Professional Audio Learning Zone

VCA GROUPING

Introduction

The MH2 sets new standards for affordable consoles with its VCA grouping capability, but many engineers are still unfamiliar with how to use VCA groups.

Most engineers are familiar with audio subgroups, even if their uses have been limited up to now. By assigning channels to a sub-group, you can control the master level of all instruments or vocals assigned to that group from a central location on the desk so the engineer doesn't have to stretch out to adjust the drum kit level, for example.

Audio Groups are also useful when you feed a number of sources to an effects or processing device such as a compressor / limiter, noise gate, or delay, or you want to create a separate 'mix' for recording to a computer or hard-disk recording system, or a feed to a separate set of speakers.

While audio subgroups make this easier, they also have some limitations:

- To create a stereo feed to the mix or recorder, you need to assign channels to two groups, hard-panning each group to Mix L and Mix R. On a four-group console, this means only two stereo subgroups.

- The subgroup master fader only controls the overall level of the summed channels. This means that all channels remain open, so any post-fader aux sends feeding effects devices will continue to return effected signals to the mix if so routed, unless the effect is routed back only to that group.

- The subgroup master adds another set of electronics and a fader into the signal path, possibly contributing more noise and distortion to the mix, especially fader noise caused by wear or dirt.

So what is a VCA group?

A VCA is a small electronic device, full name Voltage Controlled Amplifier. This simply means that the audio signal is passed through the amplifier and a fader is used to control the level of the amplifier output using a DC voltage. The audio does not pass through the fader on the channel.

Any number of channels may be routed or assigned to a VCA group, with a master fader linking the DC voltages together.

OK, so far, no real difference to audio grouping: after all, what does it matter how the channel audio is adjusted?

Well, let's consider linking a number of channels together, and controlling all their VCAs by a single master fader which adjusts the VCAs altogether.

The advantages?

Firstly, by routing the channels directly to the mix, you can directly control the stereo level of the channel in the mix using just one fader. This means that whereas you needed two faders with an audio subgroup, you now need only one.

Secondly, you are actually directly adjusting the level of the channel when you adjust the VCA master fader. This also means that when you lower a master fader, you also lower the channel signal, and consequently any post-fader aux send feeds are reduced as well, preserving the dry/wet balance of the effect.

Thirdly, you are reducing the electronics elements in the signal path and so keeping noise and distortion down.

Another advantage is for varying the relative levels of channels within subgroups.

Imagine this scenario: You have a choir of 3 male and 3 female voices. You can group the male voices on one group (say Group 3) and the female voices on another (Group 4), and adjust the balance of the male/female voices by controlling the group master levels. In this instance, to raise the level of all the singers you have to move two faders at once.

By additionally assigning all channels to a single fader, a single VCA master controls the level of all vocalists across both subgroups, while the groups themselves allow you to maintain the balance between male and female singers.

VCA Groups within VCA groups.

So, can we control more than one VCA group at a time? Simply, yes. Typically, each channel can be assigned to any number of VCA groups (up to the maximum number of VCA groups fitted to the console). So while drums may be assigned to VCA Group 1, they could also be assigned to VCA Group 2 along with bass to control the rhythm section.

So imagine what happens if you assign **all** channels to a single VCA Group…yes, you have one fader that reduces all channel levels at once, without disturbing the main mix faders. This could be important if you want to route some playback device to the mix for intermission music while you fade out the band.

This overall control would be known as a Grand Master.

What about Mutes and Mute Groups?

You're probably familiar with normal mute groups. This is where you can assign a channel to a master mute function (maybe 4 or 8 such masters) and have that master switch remotely mute all assigned channels, saving precious time and eliminating muting errors. This is typically used to select different scene setups or song patches.

Normally, VCA Groups also have Mutes, which also directly control the channel mute. If your console already has mute groups, this means you have additional mute groups when using VCAs, a great asset for scene changes.

Can I use VCA Groups while running monitors?

Yes, as long as the monitor sends are pre-fader, you can still control a VCA group as before, without disturbing the levels sent to your monitor mixes.

Scenes and Snapshots

Many consoles have additional functionality connected with VCAs, the main one being snapshot automation. Simply explained, you can memorise the assignments of channels to VCA groups using an onboard computer, which may be for different songs or scenes, and recall them when the time is right. This saves a great deal of time, but it should be noted that this 'static' type of automation recalls only VCA Group assignments, not levels.

Example:
If you are mixing a theatre performance and you have a different lead actor in each scene, you may wish to create a VCA group that only has this lead actor's microphone assigned to it. This enables you to easily ride the voice level without moving from the centre of the console. The ability to reassign this VCA to a different channel when a snapshot is recalled will now enable you to keep your finger on the same physical VCA master fader, whilst the actual microphone being controlled changes to match the change of lead character in each scene.

If you want to prevent a channel being reassigned by recalling a snapshot, there is usually a 'safe' mode to isolate that channel from the automation, or a way of completely disabling the VCA assign recall from the snapshot automation.

Levels within VCA Groups

The combination of a fader controlling a channel plus a VCA master controlling it needs some explanation.

Imagine we have just two channels assigned to a VCA group. One channel fader is set at zero, while the other is set to -5dB. Assuming the VCA master is set to 0dB, the channels will output the signals at the same level as they are set.

Now decrease the VCA master to -10dB. Now the first fader is effectively set at -10dB, while the second is at -15dB.

This is because the voltages from all the faders are added together to control the VCA.

However, do not assume that you can get more level out by putting a channel fader and more than one VCA master assigned to that channel at +10dB, and get more than +20dB of gain – the circuits are designed to prevent such overload possibilities.

Solo

Some consoles, but not all, also have VCA Solo facilities. The MH Series all have this function.

Pressing the SOLO button on a VCA group on an MH console selects all channel SOLOs as stereo AFL signals and so all the channels assigned to that VCA group can be monitored in stereo and you can hear the balance of the mix (or as Solo-in-Place in the main mix if this mode is selected).

Do VCA groups have any limitations?

Well, actually yes, but not many. An audio subgroup can feed a group of signals to a single or stereo compressor or effects device. A VCA group has no actual audio output of its own as it is merely a control device, so you still need to use subgroups for this.

Similarly, if the console is fitted with a matrix, the source for that matrix will most likely be the subgroups, so VCA groups cannot be routed to a matrix unless you assign channels to both the subgroups and VCA groups.

Finally, because there is no audio output from a VCA group, it is not possible to have output level metering that shows the combined level of the channels assigned to a VCA group. Again, you can get around this by routing the channels to both VCA and audio subgroups, using the output meters on the audio groups to provide metering information which also corresponds to the VCA grouped channels (Subgroup master faders must be set at unity gain).

So, there is a place in live mixing for both types of group.