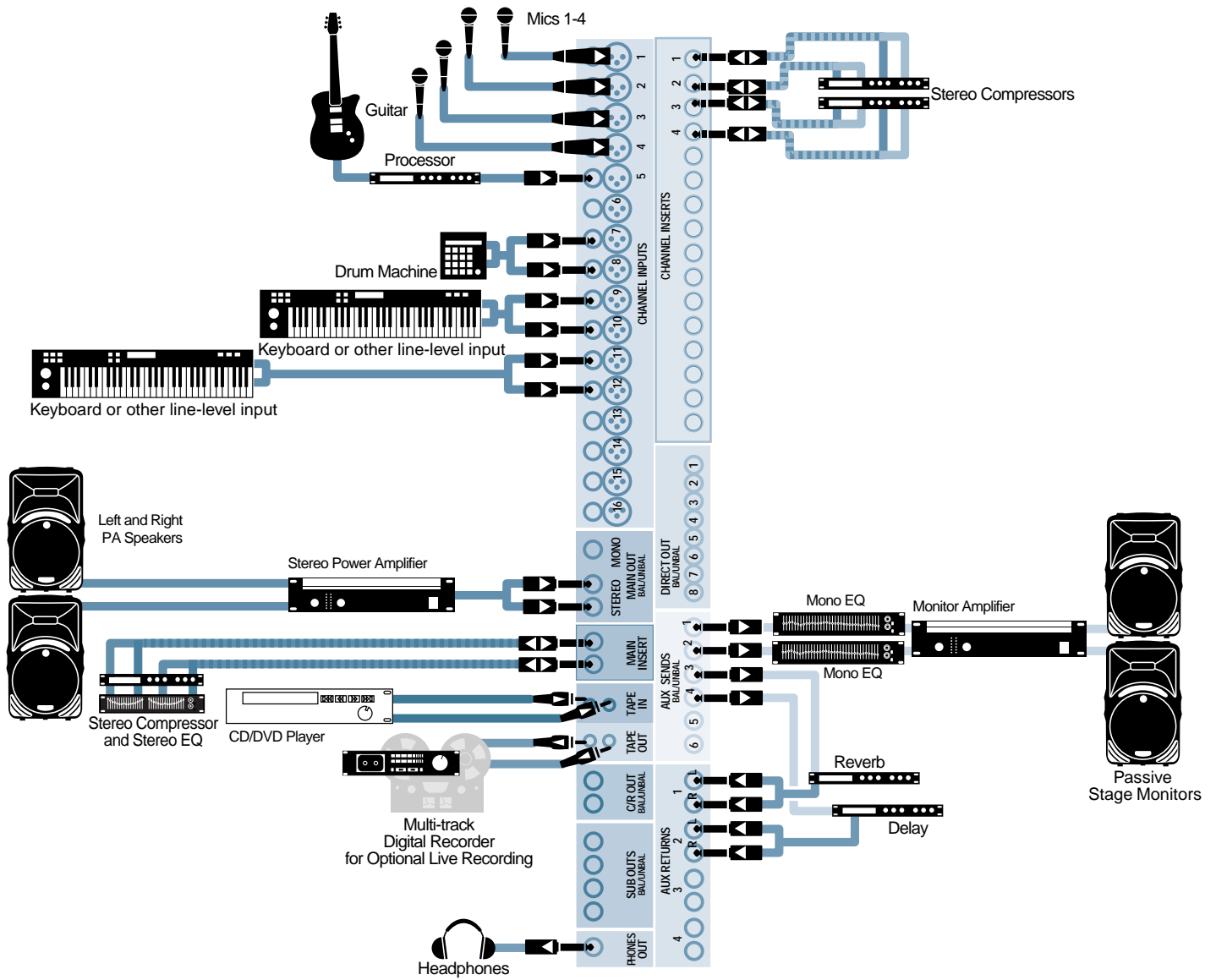


1604-VLZ PRO Stereo PA



The Setup

Sound Reinforcement (PA) systems cover a lot of ground. This setup is typical for a band that plays small clubs or lounges. We've shown compressors patched into the INSERTS for the mic channels (the vocals). They're optional of course, but if you need 'em, that's where to put 'em. There's also an optional compressor and equalizer on the MAIN outputs.

Where's The Bass Player?

More than likely he has an amplifier so big that he needs to travel in his own van, and it's loud enough so that it doesn't need to go through the PA system. Or maybe the keyboard player is playing the bass part.

The guitarist is traveling light, running his guitar straight into the mixer through an effects processor that replaces his amp, so be sure to give him plenty of volume in the monitors.

Assigns, Gozintas and Gozoutas

Main House Mix

The simplest way to run this system is to assign all the sources directly to L-R. Set the PAN controls to your liking (most likely in the center since most small PA systems are run in mono), set the TRIM controls using the Level-Setting Procedure and go. The MAIN MIX fader is your master volume control. We'll talk about using the SUBs later.

Monitor Mixes

This setup shows two stage monitor mixes fed from AUX SEND 1 and 2. Each output goes through a graphic equalizer to a power amplifier, then to the stage monitor speakers. Typically, a stereo power amplifier is used for the monitors, running one mix through each channel. Most power amplifiers are OK with a two-speaker load if you arrange your monitors on stage so that there are two speakers playing each monitor mix. Check the manual and your speaker impedances to know for sure. The graphic equalizers are for fine tuning the frequency response of the monitors and to attenuate frequencies that have a tendency to feed back when the monitor volume gets too loud (and it always does).

Pressing the PRE buttons on the channel strips makes AUX SENDs 1 and 2 pre-fader. This gives you the ability to have different mixes in the house and on stage, which is usually what you need for a loud band. The master volume controls for the monitor mixes are the AUX SEND 1 and AUX SEND 2 knobs. To check

the monitor mix in the headphones, press the AUX SEND SOLO buttons.

Effects

We've included a reverb and a delay in addition to whatever the guitarist has in his trick bag. These are fed post-fader, the reverb from AUX SEND 3 and the delay from AUX SEND 4.

The reverb signal comes back into the mix through AUX RETURN 1 and the delay through AUX RETURN 2. Start mixing with those RETURN levels set to their Unity Gain position and adjust the amount of reverb and delay in the mix by using the AUX SEND 3 and 4 controls on the channels.

To add reverb to the AUX 1 monitor mix, turn up the TO AUX SEND 1 knob located in the Aux Master section of the mixer. If you need to put reverb in both monitor mixes, instead of using the AUX RETURN, connect the reverb unit outputs to a pair of channels and turn up the AUX 1 and AUX 2 Sends on those channels. If you're squeezed for channels, unless stereo reverb is an important effect in your house mix (remember, most small PA systems are run in mono), you can use just a single output from your reverb and connect it to one channel rather than a pair.

Singers usually like to hear some reverb in their monitors, but delay in the monitors is often confusing. Nonetheless, if you want to add delay to the AUX 2 monitor mix, the TO AUX SEND 2 knob will do it.

Matching the Mixer to the Power Amplifiers

The volume in the house and stage speakers is a function of the gain and power handling capability of their respective power amplifiers. In a properly matched system, when the mixer's meters are hitting 0 VU, the volume should be just loud enough so that you want to turn it down. This will give you about 20 dB of headroom for transients before the power amplifier clips.

There's a detailed discussion of setting the power amplifier gain in the Gain Structure section of this text, but since you're here now, here's a brief "how to."

If you've connected the optional compressor and graphic equalizer into the MAIN INSERTS, set the compressor's threshold to maximum so that it won't try to undo your power amplifier gain adjustments. If your power amplifier doesn't have a gain control, you may be able to use the compressor's output level control to match levels.

It's OK to run the MAIN MIX fader (or AUX masters for the monitors) below its Unity Gain position if you can't turn the power amplifier down to a tolerable roar with the mixer's meters hitting 0 VU. You want to avoid the situation, however, where you have to crank the mixer's output so that its meters consistently read above zero in order to get adequate volume. This will lead to the mixer clipping before the power amplifier does. Get a bigger power amplifier.

Once the power amplifier's input gain is set for reasonable house level with plenty of headroom, you can set the compressor threshold so that it starts working a little before things get too loud. It will protect your speakers and your audience.

Intermission

When it's time to take a break, MUTE all the channels to keep stray noises out of the PA while you're away from the mixer. Since the MUTE comes after the pre-fader AUX SENDs, it's a good idea to either turn the monitor power amplifier off or turn AUX 1 and 2 SENDs all the way down.

To play a CD during the break, press the TAPE TO MAIN MIX button and adjust the playback volume using the TAPE IN control.



We shouldn't have to remind you but if we don't, the band will. Don't forget to un-mute the channels and turn the monitor sends back up when they return to the stage for the next set.

Mono PA

In small clubs, the main speakers are often fed in mono rather than stereo. The reason for this is that it's likely that a significant number of audience members are much closer to one speaker than the other, and you wouldn't want them to miss out on what's being fed to the other channel.

The 1604-VLZ PRO has a MONO output, which is an equal mix of the MAIN Left and Right channels. The MAIN MONO output has its own level control right next to its jack, but this output also follows the MAIN MIX fader.

Connect the MONO output to one channel of a stereo power amplifier to feed the main speakers in mono and, if you need only a single monitor mix, you can use the second channel of the amplifier to power the monitors. Your roadie will appreciate not having to carry an additional amplifier.



Just be sure that your power amplifier is rated to take the load of two speakers in parallel. If you're using 8 ohm speakers, the amplifier must be rated for 4 ohm operation. Most are, but read the label.

Since the MONO output is a sum of the Left and Right MAIN OUTPUT, the position of the PAN controls is irrelevant to the MONO mix, thanks to Constant Power panning. Once you get the level set properly in the house, you can make volume adjustments with the MAIN MIX fader and the mono mix will follow. The PAN position still functions on the stereo outputs, though, so if you're recording the PA mix from the MAIN or TAPE outputs, you'll get things placed in the stereo field of your recording in relation to their pan pot settings.

Using Subgroups

We've bypassed the subgroups in this basic application by simply assigning all the inputs to the L-R MAIN bus. There are some instances where subgroups can make mixing easier.

Stereo Subgroups

Let's say the lead singer is on Channel 1, with background vocals on Channels 2, 3, and 4. To make a background vocal subgroup pair (we're in stereo, remember?), un-assign Channels 2, 3, and 4 from L-R and assign them to 1-2. Then, over in the Master section, assign SUB 1 to LEFT and SUB 2 to RIGHT. Now, SUBs 1-2 as a pair will control the level of the background vocals in the mix.

While moving two faders rather than three might not seem worthwhile, by using the vocal subgroups, you can adjust the volume of the background singers while still maintaining the balance you've established with the channel faders. If the channel faders were in three different positions to get the right vocal blend, adjusting the background vocal would require you to move all three together, maintaining their relative positions. With the subs engaged, you only have to move two, and they'll both be in the same relative position. Some people tie the two knobs together using a broken pencil and a rubber band. (You can order a broken pencil from the Mackie Parts Department.)

The value of subgrouping becomes much more evident when working with a dynamic drummer and a full drum kit, with seven or eight mics on the drums, or when the keyboard player has a stack of keyboards that he plays at different times in the set.

It's faster to have one or two faders to dive for when the keyboard is too loud or soft, rather than having to figure out which of the eight faders controls the instrument that needs immediate attention. Once you've dealt with the disaster, you can use the SOLO buttons on the keyboard channels to determine the channel that's up too high and tame it.

Mono Subgroups

If you're running the PA in mono, or for things that will be centered in a stereo mix, you can use mono subgroups. Then you'll have four individual subgroup controls rather than two pairs.

In this example, assign all four keyboard channels to SUB 1 by pressing ASSIGN 1-2 and setting PAN fully left. Then, in the Master section, assign SUB 1 to both LEFT and RIGHT busses. Now you can control the level of all the keyboards using just the SUB 1 fader. Other subs could be used for drums and the background vocals.

Mono in Stereo?

An effective use of stereo PA in a small club is to run the main mix in mono, but pan the effects in stereo. This will give a sense of spaciousness while still putting the primary mix everywhere in the room. Since AUX RETURNS are stereo and go directly to the MAIN L-R bus, when using mono subgroups for keys, background vocals, and drums, you can do most of your balance adjustments right from the Master section.

Recording The Band

Live recordings are good. They'll let you hear your strengths and weaknesses, and a good live recording makes a great demo for getting gigs. Who knows? It might even become your next CD.

Recording Direct to Stereo

In this hookup, we've connected a recorder to the TAPE OUT jacks to record the MAIN stereo mix. This should work out pretty well in this situation since each voice and instrument is going through the PA system. They'll all end up in the MAIN mix, and the PA speakers will serve as your control room monitors.

But there may be a problem. Remember the invisible bass player we spoke of? He's got his Apocalypse Mach 747 amp cranking loud enough to give the doorman a headache, and the only way that bass will get into the recording is through leakage into the vocal mics. You have no control over the level of the

bass going to tape, and unless you're very lucky, it'll be wrong.

One approach is to turn things upside down. Give up one of the effects and use one of the AUX outputs to feed a mono post-fader mix to the main speakers. That digital delay was only used on the lead vocal anyway, wasn't it? It could just as well be patched in line through the channel INSERT.

Now, you can put a mic in front of the bass cabinet (or connect the bass through a DI), run it into a spare mixer channel, and assign that channel to the MAIN mix. Plug your headphones into the recorder's phones jack and adjust the level of bass in the recording using the fader on the bass mixer channel. Keep the AUX feeding the house speakers all the way down on the bass channel and you won't add any bass to the PA mix. Or you can sneak in a little if it helps.

Multitrack Recording

While in principle it's pretty simple to send a stereo mix to a two-track recorder, in practice it's difficult to get good results when the band gets really loud (and they do have a tendency to do that). Since you're mixing for the house, that mix will take into account the sound on stage – monitors, amplifiers, and loud instruments such as drums and bass that may not need much support in the PA in order to be heard clearly by the audience.

Even if you set up the mixer so that you have independent recording and PA mixes, it's difficult to mix on headphones. It's doubly difficult to hear the recording mix with the live sound leaking into the phones, and it's googly-difficult to mix the recording if you're playing at the same time. Capturing the elements of the mix on a multitrack recorder and mixing afterward is a good approach.

If you have as many recorder tracks as you have active channels, the simplest and most straightforward approach is to record one track per channel, connecting the recorder inputs to the channel DIRECT OUTs, or for a cleaner, pre-EQ signal path, to the INSERTs. Plug and play, just watch the levels.

Multitracking and SUBs

If you don't have a recorder track available for every channel, you can get good results by using the SUBs to make mono or stereo submixes, and record the submixes along with a few direct (one-to-one) tracks. For this hypothetical setup (including the loud bass player), you might record eight tracks as follows:

Track 1 – Drums L

Track 2 – Drums R

Track 3 – Bass

Track 4 - Guitar

Track 5 – Keys L

Track 6 – Keys R

Track 7 – Background Vocals

Track 8 – Lead Vocal

Connect the recorder inputs to the DIRECT outputs of the drum machine, bass, guitar, and lead vocal channels. Assign all of those channels to L-R so they'll go to the main PA mix.

Assign the four keyboard channels to 1-2, PAN them as you'd like them to appear in the recording. Assign SUB 1 to the Main Mix LEFT and SUB 2 to the RIGHT by pressing the LEFT and RIGHT buttons above the SUB 1 and 2 faders. Connect SUB OUT 1 to recorder Track 5 input, and SUB OUT 2 to Track 6.

Assign the three background vocal channels to 3-4, PAN them fully left (this will be a mono subgroup), and assign SUB 3 to both LEFT and RIGHT with the buttons above the SUB 3 fader. Connect SUB OUT 3 to recorder Track 7 input.

If you decide that recording stereo background vocals is more important than stereo keyboards, you could assign the background vocals to a subgroup pair and assign the keyboards to a single subgroup. Or if you wanted stereo keys and vocals, perhaps you could settle for mono drums. Decisions, decisions!

Making Your Live Recording Live

Another possibility is to combine the keyboards and guitar into a subgroup or pair, juggle some other things around, and free up a pair of tracks that you can use to record the audience and the sound in the house. This is what really makes a live recording come alive. A promoter listening to a demo tape will appreciate hearing an enthusiastic audience response, and blending a touch of the house sound into your recording might be all the reverb you'll need.

Connect a pair of mics to an open pair of mixer channels, don't assign them anywhere, but connect the direct outputs of those channels to a pair of recorder tracks. You'll be glad you did.

Notes
