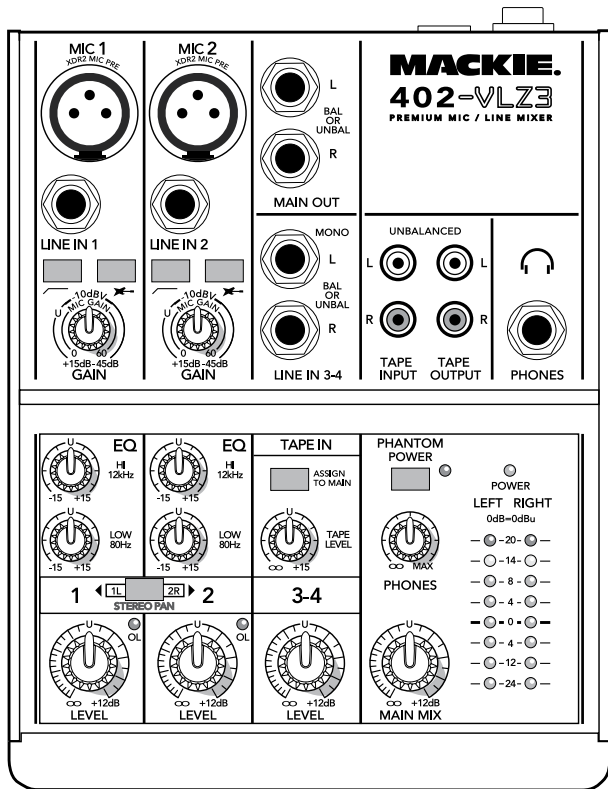
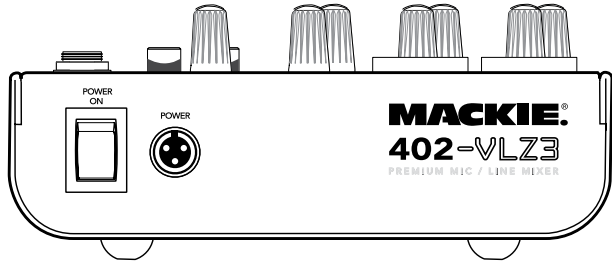


402-VLZ3

4-Channel Premium Mic/Line Mixer

OWNER'S MANUAL



MACKIE®

Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
11. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
12. Only use attachments/accessories specified by the manufacturer.
13. Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
14. Unplug this apparatus during lightning storms or when unused for long periods of time.
15. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
16. This apparatus shall not be exposed to dripping or splashing, and no object filled with liquids, such as vases or beer glasses, shall be placed on the apparatus.
17. This apparatus has been equipped with a rocker-style AC mains power switch. This switch is located on the rear panel and should remain readily accessible to the user.



18. The MAINS plug or an appliance coupler is used as the disconnect device, so the disconnect device shall remain readily operable.
19. NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and the receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.

CAUTION: Changes or modifications to this device not expressly approved by LOUD Technologies Inc. could void the user's authority to operate the equipment under FCC rules.

WARNING — To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

	CAUTION AVIS	
RISK OF ELECTRIC SHOCK. DO NOT OPEN RISQUE DE CHOC ELECTRIQUE. NE PAS OUVRIR		
<small>CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT REMOVE COVER (OR BACK) NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL. ATTENTION: POUR EVITER LES RISQUES DE CHOC ELECTRIQUE, NE PAS ENLEVER LE COUVERCLE. AUCUN ENTRETIEN DE PIECES INTERIEURES PAR L'USAGER. CONFIER L'ENTRETIEN AU PERSONNEL QUALIFIE. AVIS: POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROUCTION, NEPOSEZ PAS CET ARTICLE A LA PLUIE OU A L'HUMIDITE</small>		



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.
Le symbole éclair avec point de flèche à l'intérieur d'un triangle équilatéral est utilisé pour alerter l'utilisateur de la présence à l'intérieur du coffret de "voltage dangereux" non isolé d'ampleur suffisante pour constituer un risque d'électrocution.



The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.
Le point d'exclamation à l'intérieur d'un triangle équilatéral est employé pour alerter les utilisateurs de la présence d'instructions importantes pour le fonctionnement et l'entretien (service) dans le livret d'instruction accompagnant l'appareil.

20. This apparatus does not exceed the Class A/Class B (whichever is applicable) limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

ATTENTION — *Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de class A/de class B (selon le cas) prescrites dans le règlement sur le brouillage radioélectrique édicté par les ministere des communications du Canada.*

21. Exposure to extremely high noise levels may cause permanent hearing loss. Individuals vary considerably in susceptibility to noise-induced hearing loss, but nearly everyone will lose some hearing if exposed to sufficiently intense noise for a period of time. The U.S. Government's Occupational Safety and Health Administration (OSHA) has specified the permissible noise level exposures shown in the following chart. According to OSHA, any exposure in excess of these permissible limits could result in some hearing loss. To ensure against potentially dangerous exposure to high sound pressure levels, it is recommended that all persons exposed to equipment capable of producing high sound pressure levels use hearing protectors while the equipment is in operation. Ear plugs or protectors in the ear canals or over the ears must be worn when operating the equipment in order to prevent permanent hearing loss if exposure is in excess of the limits set forth here:

Duration Per Day in hours	Sound Level dBA, Slow Response	Typical Example
8	90	Duo in small club
6	92	
4	95	Subway Train
3	97	
2	100	Very loud classical music
1.5	102	
1	105	Dave screaming at Steve about deadlines
0.5	110	
0.25 or less	115	Loudest parts at a rock concert

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Please write your serial number here for future reference (i.e., insurance claims, tech support, return authorization, make dad proud, etc.)

Purchased at:

Date of purchase:

Read This Page!



We realize that you must be anxious to try out your new 402-VLZ3. All we ask is that you read this page now, and the rest can wait until you're good and ready. But do read it — you'll be glad you did.

Adjusting input levels

It's not even necessary to hear what you're doing to set optimal levels. But if you'd like to: Plug headphones into the phones jack, then set the phones knob just a little bit up.

The following steps must be performed for channel 1 and 2:

1. Turn the gain and level knobs fully down (counterclockwise).
2. Set the EQ knobs at the center.
3. Connect the signal source to the input of channel 1.
4. Play something into channel 1. This could be an instrument, a singing or speaking voice, or a line input such as from a CD player or tape recorder output. Be sure that the volume of the input is the same as it would be during normal use. If it isn't, you might have to readjust these levels during the middle of the set.
5. Adjust the gain control so that the OL LED does not come on very often, if at all, even during the loudest parts of your program.
6. If you'd like to apply some EQ, do so now and repeat step 5.
7. Repeat for channel 2 if required.

Instant Mixing

Here's how to get going right away, assuming you have a microphone and a keyboard:

1. Plug your microphone into channel 1's mic input.
2. Turn on the 402-VLZ3.
3. Adjust the input levels.
4. Connect cords from the main outputs to the inputs of your amplifier.
5. Hook up speakers to the amplifier and turn it on.
6. Turn up the channel 1 level knob to the center and the main mix knob one quarter of the way up.
7. Sing like a canary!
8. Turn down the channel 3-4 level knob.
9. Plug your keyboard into stereo channel 3-4.
10. Play the keyboards and sing a little, and adjust the channel 3-4 level knob to add the keyboard to the vocals.
11. Play like a madman and sing like a canary! It's your first mix!

Other Notes

For optimum sonic performance, the channel level knobs and the main mix knob should be set near the "U" (unity gain) markings.

Always turn the main mix control down before making connections to and from your mixer.

If you shut down your equipment, turn off your amplifier or powered speakers first. When powering up, turn them on last.

Save the shipping box! You may need it someday.

Introduction

Thank you for choosing a Mackie professional compact mixer. The 402-VLZ3 is equipped with our precision-engineered XDR2™ Extended Dynamic Range premium studio-grade mic preamp.

The small size of this mixer and the quality of its design make it an ideal choice for recording, sound reinforcement, multimedia use, or post-production work. Tuck it away in your home studio and use the included Traktion software to record your wonderful talent.

The Mackie VLZ3 series of mixers consist of the 802, 1202, 1402, 1642, and 1604-VLZ3. We had a few of these high quality channels left over in engineering, so we decided to put them to good use in the 402-VLZ3. Some of the features include:

- 2 mono mic/line channels and 1 stereo line-level channel
- 2-band EQ on mono channels
- Instrument input switches on channels 1 and 2
- Stereo pan button allows mono channels to be used in either summed mono or discrete stereo operation
- Mix bus allows monitoring of any combination of main mix and tape input
- Low-cut filter and overload LED on mic channels
- Separate main mix and phones outputs with individual volume controls
- DJ Style “cueing” of the tape input using the “Assign to Main” button
- Tape input and output with analog RCA connectors
- Includes Traktion software to allow complete recording with computers
- Solid and stylish mechanical design
- Optional mic stand adapter (see p.22)

How To Use This Manual

Since many of you folks will want to hook up your 402-VLZ3 immediately, the first pages you will encounter after this introduction are the ever-popular hookup diagrams. These show typical mixer setups for various applications.

After this section is a detailed tour of the entire mixer, where you will find illustrations with each feature numbered. If you're curious about a feature, simply locate it on the appropriate illustration, notice the number attached to it, and find that number in the nearby paragraphs.



This icon marks information that is critically important or unique to the 402-VLZ3.



This icon will lead you to in-depth explanations of features and some practical tips.

Appendix A is a section on troubleshooting and service information.

Appendix B is a section on connectors.

Appendix C shows the technical specifications, and a block diagram.

Traktion

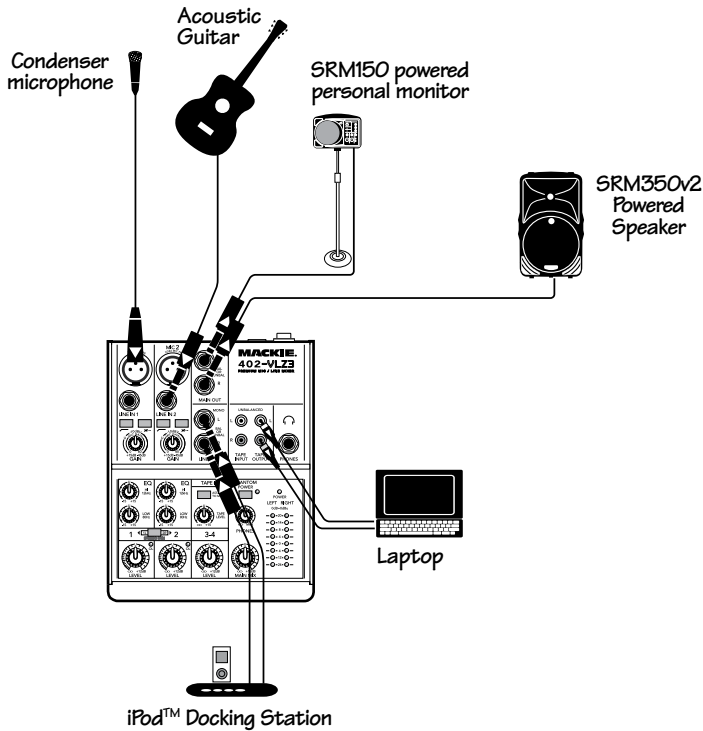
Not only do you get a shiny new 402-VLZ3 mixer, you also get Traktion software added for good measure. This wonderful software is not required to run the 402-VLZ3 mixer, but once you start using it, you will just love it.

Traktion is a powerful audio production and MIDI sequencing application, designed with simplicity and ease of use in mind. It can be easily loaded onto your PC or Mac, and configured for your system. It is capable of delivering professional results that only a few years ago would have required a significant investment in expensive hardware. When you open Traktion, you have at your disposal all of the tools necessary to turn your musical ideas into great mixes.

You will need a computer with a high-speed internet connection to download the Traktion Basic Bundle. The authorization code is supplied with your 402-VLZ3. See www.mackie.com for system requirements and more Traktion details.

Entire audio civilizations have grown up around Traktion, so we hope that you will enjoy it and your new 402-VLZ3 mixer.

Hookup Diagrams



This diagram shows a microphone connected to channel 1's mic input, with the phantom power switch pressed in. A guitar is attached to the instrument input of channel 2, with the instrument switch pressed in.

An iPod™ docking station is connected to the line-level inputs of channels 3 and 4, so you can play to a pre-recorded backing track, or play music during the breaks caused by drinking too many free lattes. You may need two 1/4" to RCA adapters to make these connections.

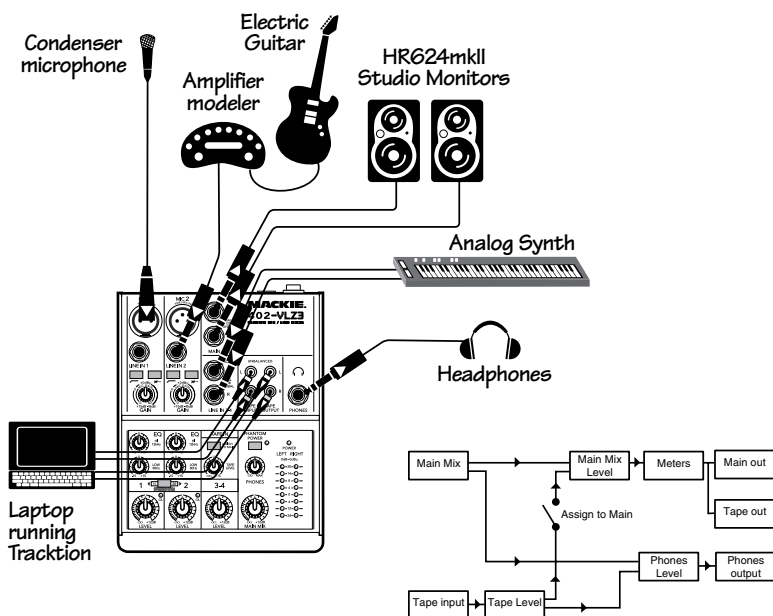
The tape outputs are connected to the line-level stereo inputs of a laptop's sound card. This allows you to record the entire performance with Traktion software.

The mic and guitar are panned mono, so the same mix is coming out of the main left and right outputs, and each can be used for a monitor or a front-of-house loudspeaker as follows:

The left main mix output connects to an SRM150 powered personal monitor. This is pointed at the performer (the fabulous you).

The right main mix output feeds the input of an SRM350v2 powered loudspeaker playing to your appreciative, jittery, hepped-up-on-the-bean audience. Jump quickly from one song to another, and keep the poetry about the Washington State Rain Festival (Jan 1st–Dec 31st) to a minimum.

Seattle Coffeehouse Gig



This diagram shows a condenser microphone connected to channel 1's mic input, with the phantom power switch pressed in.

The line-level output from a popular guitar amplifier modeler feeds the line input of channel 2.

A stereo synth connects to the line inputs of channels 3 and 4.

A laptop computer running Tracktion is connected to the tape input and output.

A pair of headphones allows you to hear the main mix as you play.

A pair of studio reference monitors is connected to the main mix outputs.

For a recording session example, you can record the vocals, guitar and keyboards using Tracktion. These can be recorded as individual tracks, and you can listen directly through the headphones. Tracttion can be set so there is no playback of the track as you record. If you are recording through the mic, listen through the headphones only, and turn off power to your loudspeakers. (The main mix level still needs to be up, so you can record the tape out.)

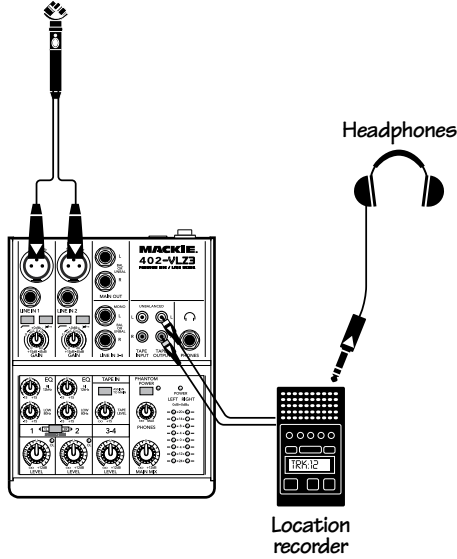
For overdubbing, you will be playing live, and recording a new track onto the computer through the tape outputs. You can listen to the pre-recorded tracks and your live playing at the same time in the headphones. Adjust the tape level to find a nice mix of the playback compared to your playing. If the "assign to main" is out, then the pre-recorded tracks will not appear in the tape out or main mix, so only your new playing is recorded.

To playback the recording, adjust the tape level control to hear it in the headphones. Press "assign to main" in, and slowly bring up the main mix level to hear the results of all your efforts in the studio monitors.

Recording with a Computer



Stereo microphone

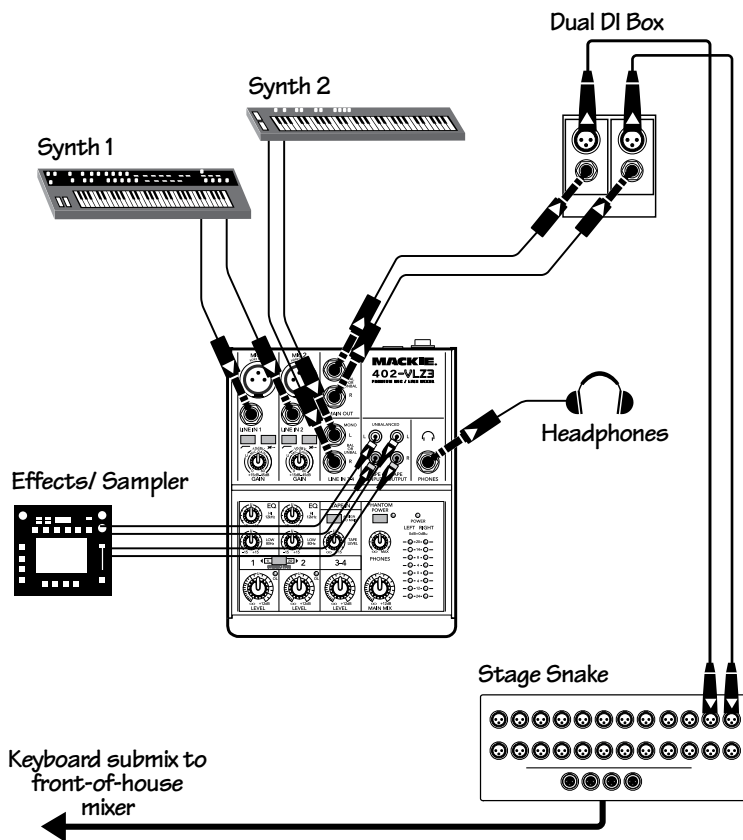


This diagram shows the outputs of a stereo microphone connected to the mic inputs of channels 1 and 2. The stereo pan switch is pressed in, so channel 1 goes only to the left of the main mix, and channel 2 goes to the right.

The tape output is connected to a location recording device, with a set of headphones attached. It is best to keep the headphones on the last device in your recording chain (the recording device). Many flash-based digital devices are available.

Set the main mix output level control to unity (U) and use the recorder's own level control to adjust the levels going to the recorder. Each channel from your microphone can be adjusted with the channel level controls. Keep them at the same level to retain the true balance from your microphone.

Location Sound



This diagram shows the stereo outputs of a synth connected to the line inputs of channels 1 and 2. The stereo pan switch is pressed in, so channel 1 only goes to the left of the main mix, and channel 2 only goes to the right.

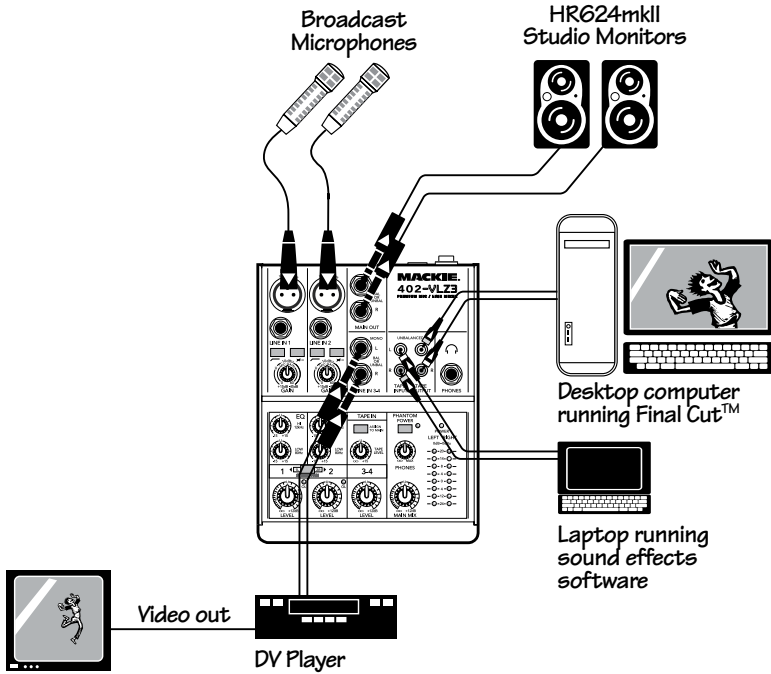
Another stereo synth is connected to the line-level inputs of channels 3 and 4.

An effects/sampler is connected to the tape input and tape output. The "assign to main" switch is pressed in during playback, so the output from the effects/sampler will appear in the main mix. Leave the switch out when capturing sounds.

The line-level main mix output connects to the inputs of a dual DI box. This converts the output so it is suitable for connecting to the inputs of a stage snake connected to the inputs of the front of house mixer.

A pair of headphones allows you to hear the main mix as you play. Between songs, you can turn down the main output to the FOH mixer, and experiment with sounds and new patches and still listen in the headphones without upsetting your audience.

Keyboard Submixer



This diagram shows two voice-over microphones connected to the mic inputs of channels 1 and 2.

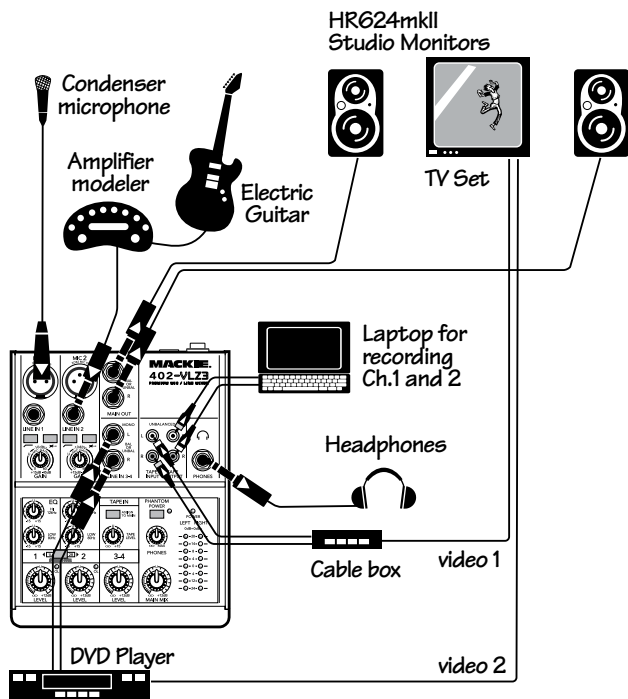
The stereo line-level output from a digital video player connects to the line inputs of channels 3 and 4.

A laptop running sound effect software is connected to the tape input. The "assign to main" switch is pressed in, so the sound effects can be added to the main mix.

The tape output connects to the line-level audio input of a desktop computer running Final Cut software.

The main outputs feed a pair of powered studio reference monitors.

Video Editing/Production Bay



This diagram shows how you can use the mixer to control a home studio and a home theater, using the same set of loudspeakers. This is useful if you are short on space, or you are in love with a really nice pair of loudspeakers and want to share them between your home theater and home studio.

A condenser microphone is connected to channel 1's mic input, with phantom power engaged. The line-level output from a guitar amplifier modeler feeds the line input of channel 2.

A laptop computer running Traktion is connected to the tape output, so you can record channels 1 and 2.

The stereo line-level audio output from a cable box is connected to the tape inputs, and the video output from the cable box connects to the TV monitor. If you press "assign to main," the audio will be added to the main mix.

The stereo line-level audio output from a DVD player is connected to the line inputs of channels 3 and 4, and the video output connects to the TV monitor.

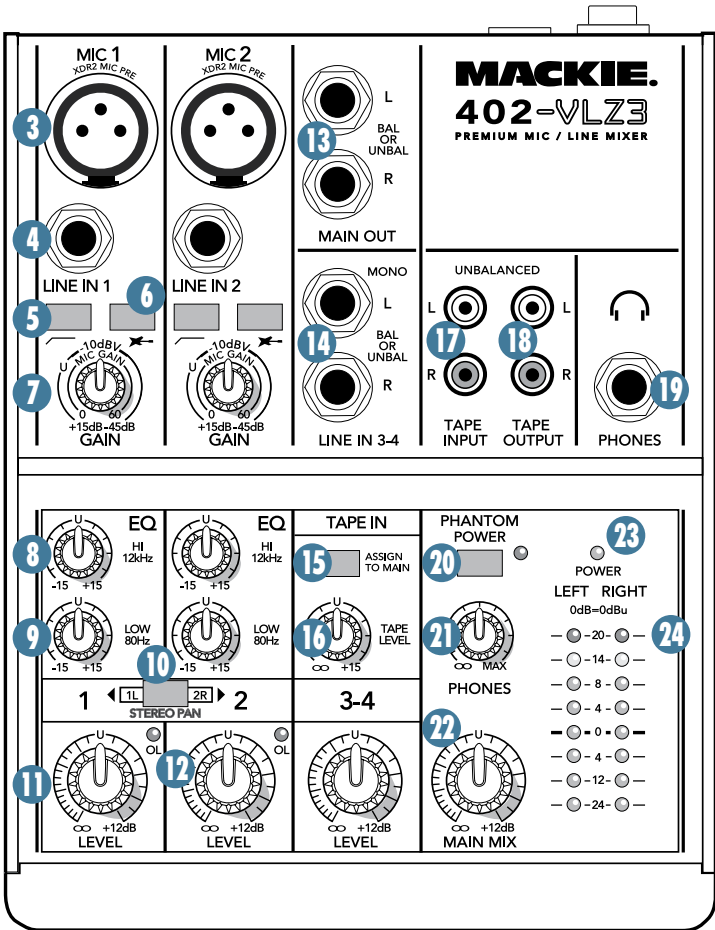
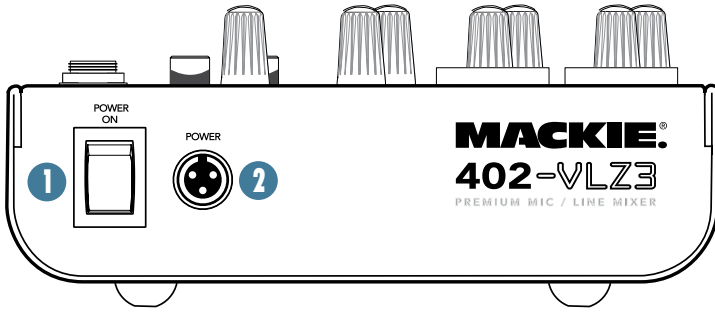
A pair of headphones allows you to hear the main mix.

To use the home studio, sing and play your guitar, and record using Traktion, or listen through the nice speakers. Turn down channels 3 and 4, and do not assign the tape inputs to the main mix from the cable box.

To use the home theater, turn down channels 1 and 2. Select a program using the cable box, and assign the tape inputs to the main mix. Listen to the audio in your nice speakers. If you play a DVD, adjust channels 3 and 4, and turn off the "assign to main" switch. Select the DVD video with your TV set.

Combined Home Studio/Home Theater

Features



1. POWER SWITCH

Press the top of this rocker switch inwards to turn on the mixer. The power LED [23] on the top surface of the mixer will glow with happiness. Press the bottom of this switch to put the mixer into standby mode. It will not function, but the circuits are still live. To remove power, either turn off the mains supply, or unplug the power cord from the mixer and the mains supply.

As a general guide, turn on your mixer first, before the power amplifier or powered speakers, and turn it off last. This will reduce the possibilities of any turn-on, or turn-off thumps in your speakers.

2. POWER CONNECTION

This is where you plug in the connector from the AC adapter supplied with your mixer.

Only use the AC adapter that came with your mixer, or a factory-authorized power supply.

3. MIC INPUTS (Ch.1–2)

We use phantom-powered, balanced microphone inputs just like the big studio mega- consoles, for exactly the same reason: This kind of circuit is excellent at rejecting hum and noise. You can plug in almost any kind of mic that has a standard XLR male mic connector.

Professional ribbon, dynamic, and condenser mics will all sound excellent through these inputs. The 402-VLZ3's mic inputs will handle any kind of mic level you can toss at them, without overloading.

PHANTOM POWER

Most modern professional condenser mics are equipped for phantom power, which lets the mixer send low-current DC voltage to the mic's electronics through the same wires that carry audio. (Semi-pro condenser mics often have batteries to accomplish the same thing.) "Phantom" owes its name to an ability to be "unseen" by dynamic mics (Shure SM57/SM58, for instance), which don't need external power and aren't affected by it anyway.

The phantom power for both channels 1 and 2 is turned on and off together using the phantom [20] switch.



Never plug single-ended (unbalanced) microphones or instruments into the mic input jacks if the phantom power is on.

Do not plug instrument outputs into the mic input jacks with phantom power on, unless you know for certain it is safe to do so.

Do not use phantom power with ribbon microphones.

4. LINE INPUTS (Ch.1–2)

These inputs share circuitry (but not phantom power) with the mic preamps, and can be driven by balanced or unbalanced sources at almost any level. You can use these inputs for virtually any audio signal you'll come across.

To connect balanced lines to these inputs, use a 1/4" Tip-Ring-Sleeve (TRS) plug.

To connect unbalanced lines to these inputs, use a 1/4" mono (TS) phone plug or standard instrument cable.

These two line inputs are a good place to connect older instruments that need more gain. You can correct weak levels by adjusting the channel's gain control [7].

5. LOW CUT (Ch.1–2)

Each low-cut switch, often referred to as a high-pass filter (all depends on how you look at it), cuts bass frequencies below 100 Hz at a rate of 18 dB per octave.

We recommend that you use low-cut on every microphone application except kick drum, bass guitar, or bassy synth patches. These aside, there isn't much down there that you want to hear, and filtering it out makes the low stuff you do want much more crisp and tasty. Not only that, but low-cut can help reduce the possibility of feedback in live situations, and it helps to conserve amplifier power.



Another way to consider low-cut's function is that it actually adds flexibility during live performances. With the addition of low-cut, you can safely use low equalization on vocals. Many times, bass shelving EQ can really benefit voices. Trouble is, adding low EQ also boosts stage rumble, mic handling clunks and breath pops. Applying low-cut removes all those problems, so you can add low EQ without losing a woofer.

6. INSTRUMENT SWITCH (Ch.1–2)

When this switch is pressed in, channel 1 or 2's line input can accept direct instrument-level signals from guitars or other instruments. They will be impedance-matched to the line input, without the need for a DI box.

When this switch is out, you can connect line-level sources such as CD players, MP3 players, keyboards, drum machines, and tape players. You will need a DI box if connecting instrument-level signals to the inputs of channel 3 and 4.



Direct-In (DI) boxes are commonly available from most music stores.

They provide signal and impedance matching for the direct connection of guitars and other instruments to amplifiers and mixers. They convert unbalanced instrument-level signals to a balanced mic-level output. Normally, they just look like a funny little box with a 1/4" TS input at one end, and an XLR output at the other. The good thing is that you do not need them with the 402-VLZ3.

7. LET'S TWIST A GAIN (Ch.1–2)



If you haven't already, please read the input level adjustment procedure on page 4.

Gain adjusts the input sensitivity of the mic and line inputs connected to channels 1 and 2. This allows signals from the outside world to be adjusted to optimal internal operating levels.

If the signal comes through the XLR jack, there will be 0 dB of gain with the knob fully down, ramping to 60 dB of gain fully up.

Through the 1/4" input, there is 15 dB of attenuation fully down and 45 dB of gain fully up, with a "U" (unity gain) mark at 10:00. This 15 dB of attenuation can be very handy when you are inserting a very hot signal, or when you want to add a lot of EQ gain, or both. Without this "virtual pad," this scenario might lead to channel clipping.

"U" LIKE UNITY GAIN

Mackie mixers have a "U" symbol on almost every level control. This "U" stands

for "unity gain," meaning no change in signal level. Once you have adjusted the input signal to line-level, you can set every control at "U" and your signals will travel through the mixer at optimal levels. What's more, all the labels on our level controls are measured in decibels (dB), so you'll know what you're doing level-wise if you choose to change a control's settings.

2-BAND EQUALIZATION

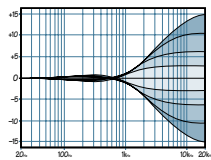
The 402-VLZ3 has 2-band equalization at carefully selected points — low shelving at 80 Hz, and hi shelving at 12 kHz. "Shelving" means that the circuitry boosts or cuts all frequencies past the specified frequency. For example, rotating the low EQ knob 15 dB to the right boosts bass starting at 80 Hz and continuing down to the lowest note you never heard.



With EQ, you can also screw things up royally. We've designed a lot of boost and cut into each equalizer circuit, because we know everyone will occasionally need that. But if you max the EQs on every channel, you'll get mix mush. Equalize subtly and use the left sides of the knobs (cut), as well as the right (boost). Very few gold-record-album engineers ever use more than about 3 dB of EQ. If you need more than that, there's usually a better way to get it, such as placing a mic differently (or using a different kind of mic entirely).

8. HI EQ

This control gives you up to 15 dB boost or cut above 12 kHz, and it is also flat at the center. Use it to add sizzle



High EQ

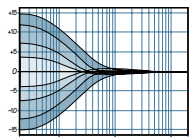
to cymbals, and an overall sense of transparency, or edge to keyboards, vocals, guitar and bacon frying. Turn it down a little to reduce sibilance, or to hide tape hiss.

9. LOW EQ

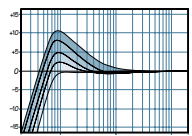
This control gives you up to 15 dB boost or cut below 80 Hz. The circuit is flat (no boost or cut) at the center position. This frequency

range represents the punch in bass drums, bass guitar, fat synth patches, and some really serious male singers.

Used in conjunction with the low cut [5] switch, you can boost the low EQ without injecting a ton of subsonic debris into the mix.



Low EQ



Low EQ with Low Cut

10. STEREO PAN SWITCH (Ch. 1–2)

With this switch out, each mono channel feeds both the left and right sides of the main mix equally. For example:

- Playing a mono source: If you talk into a microphone connected to input 1, your sweet tones will be heard in both the left and right loudspeakers.
- Overdubbing a mono source: if you are monitoring directly through the headphones, you can hear the overdub signal in both ears while you are playing.

With this switch pressed in, channel 1 will play only in the left side of the main mix, and channel 2 will play in the right side. For example:

- Recording a stereo source: If you have a stereo microphone connected to the mic inputs, or if you are playing a stereo source into the line inputs, each side of the source can be recorded discretely onto a recorder connected to the main or tape outputs.

The pan switch does not affect channels 3 or 4, or the tape inputs.

11. LEVEL

This adjusts the channel's level from off, to unity gain at the center, on up to 12 dB of additional gain. Once the gain [7] has been adjusted for each channel, use the level to adjust how much of each channel appears in the main mix.

Channels 1 and 2 use mono level controls, and channels 3 and 4 uses a stereo control.

12. OL LED

This overload LED will come on if the input signal is too high. The signal level is measured just before the level control, but after the gain control and EQ.

If the OL LED does come on, turn down the gain and/or the EQ controls until this will only come on occasionally when the input source is running high. Turning the level control will not affect the OL LED.

13. MAIN OUTS

These outputs feed the main mix out into the waiting world. They can be connected to the line-level inputs of power amplifiers, powered speakers, or to the line inputs of another mixer.

To use these outputs to drive balanced inputs, connect 1/4" TRS (Tip–Ring–Sleeve) phone plugs like this:

- Tip = + (hot)
- Ring = – (cold)
- Sleeve = Ground

For most music recording and PA applications, unbalanced lines are fine. To drive unbalanced inputs, connect 1/4" TS (Tip–Sleeve) phone plugs like this:

- Tip = + (hot)
- Sleeve = Ground

14. STEREO LINE INPUTS (Ch.3–4)

These fully-balanced inputs are designed for stereo or mono, balanced or unbalanced signals. They can be used with just about any professional or semi-pro instrument, effect or tape player.

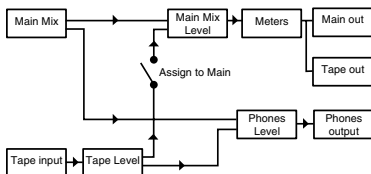
Signals entering channel 3 are added to the left side of the main mix only. Signals entering channel 4 are added to the right.

When connecting a mono device, always use the left (mono) input (ch. 3) and plug nothing into the right input (ch. 4)—this way the signal will appear on both sides. This trick is called “jack normaling.”

15. TAPE ASSIGN to MAIN

Press this switch in to add the tape input to the main mix.

Press it out if you do not want the tape input to play in the main mix. This allows DJ-style cueing of the tape input in your headphones before it is added to the main mix for your audience.



This also allows for overdubbing with the tape inputs/outputs without experiencing feedback, and it maintains isolation of your audio tracks. For example, you could be feeding the pre-recorded tracks from a computer running Tracktion into the tape inputs. Leave "assign to main" out so you can hear the pre-recorded tracks in the headphones, as you play along to them. Only your live performance will be recorded from the tape outputs, not the pre-recorded tracks. Press "assign to main" in if you want to play the completed songs in your main loudspeakers.

16. TAPE LEVEL

Use this to adjust the level of the tape input playing in the main mix and headphones.

17. TAPE INPUT

These dual, unbalanced RCA inputs accept line-level stereo signals. The signals entering the inputs are always routed to the phones output, and can be routed to the main output, depending on the position of the "assign to main" button.

Use these jacks for convenient playback of your mixes. You'll be able to review a mix and then try another pass without repatching or disturbing the mixer levels. You can also use these jacks with an iPod dock, computer line-level audio output, or DVD player to feed music to a PA system between sets.

Use the "assign to main" switch [15] to add the tape input to the main mix, and use the tape level knob [16] to adjust its level.

18. TAPE OUTPUT

These unbalanced RCA connections tap the main mix output to make simultaneous recording and PA work more convenient. Connect these to your recorder's inputs.

The output here is an unbalanced copy of the main mix, and it is affected by the main mix level [22].

19. PHONES

This stereo jack will drive any standard headphone to very loud levels. iPod-type or computer headphones can also be used with an appropriate adapter.

If you're wiring your own cable for the headphones output, follow standard conventions:

- Tip = Left channel
- Ring = Right channel
- Sleeve = Common ground

In the headphones, you will hear the main mix as well as any source playing in the tape inputs [17]. Adjust the phones level [21] knob for comfortable and safe listening levels in your headphones. See the warning on the next page before using headphones.

Adjusting the main mix level [22] will not affect the headphone output. Adjusting the tape level [16] will affect the level of the tape input signal heard in the headphones.

20. PHANTOM POWER SWITCH

This global switch controls the phantom power supply for condenser microphones plugged into channel 1 and 2 mic [3] inputs. Press this in if your microphone requires phantom power. (The mixer can supply the microphone's power through the XLR connectors, using the same lines used for the audio.) Check with the microphone manufacturer if you are not sure. See the phantom power discussion on page 13 before using this switch.

Press the switch in to engage phantom power to both mic inputs. The phantom LED next to the switch will light when phantom is engaged. Press the switch again to turn it off.

21. PHONES LEVEL

This knob allows you to adjust the level of the signals going to your headphones.



WARNING: When we say the headphone amp is loud, we're not kidding. It can cause permanent ear damage. Even intermediate levels may be painfully loud with some headphones. **BE CAREFUL!** Always turn the phones knob all the way down before connecting headphones, or making any connections to the mixer. Keep it down until you've put the phones on. Then turn it up slowly.

22. MAIN MIX

This knob controls the levels of signals sent to the main outputs. All channels that are not turned fully down will wind up in the main mix.

Fully counterclockwise is off, the center is unity gain, and fully clockwise provides 12 dB of additional gain. This additional gain will typically never be needed, but once again, it's nice to know it's there.

This is the knob to turn down at the end of the song to achieve "The Great Fade-Out."

23. POWER LED

This LED will illuminate when the mixer is turned on. It shows a general readiness of the mixer to do something wonderful to your musical world.

If the power switch [1] is off, or the power to the unit is turned off, then the LED will be off.

24. METERS

The 402-VLZ3's peak metering system is made up of two columns of eight LEDs. It displays the signal level after the main mix level control [22].

Thanks to the 402-VLZ3's wide dynamic range, you can get a good mix with peaks flashing anywhere between -12 and $+8$ dB on the meters. Most amplifiers clip at about $+10$ dB, and some recorders aren't so forgiving either. For best real-world results, try to keep your peaks between "0" and "+8".

Remember, audio meters are just tools to help assure you that your levels are "in the ballpark." You don't have to stare at them (unless you want to).

Congratulations! You've just read about all the features of your 402-VLZ3. You're probably ready for a cold shower. Go ahead.

Appendix A: Service Information

If you think your 402-VLZ3 has a problem, please check out the following troubleshooting tips and do your best to confirm the problem. Visit the support section of our website (www.mackie.com) where you will find lots of useful information such as FAQs, and documentation. You may find the answer to the problem without having to send your mixer away.

Troubleshooting

Bad Channel

- Is the gain set correctly?
- Is the level knob turned up?
- Is the instrument switch set correctly? (Channels 1–2 only).
- Try the same source signal in another channel, set up exactly like the suspect channel.
- Check that the stereo pan switch is set correctly.
- Check the EQ and the low-cut switch.

Bad Output

- Is the associated level knob (if any) turned up?
- If it's a left main out, try unplugging the RCA left tape output. If the problem goes away, it's not the mixer.
- If a left speaker is presumed dead, switch the left and right cords, at the mixer's main outs. If the left speaker is still not working, it's not the mixer.

Noise

- Turn the channel level knobs down, one by one. If the sound disappears, it's either that channel or whatever is plugged into it, so unplug whatever that is. If the noise disappears, it's from your whatever.

Power

- The power LED on the mixer should come on when the power switch is on. Check that the power connection to the mixer is plugged in.

Repair

For warranty service, refer to the warranty information on page 23.

Non-warranty service for Mackie products is available at a factory-authorized service center. To locate your nearest service center, visit www.mackie.com, click "Support" and select "Locate a Service Center." Service for Mackie products living outside the United States can be obtained through local dealers or distributors.

If you do not have access to our website, you can call our Tech Support department at 1-800-898-3211, Monday-Friday during normal business hours, Pacific Time, to explain the problem. Tech Support will tell you where the nearest factory-authorized service center is located in your area.

Need help with your new mixer?

- **Visit www.mackie.com and click Support to find: FAQs, manuals, and addendums.**
- **Email us at: techmail@mackie.com.**
- **Telephone 1-800-898-3211 to speak with one of our splendid technical support representatives (Monday-Friday, during normal business hours, PST).**

Appendix B: Connections

"XLR" Connectors

Mackie mixers use 3-pin female "XLR" connectors on all microphone inputs, with pin 1 wired to the grounded (earthed) shield, pin 2 wired to the "high" ("hot" or positive polarity) side of the audio signal and pin 3 wired to the "low" ("cold" or negative polarity) side of the signal. See Figure A.

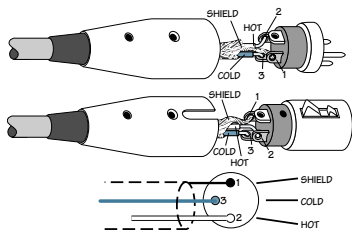


Figure A: XLR Connectors

Use a male "XLR"-type connector, usually found on the nether end of what is called a "mic cable," to connect to a female XLR jack.

1/4" TRS Phone Plugs

"TRS" stands for Tip-Ring-Sleeve, the three connections available on a "stereo" 1/4" or "balanced" phone jack or plug. See Figure B.

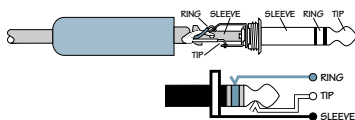


Figure B: 1/4" TRS Plugs

TRS jacks and plugs are used in several different applications:

- Balanced mono circuits. When wired as a balanced connector, a 1/4" TRS jack or plug is connected tip to signal high (hot), ring to signal low (cold), and sleeve to ground (earth).
- Stereo headphones, and rarely, stereo microphones and stereo line connections. When wired for stereo, a 1/4" TRS jack or plug is connected tip to left, ring to right and sleeve to ground (earth).

Mackie mixers do not directly accept 1-plug-type stereo microphones. They must be separated into a left cord and a right cord, which are plugged into the two mic preamps.

You can cook up your own adapter for a stereo microphone. "Y" two cables out of a female 1/4" TRS jack to two male XLR plugs, one for the right signal and one for the left.

1/4" TS Phone Plugs

"TS" stands for Tip-Sleeve, the two connections available on a "mono" 1/4" phone jack or plug. See Figure C.

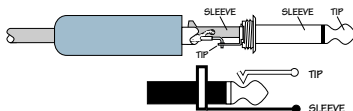


Figure C: TS Plug

TS jacks and plugs are used in many different applications, always unbalanced. The tip is connected to the audio signal and the sleeve to ground (earth). Some examples:

- Unbalanced microphones
- Electric guitars and electronic instruments
- Unbalanced line-level connections

RCA Plugs and Jacks

RCA-type plugs (also known as phono plugs) and jacks are often used in home stereo and video equipment and in many other applications (Figure D). They are unbalanced and electrically identical to a 1/4" TS phone plug or jack (Figure C). Connect the signal to the center post and the ground (earth) or shield to the surrounding "basket."



Figure D: RCA Plug

Appendix C: Technical Information

Specifications

Main Mix Noise

(20 Hz–20 kHz bandwidth, 1/4" main out, channels 1–2 gain @ unity, channel EQs flat, stereo-pan button in.)

Main mix knob down, channel level knobs down: –103 dBu

Main mix knob unity, channel level knobs down: –98 dBu

(102 dB Signal to Noise Ratio, ref +4 dBu)

Main mix knob @ unity, and channel level knobs @ unity: –92 dBu

Total Harmonic Distortion (THD)

(1 kHz @ 35 dB gain)

20 Hz–80 kHz bandwidth <0.005%

20 Hz–20 kHz bandwidth <0.003%

Attenuation (Crosstalk)

(1 kHz relative to 0 dBu, 20 Hz–20 kHz bandwidth, line in, 1/4" main out, gain @ unity.)

Main mix knob down: –70 dBu

Channel level knob down: –94 dBu

Frequency Response

(Mic input to any output.)

20 Hz to 50 kHz: +0 dB/–1 dB

20 Hz to 90 kHz: +0 dB/–3 dB

Equivalent Input Noise (EIN)

(Mic in to main out, max gain.)

150 ohm termination: –129.5 dBu

20 Hz–20 kHz

Common Mode Rejection Ratio (CMRR)

1 kHz: better than –70 dB

Maximum Levels

Mic in: +21 dBu

Tape in: +24 dBu

All other inputs: +22 dBu

All outputs: +22 dBu

Impedances

Mic in: 3.4 kilohms

All other inputs: 10 kilohms or greater

Tape out: 1.0 kilohms

Phones output: 60 ohms

All other outputs: 120 ohms

EQ

High Shelving ±15 dB @ 12 kHz

Low Shelving ±15 dB @ 80 Hz

Power Consumption

8 watts

(H x W x D)

7.3" x 5.8" x 1.6"

(185.5 mm x 146.9 mm x 40.7 mm)

Weight

With power supply 3.0 lb (1.36 kg)

Without power supply 2.5 lb (1.1 kg)

LOUD Technologies Inc. is always boldly striving to improve our products by incorporating new and improved materials, components, and manufacturing methods. Therefore, we reserve the right to change these specifications at any time without notice.

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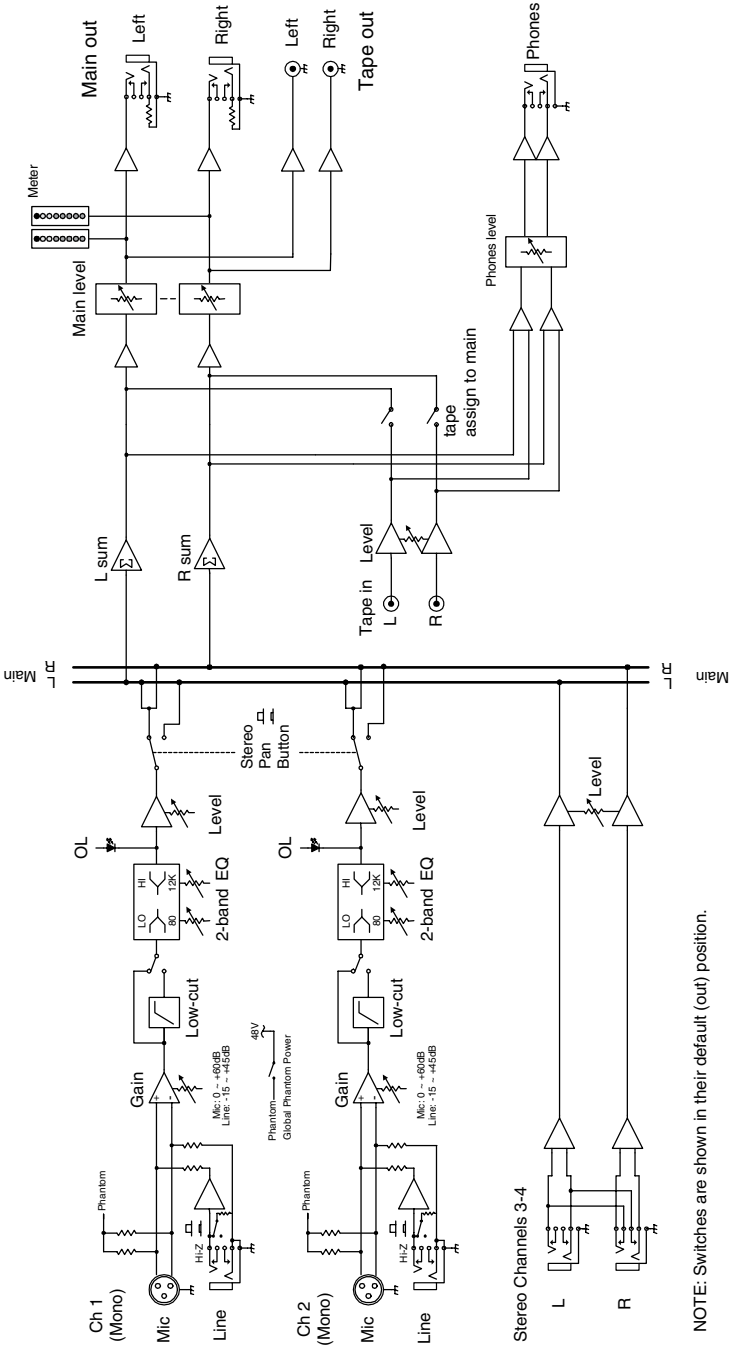
The technical writer responsible for this owner's manual lives in an odd kind of dreamworld on Thursday afternoons. Therefore it is possible that all the instructions given here might only be true on a small blue-purple planet in the outer spiral arm of the Great Andromeda Galaxy. Please check our website for any possible updates to this manual.

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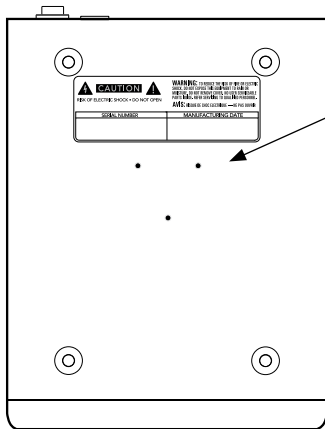
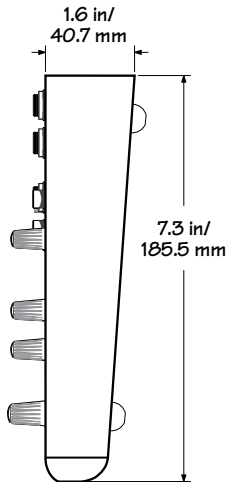
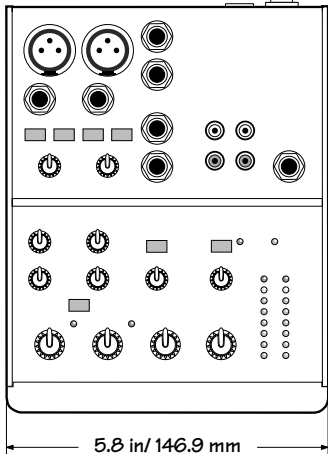
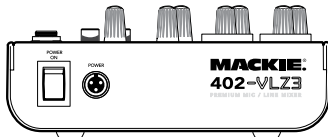
Correct disposal of this product. This symbol indicates that this product should not be disposed of with your household waste, according to the WEEE Directive (2002/96/EC) and your national law. This product should be handed over to an authorized collection site for recycling waste electrical and electronic equipment (EEE). Improper handling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE. At the same time, your cooperation in the correct disposal of this product will contribute to the effective usage of natural resources. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, waste authority, or your household waste disposal service.

Block Diagram



NOTE: Switches are shown in their default (out) position.

Dimensions



Microphone Stand

The bottom panel of the 402-VLZ3 has three non-threaded holes that allow it to be fitted with an optional microphone stand adapter. This lets you support the mixer on a standard mic stand, and adjust its height and level to whatever suits your strangely-complex set of preferences.

1. Order the Atlas AD-11B mic stand adapter available from many a fine music store. (It is made and distributed by Atlas Sound.)
2. Use three self-tapping machine screws 6-32 x 1/4" long to secure the adapter to the bottom of the 402-VLZ3.



Do not use screws longer than 1/4", as these could damage the circuit boards. Do not use screws shorter than 1/4", or the adapter will not be securely fixed to the mixer.

3. Do not order the Atlas AD-11, as this is a pack of 100. If you do, please send for the informative booklet entitled "99 things to do with a mic stand adapter."

Mackie Limited Warranty

Please keep your sales receipt in a safe place.

This Limited Product Warranty ("Product Warranty") is provided by LOUD Technologies Inc. ("LOUD") and is applicable to products purchased in the United States or Canada through a LOUD-authorized reseller or dealer. The Product Warranty will not extend to anyone other than the original purchaser of the product (hereinafter, "Customer," "you" or "your").

For products purchased outside the U.S. or Canada, please visit www.mackie.com/warranty to find contact information for your local distributor, and information on any warranty coverage provided by the distributor in your local market.

LOUD warrants to Customer that the product will be free from defects in materials and workmanship under normal use during the Warranty Period. If the product fails to conform to the warranty then LOUD or its authorized service representative will at its option, either repair or replace any such nonconforming product, provided that Customer gives notice of the noncompliance within the Warranty Period to the Company at: www.mackie.com/support or by calling LOUD technical support at 1.800.898.3211 (toll-free in the U.S. and Canada) during normal business hours Pacific Time, excluding weekends or LOUD holidays. Please retain the original dated sales receipt as evidence of the date of purchase. You will need it to obtain any warranty service.

For full terms and conditions, as well as the specific duration of the Warranty for this product, please visit www.mackie.com/warranty.

The Product Warranty, together with your invoice or receipt, and the terms and conditions located at www.mackie.com/warranty constitutes the entire agreement, and supersedes any and all prior agreements between LOUD and Customer related to the subject matter hereof. No amendment, modification or waiver of any of the provisions of this Product Warranty will be valid unless set forth in a written instrument signed by the party to be bound thereby.

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