The Roland VM-C7200 digital mixer console with the optional MB-24 level meter bridge.

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WELCOME TO THE DIGITAL AGE

This is the digital age. The advantages of creating, editing and producing music in the digital domain are very well known. Virtual tracks, non destructive editing, and powerful on board digital FX have made Roland's VS series of Digital Studio Workstations the most successful digital studio workstations in history!

But what about mixing? What is digital mixing? Does it have the same kind of advantages that digital recording and editing have over the old analog ways? And how does a digital mixer work, anyway. Isn't mixing just moving a fader up and down? So why would a digital mixer be any better than an analog mixer?

Let's answer that question and take a look at what incredible advantages digital mixers can offer you and your music. Along the way, we'll discuss some of the basic features and concepts of mixers in general to help show how the flexibility and power of digital mixers is truly revolutionary.

Digital Mixer VS Analog Mixer Overview

Before we get started looking at mixers in general, here are a few of the major benefits digital mixers have over analog mixing.

FLEXIBLE CONFIGURATION VERSUS FIXED PATHS

In an analog mixer, all of the connections, inputs and outputs, are "hardwired". Once the design is finished, the mixer can never change.

In a digital mixer, once the audio is inside the mixer, there is virtually total freedom to move it around, add effects, and configure its paths anyway you need to for your application. For example, any input can go to any or all channels. And the various paths within a digital mixer can be routed to many different destinations as well as different physical outputs.

SIZE AND PRICE

Because the configuration and control of a digital mixer is so flexible, digital mixers can be designed in more compact forms to accommodate the size and shape you need for your studio. For example, an analog console with 94 channels of audio would be very, very wide, probably over 12 or more feet, and would weight thousands of pounds.

Because of the flexible control options a digital mixer offers, you could control 94 channels using a much more convenient sized console that could still be portable.

This design flexibility also allows digital mixers to often be a lot less expensive than an analog console with the same number of channels.

POWERFUL ONBOARD DIGITAL EFFECTS

Because the audio in a digital console has entered the digital domain, it is easy and cost effective to add very high quality, on-board digital effects processing. Since this processing is an integral part of the mixer, you avoid the audio losses of cabling, external patching and audio conversions inherent in an analog console.

Analog Hardwired Audio Paths vs Digital Flexibility

TOTAL RECALL OF ALL SETTINGS

A huge advantage of digital consoles is their ability to store and then recall all of the settings of a mix, even including the effects. This allows you to work with a project, store its settings and later come back to the mix exactly as you left it.

Easy recall of all mixer settings

A mixer with memory has lots of other advantages. For example, you could recall a vocal's EQ and level for a new take or to punch in over an old version with matching audio quality. The speed of recall also allows you to try one mixing approach, store it, try a completely different idea, and then compare the two. This really helps your music sound better.

DIRECT DIGITAL CONNECTIONS TO TAPE RECORDERS OR DATS

In today's music world, more and more of the multi track and stereo recorders are digital. When you are processing and mixing your music in a digital mixer, you have direct digital paths to both digital recorders and digital mix down devices such as DATs. This avoids the losses inherent in A/D and D/A conversions that would be required using an analog mixer. Again, your music will sound better.

But let's look at some more basic mixer concepts to help us see what some of the advantages of digital mixing are all about.

Many Analog Connections

Two Digital Connections

Definition of a Mixer and Busses

Before we go any further, we really should define a mixer and its most basic parts and functions. Actually, a mixer is a very simple device. It takes audio from various inputs and sends this audio to various outputs. Along the way it can combine the audio streams, change their levels, and sometimes even change the audio using processing.
The basic controls for each stream of audio are called CHANNELS. A channel contains the controls to send a stream of audio along various paths and to change the level and process the audio.

The paths that audio is routed along in a mixer are called BUSSES. A bus is a path that can be accessed by more than one stream of audio and that goes to one or more destinations. Sometimes two busses are combined and used as a stereo bus routed to two outputs for stereo applications.

Simple Signal Bus

Digital Channel Strip

Types of Busses and Their Applications

In traditional analog mixers, every path is hardwired, as we discussed earlier. There are several different ways that busses have traditionally been wired.

STEREO MASTER BUS

This bus is used as the main outputs for a mixer and often is sent to a two track tape recorder or the analog inputs of a DAT. The main fader for a channel is used to adjust the send levels to this master bus.

CUE AND MONITOR BUSSES

These can also be stereo busses and are used to send headphone or monitor mixes to performers or audio to the speakers and headphones in a control room.

GROUP, SUB GROUP OR RECORDING BUSSES

These busses are traditionally used to send audio to tape recorders. They are arranged in pairs and are accessed using an On/Off button. There is no send level so the volume of the channel sent to the bus just follows the level of the main channel fader. The balance of audio sent to either pair is adjusted using the Channel's PAN control.
Because there is no independent level control for these busses, their use is limited.

Types of Busses and Their Applications

AUX BUSSES

Aux busses are mono or sometimes stereo busses that are accessed using a small level control knob. Aux busses are routed to a dedicated output and are used for either headphone mixes or for sending audio to external FX processing.

Aux busses are more flexible than Recording busses, as they have send levels. They sometimes also have a switch that allows their level to be independent of the main channel level. This switch sends the channel's audio to the Aux bus either PRE: independent of the main fader; or POST main fader.

With the PRE fader position, the mix out of the Aux bus can be used for headphones or monitor sends since the output levels for each channel will be independent of the main or stereo output level determined by the channel's main fader. In the POST fader position, the send level will follow the main master bus levels, which is often used for sending audio to external FX processors.

A Digital Mixer's More Flexible Busses

In an analog console, all of the channels and busses have fixed, hardwired paths. For this reason, some analog consoles are designed for mixing and recording purposes and others for live mixing. Most of the design difference is based on the busses and how they will be used.
Some powerful digital mixers have busses that are much more flexible than analog busses. In fact, these are sometimes called Flex Busses! These flexible busses combine all of the features of every type of analog bus. They have send levels and can be sent PRE or POST fader (and even from more locations along the channel strip). The outputs of a Flex Bus can also be sent to many different destinations as well.

For this reason, a console with a very flexible bus structure can be configured by the user for just about any mixer application imaginable. They can be used for sending audio to internal or external effects, to either analog or digital recorders, to headphone amplifiers, to monitors or studio speakers and can even be sent to other busses to be used as "matrix" busses for live sound.

This kind of configurable bus structure is one of the great examples of how digital mixers can be more "flexible" and powerful than any type of analog mixer.

Inputs and Outputs

A mixer combines and routes audio that comes from inputs and then sends this audio to outputs. Let's take a look at the types of inputs and outputs available to most mixers.

INPUTS AND SOURCES

Low level sources require low level mixer inputs. Typical low level inputs include:

- Microphones are a standard in the studio. Most have XLR balanced connectors and require mic level inputs. Some require extra (phantom) power directly from the mixer via the mic cable.
- Guitars require low level mixer capability also.

High level sources require higher level mixer inputs, such as:

- Synths and electronic instruments
- Tape recorders
- Effects processor outputs

In today's world, most studios need lots of channels of both mic and line level inputs. For live applications, especially, you need lots of mic inputs.

Outputs and Destinations

Audio from a mixer can go to many different destinations, depending on the application. Almost always these outputs are high or line level.

Typical output destinations would include:

- Mix down tape recorder via Master Bus outputs
- Multi track tape recorders via Recording Bus outputs
- External effects processor via Aux outputs
- Surround sound amplifiers or encoders via various Bus outputs
- Headphone amplifiers via Aux outputs
- Stage Monitors
- Studio Monitors
- Various speakers and their amplifiers

These outputs are usually RCA, 1/4 inch phone, or XLR connectors.

Inputs and Outputs: The Digital Difference

In an analog mixer, all of the paths from the inputs to the channels to the outputs are "hardwired" and can't be changed. An aux bus only goes to the aux send output. Period.

So what if you need extra Pre Fader headphone sends, need to do a Surround Sound mix, or need to send lots of extra channels to a multi track recorder?

In most digital mixers, the routing is totally flexible. This includes the paths from the inputs to the channels, the paths from the channels to the busses, and via the busses to all of the outputs.

For example, in some digital mixers, any physical input can go to any or even all tracks. This way you can route a vocal to one channel to process without EQ or compressors and to another channel with some EQ, compression and delay for an easy way to record and compare two differently processed "takes".

In digital mixers with a flexible bus structure, you can route your audio anyway you want to your busses, depending on your needs at the time.

The outputs of most digital mixers are also completely flexible. For example, a bus can be used for a headphone mix and sent to a monitor output for one application, and then later used as a recording bus and sent to a set of assignable outputs or even sent digitally to an MDM (Modular Digital Multitrack). The bus could also be used to send audio to an external FX processor or even for Surround Sound mixing via balanced outputs.

The routing on a digital mixer is not fixed. It's available for use for whatever application you need.

Connecting to the Digital World the Digital Way

Of course in an analog console, all of the inputs and outputs are analog. This makes it difficult to connect an analog console to various digital devices such as digital effects units, digital tape recorders, or digital mix down decks such as DATs.
Digital consoles have, in addition to many analog inputs and outputs, many different digital connectors including stereo digital bus outputs for routing to digital FX or DATs. In today's studio, more and more mixing is being done digitally to DAT. This, of course, can be done even at a 24 bit level from many digital mixers.

Digital routing to MDMs is also possible from most digital mixers. This gives you high quality audio and total flexibility with out the hassles and audio losses of lots of cabling, patching and useless A/D and D/A conversions.

Routing to digital devices from digital mixers is easy, convenient, and keeps your audio at its highest quality.

Avoiding Conversions

Keeping your audio in the digital domain avoids the audio losses from numerous A/D and D/A conversions and ensures the highest quality audio for your music.

Internal Digital Effects

A huge part of mixing audio for any application is adding FX. In a digital mixer, these effects can be all digital, right inside the mixer. This gives you much higher audio quality, without the patching hassles of analog FX and analog patchbays.

The internal processing power in a digital mixer can also be reconfigured. For example, you could have a Real Time Analyzer for live concert work or when you are first tweaking the sound in your studio. When you're recording guitars you could have COSM guitar amp and speaker models to quickly and easily get the guitar sound you need without using lots of loud studio gear bleeding into other mics or just driving your neighbors crazy. For live gigs, you could configure your console so you have compressors on 20 or 30 inputs just to make mixing the gig a bit easier.

When you're mixing a music project, you could use COSM Speaker Modeling to listen to your mix as it would sound on a variety of different kinds of speakers. Later you could configure your effects to be a Mastering Tool Kit with multi-band compressors and expanders as you mix digitally to CD or DAT.

All of this is possible in a digital mixer. The convenience and power of onboard digital effects really can enhance the quality of your music.

External Effects

Internal Effects

Instant Information and Fast Access

The audio in a digital mixer is in digital form. That makes it easy to display the audio in many convenient ways that are not possible with analog mixers. For example, you could see the interaction of all of the EQs on one channel as a graphic of the whole EQ. This gives you instant feedback on exactly how you are processing your channel. You could also call up a screen or even a bank of moving faders that instantly shows all of the send levels to one of your busses. This is much easier than looking down a row of tiny knobs and trying to see what their settings are.

And controlling your audio can be much faster on a digital console. For example, suppose you have a 94 channel analog system and want to change the send level to a certain bus for channel 2. To do this, you actually have to get up out of your chair (remember, this console is going to be over 12 or 13 feet long!), walk down and count the knobs to find the bus you want to change. All this time you have left the "sweet spot" of your speakers, so you can't even really hear the change you are making while you are making it.

On a digital console, you could access the send to that bus by pressing one button. All of your parameters for that channel or that bus would be right in front of you for fast and easy access. AND, you would still be comfortably in your seat, right in the correct listening position, so you would be able to more accurately make your changes.

Digital consoles make mixing easier!

Memory: Scenes, EZ Routing and Libraries

As you learn more about digital mixers, you can see how powerful and flexible they really are. To help you manage your mixing, some digital mixers have features designed especially to help you reconfigure your console for the type of work you are doing, or, to get back to an earlier project exactly as you left it. These are all advantages not available on analog mixers.

LIBRARIES

A digital mixer can have lots of powerful processing on each channel such as many bands of digital EQ or dynamics processing. To help speed up working on a project, a digital mixer may have libraries of different EQ settings or dynamics presets. These libraries are available to use in any project, so you can store your favorite EQ for recording a bass player or a drum set, for instance. You can also use the presets to help you get started processing your audio.

SCENES

Scenes are pictures of every parameter of your digital mixer: from the levels to the EQ to the FX settings to the bus routings; everything. Scenes let you recall a mix just as you left it, so you can get right to work on it again. Scenes allow you to bring back the exact settings you used when you recorded a vocal, so you can overdub with the same EQ and levels. Scenes let you store your current mix idea, work on another great idea you just had, then compare the two. They can also let you instantly reconfigure your mixer for live concerts if you need different levels, FX or mic settings between songs, or from one band to another. Scenes can really help you get better results whether you are mixing or tracking or overdubbing or doing live concerts.

EZ ROUTING

Some digital mixers have a powerful function called EZ Routing. EZ Routing has two different basic applications. Whereas Scenes are pictures of all of your mixer settings for one particular project, EZ Routing templates are complete, global configurations of your mixer that can be called up at any time in any project.

For example, you can store templates of how you like to record drums, with the exact FX, EQ, and bussing. You can use EZ Routing templates to instantly re-configure your mixer from a recording mixer to a mastering mixer to a live sound mixer. All with the push of one button.

EZ Routing also has another valuable function. It can take you step by step through all of the different settings you need to set up your mixer for just about any application. In this capacity, it's like having an onboard guide or help system. Mixing has never been easier and more flexible.

And of course, this power to instantly recall or reconfigure your console is not available on an analog console.

Use EZ Routing to store custom routing templates

Automation: Dynamic, Snapshots & Moving Faders

Picture yourself doing a complicated mix. You've got the vocal level changes down pretty well, but how are you ever going to be able to keep track of those changes and still work on the drums? Once again, digital mixers come to the rescue with their automation functions. Like the Scenes described above, a mixer's automation memory can recall the various settings of your mixer. Unlike scenes, however, which can be recalled manually at any time by the mixing engineer, automation changes happens automatically at a certain time during the playback of your song.

There are two basic types of automation: snapshot and dynamic. Snapshots are also complete pictures of your mixer: all of the effects settings, levels, etc. Some digital mixers let you customize which mixer parameters are stored in your snapshots. You place a snapshot where you need an effects patch change on your guitar part, an instant volume change for verse to chorus vocal or anywhere you want an immediate mixer adjustment. When the song plays back: voila: the change happens automatically. Snapshots are also great for using the same internal FX processor in your digital mixer for different effects at different times.

Automation: Dynamic, Snapshots & Moving Faders

Dynamic automation is used when you need gradual changes of parameters such as a fade out. For example, you could use dynamic automation to recall every little level move you make to your vocal track. Once you have it right, you can then move on and work on the drums, knowing that the vocal track is now perfect.
Some digital consoles even have moving faders that help you see exactly what is happening during your mix.
The memory for this automation in your digital mixer can be on board or it can be transmitted via MIDI. If it is MIDI based automation, then you would use a sequencer to play back the automation data during your mix.

It's easy to see how automation could really help you perfect your mixes, working on just one part at a time and getting everything exactly the way you want it.

Automation is another great way that digital mixers enhance the sound of your projects.

Channel Grouping and Linking

Digital mixers offer some new, great ways to control your audio that will help you make better mixes. One way is Channel Linking. If you have two channels that are being used together as a stereo pair, you can link the volume controls together so you can control them using only one fader. This helps with the accuracy of your mix. You can often use this channel linking and still maintain independent pan positions or other channel parameters.

Fader grouping is an extension of linking. Using grouping, you can control the level of several different channels using only one fader. This is a great way to control the mix of a whole drum set or several background vocals by using only one fader. This is much more convenient and accurate than trying to bump up all 8 drum mics a little bit using 8 faders (unless you are related to an octopus!). Of course with fader grouping, you can set the relative balance of each part before you group them. That way your overheads will all stay in balance with your snare part, but you can raise or lower the level of your whole drum kit using only one fader.

Digital mixing definitely makes mixing easier!

One fader can control a whole drum mix

Since the functions of a digital console are really limited only by the imagination of the software engineers, there are lots of new and powerful applications for a digital console. One great application is the control of MIDI devices right from the console. This allows you to control the levels of audio in computer based systems that might not have digital audio I/O. You can also control the transport functions of sequencers and MDMs, arm tracks, and have a completely integrated control surface right from your mixer.
Controlling the volume of computer based audio or sequenced parts right from your mixer is especially powerful, as mixing with a mouse is kind of like trying to tie a knot using only one finger!!

Sending MIDI information from mixer faders and transport controls

Console Designs

Analog consoles are hardwired as mentioned above. The inputs are hardwired to the channels which are hardwired to the busses which are hardwired to their outputs. For this reason, the physical connections to an analog mixer are made right on the mixer itself. Usually these are on the rear of the mixer, but sometimes they are made right on the upper surface of the console.

Of course the sources for the mixer such as microphones, tape recorders, effects processor are usually located quite some distance from the mixer. This requires that long analog snakes be made up to bring all of the audio right into the control room to connect into the mixer. As we know, analog cabling, especially long runs, can introduce hums, buzzes and other types of signal degradation.

This type of wiring is also extremely time consuming and can be very expensive, especially when it comes time to try and eliminate the worst of those hums! In addition, once the console has been wired in place, there are so many wires and cables around that the console is impossible to move.

With digital consoles, all of the audio is controlled in a flexible system that is not hard wired at all.. For this reason, some advanced digital mixers actually have a control surface that is totally separate from the inputs and outputs of the mixer. This means the I/O interface, usually called a processor, can be located right where your audio sources are located. If your mics are in a studio, then the processor can be there. If you are doing a live concert, then the processor can be right on stage. The only connection you need back to your mixing control surface or console are 2 digital cables. NO SNAKES!!!!

Of course you can see the incredible advantages this offers the mixing engineer or musician. First of all, you don't have any signal losses from the stage or studio to the mixer. All of the cable runs are as short as possible, eliminating most of the wiring problems that studios typically have. Secondly, now that there aren't mountains of cables and lines and snakes ending up in your control room, you can actually have the freedom to move the console around to a new configuration, or just move it out of the way if you have some friends over for a jam session. Your studio now becomes custom configurable, just like your digital mixer! Finally, setting up your studio or your live mixing system is much easier, faster and less expensive.

Eliminating analog snakes is a big advantage of some digital mixers.

No External Patchbays and Wires

Of course you have seen the patchbays in most studios with analog consoles. These are used to help the engineer route their various inputs to different channels, to patch in effects as needed, to patch tape decks to the different outputs of the mixer and so on. And you have probably seen the confusing rats nest of cabling that goes with such a patchbay. Of course it goes without saying that having lots of extra audio connections with their capability of generating extra noise isn't exactly what the doctor ordered for your mixes.

Well digital consoles can help you eliminate these patchbays, and their expense and wiring hassles. Since digital consoles have built in, digital patchbays, you can route different microphones to different channels, add effects, patch busses to tape recorders digitally, all without using a single analog cable. This is a very elegant and clean way to work with your audio!

Unlike this analog mixer with an external patchbay and lots of wires, digital mixing with internal digital effects requires no extra wiring!

Other Cool Digital Mixer Tricks

Finally, since digital mixers are controlling digital audio, the sky's the limit when it comes to processing your audio. In fact, instead of having an analog console that is basically getting older by the minute, digital consoles can have software updates, adding features and making them "younger as they get older"!!!

How about adding a real time analyzer, or controlling the muting of several faders for your drum kit using 1 mute group button? Accessing commonly used functions using one macro button? All of this is easy using a digital console. Special effects such as powerful 24 bit mastering tools, guitar amp and speaker models, microphone models and even speaker modeling are possible once your audio is in the digital environment and surrounded by powerful effects processors. And of course new effects patches can be added easily. How about additional MIDI functions for controlling external FX processors in real time, allowing internal or external real time FX editing? Doing live sound, how about a built in feedback eliminator?

The list will go on and one as more features are dreamed up by designers or even users. The bottom line is that features and powerful processing can be added via software to help your digital mixer become even more and more powerful.

Summary

Digital mixers offer extensive advantages over analog mixing. Once you see how these new powerful features can help you easily create better sounding and more accurate mixes, you'll never want to go back to the old analog days.

Digital mixer features that will improve your mixing include:

- **Configurable input and output routing**: any channel can go anywhere
- **Flexible bus structure** for the maximum mixing power
- **Direct digital connections** to DATs or MDMs
- **Lots of channels** in **compact designs**
- **Easy and fast** operation.
- **Powerful onboard digital effects** for high quality and repeatable FX processing
- **Internal digital patchbays** for easy, high quality routing
- **Total recall of all mixer settings** using Scenes
- **Instant configuration of mixer FX and routing** for different applications
- **EZ routing** for on-screen help and storing your commonly used mixer settings
- **Scenes, snapshots and dynamic automation** to help you perfect your mixes
- **MIDI fader and transport buttons** for easy control of MIDI sequencers and workstations
- New and powerful effects built in such as **Real Time Analyzers and Speaker Modeling**
- **Channel grouping, linking, mute groups** and other powerful ways to help you mix
- **Separate console and processor** to eliminate the audio losses of analog snakes

The list goes on and on, but the bottom line is that digital mixing can give you the tools to ensure that your audio is the highest quality possible and to help you make better mixes.

Roland VM-3100 and VM-3100Pro

Inexpensive, compact with 24 bit audio quality, the VM-3100 has made digital mixing affordable enough so anyone can have the advantages of digital mixing.

- Affordable 12/20* channel 8 bus digital mixer
- 24-bit AD / DA
- 3 band 24 bit digital EQ per channel
- 1 or 2* onboard stereo effects processor with compression, reverb, chorus, delay, and guitar/keyboard/vocal multi-effects, COSM Speaker and Microphone Modeling
- 2 additional mono compressors
- Digital I/O
- Scene and EQ memory
- EZ Routing
- 8 Bus outputs
- 16 MIDI fader function and MIDI transport controls
- Full MIDI automation using external sequencer, including switching scenes, mixer and fader levels
- Optional DIF-AT Interface Box for 8 channels of digital I/O for ADAT/Tascam MDMs*

*applies to VM-3100Pro only

Roland VM-7000 series 94 channel digital mixers**

The VM-7000 series offers more power than ever before available for any kind of mixer, either analog of digital at anywhere near the price!

- 94 Channels of digital mixing
- 40 mic / line inputs
- 24 Bit A/Ds
- 32 mono or 16 stereo digital FX processors on board
- 94 DSP blocks for use as extra EQ or dynamics processing
- Separate console and processor eliminating noisy analog snakes
- Modular system with choices in processor and control surfaces
- Up to 48 tracks of digital routing to MDMs for recording and mixing
- On board dynamic automation using moving faders
- Scenes, libraries, EZ Routing
- Flex Buss and virtual patch bay for customizing use in many applications
- COSM speaker modeling, microphone modeling, guitar speaker and pre-amp modeling
- 5.1 Surround mixing

**specs are for fully expanded system including 6 optional VS8F-2 processing cards

Feature Comparison

	VM-3100	VM-3100 Pro	VM-7200 Series	Analog Mixers
Configurable input routing	YES	YES	YES	No
Flexible bus structure	YES	YES	YES	No
24 bit digital I/O to DAT, etc.	YES	YES	YES	No
Direct digital path to MDMs	No	YES	YES	No
Onboard digital effects	YES	YES	YES	No
COSM Speaker Modeling	No	YES	YES	No
COSM Microphone Modeling	No	YES	YES	No
Internal digital patchbay	YES	YES	YES	No
Total recall of all mixer settings	YES	YES	YES	No
Snapshot automation	Via MIDI	Via MIDI	YES	No
Dynamic automation	Via MIDI	Via MIDI	YES	$$$$
Moving Faders	No	No	YES	$$$$
Separate console and processor	No	No	YES	No
EZ Routing for configuration help	YES	YES	YES	No
MIDI Fader Function	YES	YES	YES	No
Fader linking	YES	YES	YES	No
Fader Grouping	No	No	YES	$$$$
Mute Groups	No	No	YES	$$$$
Real Time Analyzer	No	No	YES	No

Glossary

A/D: For "Analog-to-Digital Converter," a device that receives analog audio and converts it into digital data, such as analog audio coming into a digital mixer

Automation: The memorization and playback of changes you make to mixer settings

Aux: Short for "Auxiliary"; a designation for extra busses typically used for sending signal to effects, headphone amps and other destinations

Aux return: An extra input; typically used for receiving a signal from the output of an internal or external effect processor

Aux send: An extra bus that can be used for sending signal anywhere; typically used for sending signal into an effect

Balanced: A type of audio connection that uses the three leads in a cable, connector and jack as part of a phase-cancellation scheme to boost signal and reduce noise

Band: In EQ, a range of frequencies

Bandwidth: In EQ, the width of a band; the number of frequencies that will be boosted or cut above and below a selected center frequency

Bus: A pathway down which one or more signals can travel

Cannon connector: Another name for an XLR connector

Channel: A set of tools for the control and shaping of a single signal

Channel strip: A row of controls on a mixer designated for the shaping of a single signal

Compressor: A dynamics processor that reduces the level of any signal exceeding a specified threshold volume

Condenser Microphone: A type of high-quality mic that requires power

COSM: An abbreviation for Roland's "Composite Object Sound Modeling" technology that shapes audio by applying the sonic characteristics of popular or classic microphones, guitars, guitar amplifiers and studio reference speakers

Cue Bus: A bus—sometimes a stereo pair of busses—dedicated to the providing of signal to performers so they can hear what they're doing

D/A: For "Digital-to-Analog Converter," a device that converts digital data to analog audio, such as the audio leaving a digital mixer on its way to an analog device

DAT: Abbreviation for "Digital Audio Tape"; used in reference to this type of tape as well as the recorders that use it

Delay: An effect in which a copy of a signal is played back later than the original

Effects: Any of a variety of audio processes that can be applied to a signal to modify it, including reverb, delay, flanging, phasing

Effect Loop: A two-way journey of a signal from a channel insert point to and effect and back to the insert point

Glossary

Effect return: An input that receives signal from the output of an internal or
EQ: A popular abbreviation for "equalization," the thing an equalizer does
Equalization: The process of altering the levels of frequencies that comprise a signal
Equalizer: A device that boost or cuts the volume of specific frequencies in a signal
EZ Routing: A re-usable template containing a Roland digital mixer's routings; in some cases, walks you through the creation of a setup using displayed questions
Fade In: A change in level over time increasing upward from silence
Fade Out: A change in level over time falling gradually to silence
Fader: A slider-type device that's used for the precise manipulation of levels
FlexBus: A powerful all-purpose bus available on Roland digital mixers
Flying fader: A motorized fader that automatically moves during automation playback
Frequency: Refers to the number of times per second that a sound wave's cycle repeats, with a greater frequency resulting in a higher perceived pitch; also used as shorthand for describing sound waves in a signal by their pitch
Gain: Another term for level
Grouping: A process by which multiple channel strips are joined together under a single level control
Hertz: (Hz) A unit of measurement equal to a sound wave's single cycle
High-pass filter: A filter that removes lower frequencies from a signal, allowing higher frequencies to pass through unaffected
Hum: An undesirable low-frequency tone present in a signal as a result of grounding problems or proximity to a power source
Impedance: The amount of force with which voltage leaves a connector and the amount of resistance to that force in the jack receiving it; they should be equal
In-line: Any effect accessed by interrupting a channel's signal flow, directing its signal to the effect, and returning the output of the effect to the channel at the same point from which it came (also called an "insert effect"); also, a mixer whose multi-track tape return controls are contained in its channel strips
Input: A jack that receives audio
Input level: The level of signal coming into a channel strip
Insert: A point in a signal flow at which an in-line effect can be employed
kHz: for "kiloHertz": a thousand Hertz
Level: A general term for volume or amplitude
Limiter: A compressor set to a ratio of 10:1 or greater

Line level: The high-level signal produced at the outputs of audio equipment such as mixers, recorders and playback devices
Macro: A digital mixer shortcut that performs a multi-step operation as a single action
Meter: A visual device that shows the level of a signal
Meter bridge: A separate piece of mixer hardware that provides an additional array of meters
Mic: A common nickname for "microphone"
Mic Level: The low-level signal produced by microphones and electric instruments such as electric guitar or bass
Microphone: A device that converts sound waves into audio signals
MIDI: For "Musical Instrument Digital Interface," the wiring and message protocol that allows musical instruments and other devices to communicate
Mixdown: Acommon synonym for the noun "mix"
Mix: As a noun, a signal that contains one or more other signals—typically a mix is a pair of stereo signals that contains numerous mono and stereo signals, along with effects, combined together; as a verb, the act of creating such a combined signal, or of using a mixer in general
Mixer: A device in which audio signals can be manipulated, enhanced and directed to other destinations, singly or together; also, someone who works a mixer
Modeling: A process by which the characteristics of one signal are applied to another; Roland's advanced COSM modeling creates realistic emulations of popular and classic microphones, guitars, guitar amplifiers and studio reference speakers
Monitor: As a noun, a speaker, or set of speakers, for the purpose of listening to a mix; as a verb, the act of listening when mixing
Mono: A single signal
MMC: For "MIDI Machine Control," the MIDI-based protocol that allows the controls of one MMC-compliant device to affect the transport mechanism of another
MTC: For "MIDI Time Code," a form of SMPTE used for the timing synchronization of two or more MIDI-compliant devices
Mute: A switch that allows you to silence a channel's signal; some mixers provide mute grouping for silencing multiple channels at once
Out of phase: A situation in which the sound-wave cycles in one signal reach their greatest amount of air pressure as the cycles in a similar signal reach their least; the two signals will cancel each other out
Outboard: External, as in an "external device"
Output: A jack that sends out signal
Overload: What occurs when a signal is so loud that it exceeds the capabilities of the device through which it's passing

Glossary

Pad: A device that lowers the level of a signal
Parameter: A setting whose value can be changed
Parametric: A type of EQ that can be adjusted so that it can boost or cut any frequency within its overall range; may also have a user-definable bandwidth
Patch: A temporary connection made between two audio devices, or within one
Panning: The left/right positioning of a signal within a stereo image
Phantom Power: The power required for the operation of a condenser microphone when it's not supplied by internal batteries or a separate power supply
Phone Connector: A 1/4" connector used for the transmission of mic or line-level audio
Phono Connector: A small audio connector used for the connection of line-level signals and S/PDIF Aformat digital audio connections
Post: The designation for accessing audio just after it leaves a particular channel component for example, "post-fader" grabs audio just after it leaves the channel's main level control, before it gets to the panning control
Pre: The designation for the accessing of audio before it gets to a particular module; for example, "pre-EQ" grabs audio before it gets to a channel strip's EQ
RCA Connector: Another name for a phono connector
Reverb: An effect in which the ambience of a physical space is simulated; a signal is copied many times, and the copies are heard one after another at decreasing levels, so closely together that they are not heard individually
Return: A bus or input jack that receives signal, commonly used for effect outputs
Scene: All of a song's or project's mixer settings saved in a Roland digital mixer's memory; can be quickly recalled, re-establishing all settings instantly
Send: A bus or output jack that transmits signal
Sequencer: A MIDI recorder that captures MIDI data and can play it back in real time
Shelving: A type of EQ in which all frequencies above or below a selected frequency are affected; low shelving affects all frequencies below the selected frequency; high shelving all those above it
Signal Flow: The journey a signal takes from one place to another
Snapshot: A captured group of Roland digital mixer settings that reflect the state of the mixer at a particular moment within a song or project; mixer can recall the snapshot and re-instate its settings at the proper moment during subsequent song or project playbacks

Glossary

Solo: When monitoring, the isolation of one signal by silencing all other signals
Synchronization: Or "sync"; the coordination of timing between audio and/or video devices
Take: An attempt at recording something; each try is called a "take"
Track: A stream of recorded audio data
Treble: The higher frequencies in a signal
Unbalanced: A type of connection that utilizes only two of the leads—the high andground—of a cable, connector and jack
Volume: A general term for a signal's loudness
XLR Connector: A high-quality three-pin audio connector; also called a "cannon connector"; also used for AES-EBU-format digital audio connections
Y cable: An audio cable with one jack on one end, and two on the other

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