The Simple Guide To

Analog Summing

UnitAudio.com

Contents

Summing Defined

Summing is quite simply the process of mixing down recorded tracks to a single stereo track so it can be printed or rendered to a final stereo file. Much like a math equation, you add all the parts together to get a sum.

Digital summing

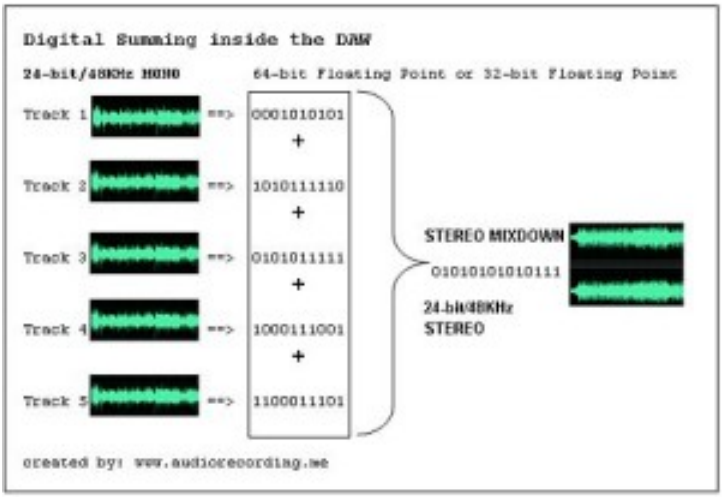
Recorded tracks are mixed down digitally inside a processor or computer.

Analog Summing

Recorded tracks are mixed down in the physical analog space using real analogs of the signal source.

Digital Summing

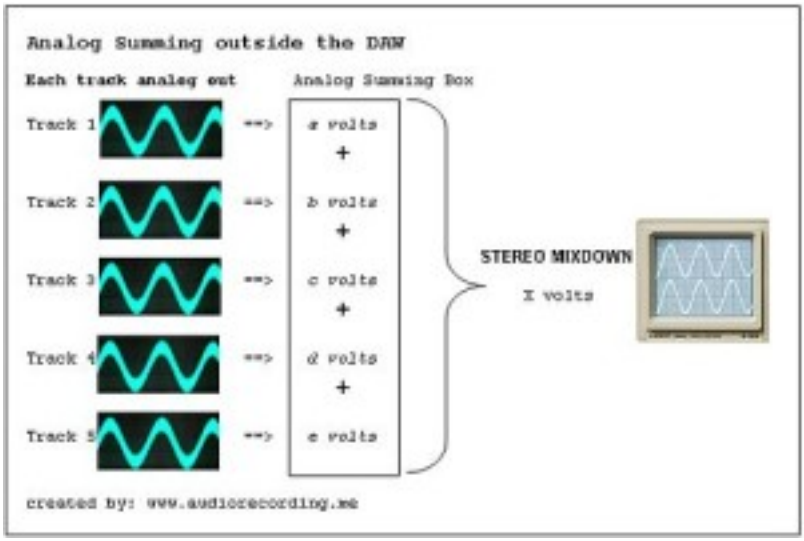
Digital summing is performed by software (Pro Tools, Cubase, etc.) inside a computer. Binary bits (0's and 1's also referred to as digital data) of every track in a mix are added to produce a stereo "mixdown". These processes are done mathematically inside a computer employing complex binary arithmetic or floating point calculations to carry out the operation.



Digital summing illustration

Analog summing

In the analog world, there are no 0s and 1s, only voltages. These complex sinusoidal voltages include harmonics and other elements.



Analog summing diagram

The screenshot above illustrates that the input to an analog summing device is analog voltage (also known as analog audio). If you use an oscilloscope to view these analog audio signals, they are sinusoidal in nature and the amplitudes are voltages and not in dBFS (digital dB).

Each track that would be rendered for analog mix down is summed in the summing device and the individual track's voltages are added together. While digital summing relies on binary math and floating point calculation to do the combining, analog summing relies entirely on electronic signals with no math involved.

Analog Summing Mixer Types

Active
Active analog summing mixers have complex circuitry that provides additional amplification. Some offer signal conditioning features like EQ, panning, monitor etc. An analog mixing console is an example of an active analog summing device.

Pros

- No make up gain necessary.
- Other features built in.

Cons

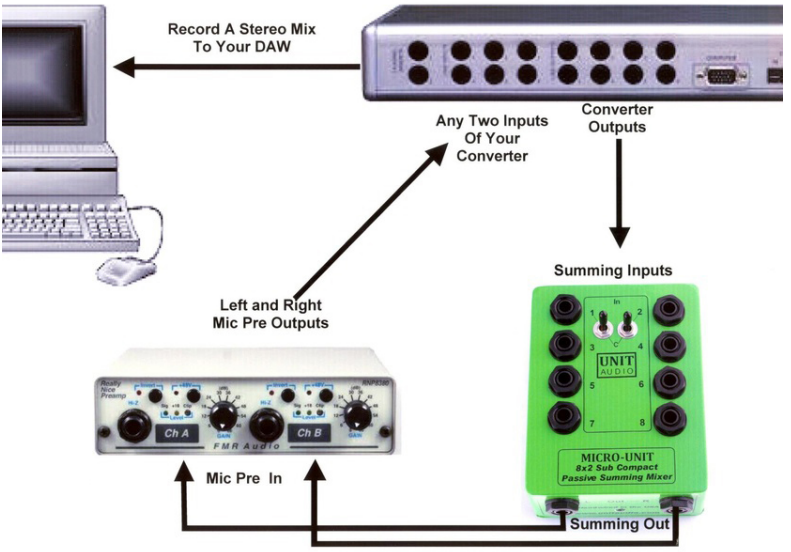
- Expensive to very expensive ($1,500.00 to $15.000.00)
- Some models limited to built -in mic pre-amps.
- Complicated set-up.
- Steep learning curve.

Passive
Passive analog summing mixers have no active electronic components on board. Most passive analog summing

devices consist only of resistors. An example of this is the **Unit Audio** passive summing mixer. The signal needs to run through a microphone pre-amp for make up gain.

Pros

- Inexpensive (Unit Audio starts at $149.00)
- Can use any mic pre-amp for different sound.
- Simple set-up. Easy to learn.
- Gives access to other outboard analog processing.

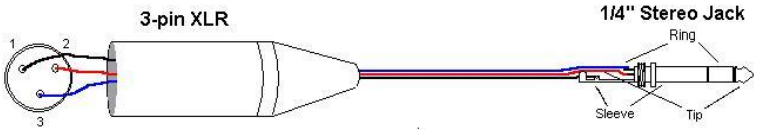


Simple Set Up Guide

1. Mix your tracks as though you were going to do your final stereo mix in the computer.
2. Add your plugins and effects, do your pans and any automation..
3. Create 4 stereo output stems for 4x2 mixer or or 8 stereo output stems for 8x2 mixer.
4. Set up hardware as shown in the diagram at the top of this page.
5. Route your recorded tracks to the 4 or 8 stems you have created, i.e. your drum tracks may be routed to stem 1 which in turn could go to outputs 1 and 2 of your interface and then to input 1and 2 of the mixer.
6. Once your have completed your routing from the software to the hardware you are ready for the mix.
7. Add a stereo track to your song.
8. Route the signal out of the mixer's balanced low impedance microphone outputs into two channels of the mic preamp of your choice,. Then out of the preamp and into two channels of your interface.
9. Record a stereo mix.
   NOTE: *Make sure the phantom power is turned OFF on the two Mic Preamp input channels you are using. You do not need phantom power.*
10. That's it. Enjoy!

Additional Information if using a Unit Audio Summing Mixer.

All odd channels of the Mill, Micro, and New Unit summing boxes default left on the stereo buss. All even channels default right. This is why you need to have the stereo output stems in your software mix, where your pans will be done. The Micro-Unit and New Unit models come with pan switches on channels 1 and 2. This allows you to put a single instrument or vocal on channels 1 and 2 by simply putting the toggle switch in the C (center) position.



Balanced ¼" TRS output to XLR input wiring diagram.

Why Would I Want an Analog Summing Mixer?

To add more punch and depth to your final stereo mix. It is just that simple! Most of us with small recording studios in our homes have probably gone through the same equipment scenarios, better microphones, preamps, software, plugins, countless upgrades in our computers, but we are still missing that polished, subtle end sound. If you are like me, putting a studio together on a budget does not leave enough room to buy an $800.00 or more summing mixer.

That is why I built this line of small passive summing mixers. I designed and built these passive mixers from a tested schematic. These mixers are to be used with 8 or 16 channel converters. If you are like many of us you may have a multi- channel converter and only use the inputs for tracking and maybe two outputs for playback. This leaves a lot of unused outputs. These outputs can run through the summing mixers balanced line inputs and then out of the two summing mixers balanced microphone level outputs into a microphone preamp for increased gain. You then run out of your preamp back into two channels of your DAW for your stereo mix. Pretty simple. The resulting sound is subtle, but definitely better. The stereo separation is better; the bass sounds are tighter and more defined. These mixers require no power to operate, no batteries, no wall connections. There is no AC line noise; they are simply transparent, and now at an affordable price.

More About The Unit Audio Analog Summing Mixers.

With modern DAW software, mixing within the computer has resulted in some great sounding recordings, but I have long been intrigued by the concept of analog summing. I was not prepared to pay $1,000.00 or more to test that theory, so I engineered and built my own. Then to test the theory, I set out to see if there was any difference in the mixed sound. Much to my amazement and pleasure, I did notice a subtle but very pleasing difference in the stereo separation and placement of the instruments compared to my In the Box mixes."

Is analog summing going to make your recordings sound like a Nashville studio with a billion dollars worth of equipment? Probably not, but you will notice a difference in your mixes using a Unit Audio summing mixer.

The Unit Audio summing mixers are pretty simple to set up. Once you have the mixer connected it can simply stay in your recording mix path. There really is no need to disconnect it. All you have to do is run cables out of your converter outputs to the Unit Audio summing mixer balanced line inputs. You then run cables out of the Unit Audio summing mixer balanced microphone level outputs into two channels of your microphone preamp. It is a good idea to have both preamp channels be alike. The microphone pre that you use dictates the final sound that you will get in your mix. The final stage of setting up is to come out of your microphone pre into two input channels

of your converter and mix to stereo in your DAW. Because of the passive circuit in the Unit Audio mixers, there will be about 30db of gain loss. This is why you need the mic pre at this stage. The really pricey summing mixers have make up gain built in which in turn creates a final mix of whatever coloring that particular circuit adds. By using your own preamps you can adjust your final mix sound by the character of each individual pre amp. It is pretty cool.

-Terry

Comments on Analog Summing

"So was there a difference? (Between Digital and Analog Summing) Yes, and my vocabulary is about to sound the same as everyone else's: the analog summed mix is wider, deeper, more musical, more spacious, etc... Especially apparent to my ears is the detail in the effects, the delays and reverbs. They seemed more audible in general, but also more spacious.

Allen Farmelo

"There is nothing necessarily wrong with digital summing (the digital equivalent of 'mixing' in analogue systems), and when performed correctly it is technically equal or superior to analogue mixing. However, many engineers and musicians enjoy the inherent imperfections associated with analogue signal processing, and that may be enough justification to warrant the use of analogue mixing systems in some circumstances."

Sound on Sound Technical Editor, Hugh Robjohns

More Comments on Analog Summing

"So is one (Digital summing vs. Analog Summing) better than the other? No, not drastically. Although they sound very similar there are some differences. The largest differences I hear are in the spatial effects like reverb and delays. Analog tends to sound slightly more natural and open to me, but make your own conclusions."

Robb Krysl, Pinnacle College

"The summation of multiple audio signals can be accomplished using digital or analog technologies. Digital summing and analog summing are not identical processes and, therefore, produce different results."

Listener preferences for analog and digital summing based on music genre

Audio Engineering Society Convention Paper October 2014

Information Sources For Analog Summing

Analog Summing Tutorial , Tape Op Magazine
http://tapeop.com/tutorials/49/analog-summing/

What is analog summing mixer comparing it to digital?
http://www.audiorecording.me/what-is-analog-summing-mixer-comparing-it-to-digital.html

How to Enhance a Mix with Saturation using a Unit Audio Milli-Unit analog summing mixer
https://www.youtube.com/watch?v=He7FRF03Gk0

What is Stem Mixing?: And How Can it Help Me? TapeOp Magazine Tutorial
http://tapeop.com/tutorials/87/what-stem-mixing/

SUMMING MIXERS

NASHVILLE, TN