



**PART 23**

# The Channel Strip

Purchase priority By Alex Case

It's time to re-ask that favorite recordist's question: What do I buy next?

Let's organize the answer by looking closely at the workhorse of the studio: the channel strip. Almost every session—be it live to two, basics, overdub, or mixdown—requires that chain of signal processing gear we use most often. It consists of a microphone preamplifier, equalizer, and compressor/limiter.

## Preamble

The vast majority of music we hear on the radio or on recordings enters the recording signal chain through a mic preamp. So it's important to make sure we have a good one.

Furthermore, mic signals are different from most audio signals in the studio. Compared to the signal that comes out of a compressor, an equalizer, a compact disc player, or your console—to name just a few—the signal coming out of a microphone is much, much lower in voltage. A microphone generally outputs about 1/1000 the voltage of most of our other studio gear, so mic signals must be pampered and protected; the mic pre is no place to cut corners.

Obviously, the number of mic preamps you have determines the number of different microphones you can record at once. If you build up your multitrack productions one track at a time, one mic at a time, you can certainly make do with one microphone preamp.

But if you have the sort of facility capable of recording drums, you might need to have the following mics up and recording all at once: hi-hat, kick drum, snare drum, two or three tom toms, a floor tom, two overhead mics, and two ambient mics. That adds up to at least ten mics. And it can easily swell to many more if the drum kit gets bigger, or if you like to experiment with multiple mics on the same drum; placing two or three mics on the snare drum alone isn't unusual in pop music recording. Your need for mic preamps grows right along with the mic count.

If you want to be able to handle the sort of music in which multiple players are recorded simultaneously, you'll need extra mic pres. A classic example is the power trio, maybe blues: drums, bass, and electric guitar—they all want to jam together. You'll need enough mic preamps to get them all to tape or disk simultaneously. Want to record a big band?

But another reason to go out and buy another mic preamp is just for variety. As is true for mics, loudspeakers, and compressors, no two mic preamps sound exactly alike. They have their own signature or flavor that can sound exactly right—or exactly wrong—when paired with a certain mic on a certain instrument for a certain kind of tune.

One final factor pressures us to acquire additional mic preamps: session flow. Keeping the session moving efficiently saves the band money and makes the studio a more creative place to work. A common approach—even when the session is a string of single-mic overdubs—is to leave each signal chain up and unchanged as you move on to the next overdub.

When the piano overdub is complete and you're moving on to a few cymbal swells, the mics and mic pre settings on the piano stay where they are. You use different ones on the cymbal overdub. Not only does that avoid stopping the session to set up for the cymbal, it means you're ready to go if someone wants to change the piano part in the bridge.

## Created equal

Equalization is a fundamental part of the music recording craft, so it too is a part of the channel strip. But please don't reach for the knobs of the equalizer too soon. There is definitely no substitute for good mic selection and placement. If you're lucky, patient, and smart enough to have a beautiful sounding instrument that you can place cleverly in a great sounding, well-controlled recording room, using excellent mics placed in that ever-elusive 'sweet spot,' you may never use eq.

The rest of the time, we get by with a little help from our equalizer. Add punch, remove shrillness, add sparkle, remove muddiness. Equalizers are an essential part of getting our projects ready for prime time.

But even more than mic preamplifiers, equalizers of different types from different manufacturers can sound quite different from one another. Using the same equalizer on most every overdub you do starts to give everything the same sonic aftertaste.

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We need a better strategy than just randomly buying a few different equalizers. And snapping up the latest eq du jour won't guarantee we'll end up with a coordinated set. I suggest diversifying your equalizer collection based on the technology employed and the functional type of equalization: software versus hardware, solid-state versus tube, integrated circuit versus all discreet, digital versus analog, among others.

Over time you'll learn to hear the subtle sonic differences between them. A session starts. You hear the singer's tone. And a bell goes off. Instantly you intuit the right choice of equalizer for this overdub.

Beyond technology, it makes sense to enrich your equalizer collection based on functional capabilities: parametric, semi-parametric, graphic, or plain old program eq.

The parametric equalizer offers the most precise control for spectral manipulation, with three different parameters (hence the name) for your knob tweaking pleasure. All the other types of equalizers (semi-parametric, graphic and program equalizers) have some subset of these three parameters available for adjusting on the front of the box or in the pull-down menu; the missing parameters are fixed by the manufacturer. When you learn how to use a parametric equalizer, you are learning how to use all types of equalizers.

Probably the most obvious parameter needed on an equalizer is the one that selects the center frequency you wish to attack. In search of shimmer, we might dial up an eq shape focused on 10 kHz. We've got to listen carefully, though, because the shimmeriness may be better at 12 kHz for today's particular track.

In parallel, we must determine how much to alter the frequency we are selecting. The addition (or subtraction) of frequencies happens via adjustment of a separate parameter: cut/boost. It indicates the amount of decrease or increase in amplitude at the center frequency you dialed in on the first parameter just discussed above. To take the muddiness out of a piano sound, select a low-ish frequency (around 250 Hz maybe) and cut a small amount—maybe about 3

to 6 dB. To add warmth and punchiness, boost maybe 9 to 12 dB at the low frequency that sounds best, perhaps somewhere between 40 and 120 Hz. As you can see, these two parameters alone, frequency select and cut/boost, give you a terrific amount of spectral flexibility.

The final parameter available on a parametric eq, bandwidth (a.k.a. Q), determines the 'width' of the cut or boost. That is, as you boost the frequency selected by the amount shown on the cut/boost knob, how much are the neighboring frequencies affected? A narrow bandwidth (high Q) is very focused on the center frequency, and it introduces a sharp spike or notch to the frequency content of the signal being equalized. A wide bandwidth (low Q) takes a broader brush approach, pulling up a wide region of adjacent frequencies along with the center frequency being tweaked. Obviously, different bandwidth settings have different uses. During the course of a project you'll often find the need for a range of bandwidth settings.

The sonic shaping power that parametric equalization offers makes it a favorite part of the channel strip. But other options exist, offering their own benefits.

A 4-band parametric eq has 12 controls on it, so you can select four different spectral targets and shape each of them. This gives us the ability to effect a tremendous amount of change to the frequency response of a track. The terrific amount of sonic shaping power that four bands of parametric equalization offer makes

it a favorite part of the channel strip. But other options exist, offering their own benefits.

Some equalizers have fixed bandwidth; the bandwidth is determined by the designers of the equipment. This type of equalizer gives the recordist the freedom only to adjust the frequency and cut/boost parameters. Because of the downgrade from three parameters to two, this type of eq is sometimes called a semi-parametric equalizer. Alternatively, they are often called 'sweepable' eq, highlighting the fact that the frequency you are cutting or boosting can be adjusted.

This configuration in which only two parameters (frequency and cut/boost) are adjustable is very appealing because it's perfectly intuitive to use. More importantly, the sweepable eq is still very musical and useful in the creation of multi-track recordings.

Down one more level in flexibility—though not intrinsically in sound quality—sometimes an equalizer only allows control over the amount of cut or boost, and can adjust neither the frequency nor the bandwidth of the equalization shape. Generally called program eq, this is the sort of equalizer found on home stereos (labeled 'treble' and 'bass'). You also see this type of eq on many consoles, vintage and new. It appears most often in a 2- or 3-band form: high, mid, and low.

In the case of your console's channel strip, this same equalizer is repeated over and over on every channel of the console. If it costs an extra \$20 to advance the functional capability of the equalizer from program eq to sweepable, that translates into a bump in price of more than \$600 on a 32-channel mixer. The good news is that well designed program eq can sound absolutely gorgeous. And it often offers frequencies that

are close enough to the ideal spectral location to get the job done on many tracks; often you don't even miss the frequency select parameter.

A slight twist on the idea above leads us to the graphic equalizer. Like program eq, this device offers the engineer only the cut/boost decision, fixing bandwidth and frequency.

# NUTS and BOLTS

On a graphic eq, several frequency bands are presented as sliders rather than knobs. The faders provide a good visual description of the frequency response modification that is being applied—hence the name ‘graphic.’ Handy also is the fact that the faders can be made quite compact. It is not unusual for a graphic equalizer to have from 10 to upwards of 30 bands that fit into one or two rack spaces.

Graphic eq is extremely intuitive and comfortable to work with. Being able to see an outline of what you hear will make it easier and quicker to dial in the sound you are looking for. Turning knobs on a 4-band parametric equalizer is more of an acquired taste, and that degree of control isn’t always necessary.

Nuts & Bolts has raved about the creative applications of compression. It is used to sharpen the transient attack of a sound; to lengthen its decay; to extract all those breaths, grunts, and rattles that performers and instruments make.

Trouble is, compression generally can’t be taken away, only added. This sort of compression, therefore, doesn’t generally happen during recording. Radical compression more typically happens during mix-down, when there is time reserved for tweaking the compressor until it sounds just right.

Unless aggressive compression is a key part of the sound—tracking piano with fierce compression on purpose, for the timbre it creates, for example (see ‘The Nuts & Bolts of

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## Compressor liberty

When signals as variable, emotional, and dynamic as music signals must be squeezed into our audio electronics, they often need to be brought under control. They don’t fit naturally into the constraints associated with storing a signal on tape or modulating it for broadcast out into the ether (that’s radio or Internet broadcast).

This is bad news for common musical elements like sax solos and drum fills. When the signals get too quiet, the music is obliterated by the hiss, rumble, hum, and buzz of our recording system. Distortion will occur if they get too loud. The extraordinarily delicate timbre of a glass harmonica or the subtly rich decay of a piano risks being lost entirely.

We have no choice when recording very loud or very soft tracks. The loud stuff needs to be turned down to avoid distortion, while the quiet stuff needs to be turned up to avoid the noise floor.

The compressor/limiter automatically tames music ever so slightly. It takes up residence on the channel strip because of this fundamental capability.

Compression,’ in the 3/00 issue)—it’s best to defer such an extreme tone alteration until you are sure it sounds right for the whole tune. Think of creative compression as a special effect.

More conservative (ratio of about 4:1 or less) compression on the other hand is a common part of the recording path. It is an important part of your channel path.

As with eq, it’s useful to have a variety of compressors around for different applications—they all sound different from one another.

## Pursuit of happiness

A few channel strips of very good quality that simultaneously offer a degree of sonic variety can give a small studio the recording vocabulary of the big studios. You don’t necessarily need a humongonormous mixer. Acquire or improve your channel strip strategically.

Alex Case mistakenly got cable, misunderstanding what they meant by 200+ channels. Help him find the faders at [case@recordingmag.com](mailto:case@recordingmag.com).