Strata User Manual

Version: V1.2.0 (Revision A — 12 January 2026) For Strata V1.2.0

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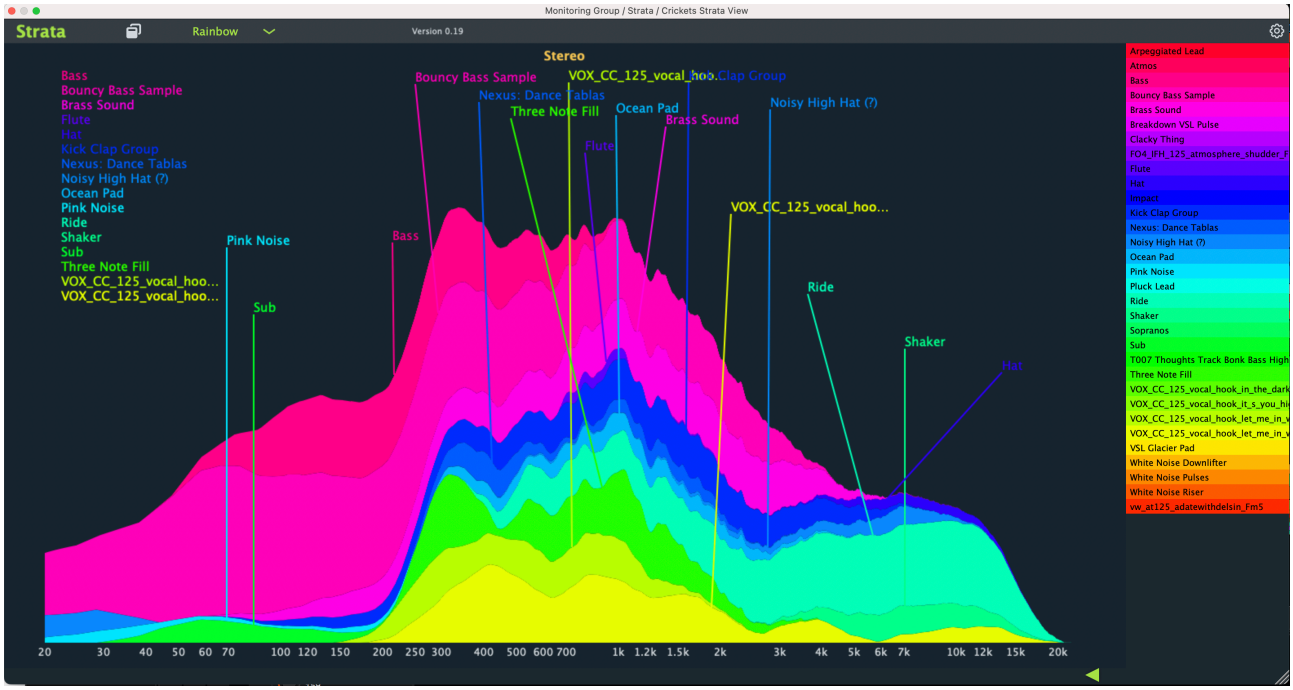

Product Summary

Strata is a software product for music producers that displays the frequency spectrum of the tracks of a song in a single view. Strata consists of two software plugins (Strata Track and Strata Vision) that run within Digital Audio Workstation (DAW) software products such as Ableton Live, Bitwig Studio, Cubase, FL Studio, Garage Band, Logic Pro, Pro Tools, Reaper, and Studio One.

Crickets Audio

The Strata software product is sold by Crickets Audio which is a trading name of the Australian company SwarmCritic Pty Ltd which owned and controlled by Ross Williams, the author of Strata.

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Australian Business Number (ABN)	54 159 515 376
Australian Company Number (ACN)	159 515 376

Strata is sold via the Crickets Audio website through the FastSpring merchant of record.

> https://fastspring.com/

At the time of writing, this is a one-person company and one-person product, so I have written this user manual in the first person. If you think that this is somehow unprofessional, recall that no one is going to read the user manual anyway, so it doesn't matter. :-)

Support is available at:

> https://www.cricketsaudio.com/support

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1 Introduction

Now, at last, you can see your song with just a glance!

Strata is monitoring software that shows you the frequency spectrum of all your tracks all at once. It's called "Strata" because it shows you your tracks layered on top of each other like geological strata.

Use Strata during mixing to instantly see the relative volumes of your tracks, and where they are in the frequency spectrum.

Strata is particularly useful for instantly detecting tracks that are in places in the frequency spectrum where they shouldn't be. In particular, you can instantly see tracks that are intruding too low and causing "mud" in your mix. It's also great for detecting synth tracks that are reaching too far up into the high-hat zone.

The moment you apply Strata to a song, you'll very likely see things that you did not expect, and will start fixing them.

But never mind all that! Strata is just plain colourful ***fun!*** Try it and see.

1.1 How To Use Strata

Strata comes in the form of *two* plugins (AAX, AU, VST3):

- Strata Track
- Strata Vision

Place an instance of Strata Track at the end of the plugin chain of each track in your song's DAW project. Place an instance of Strata Vision on its own track.

The instances of Strata Track communicate with the instance of Strata Vision (using the internet TCP protocol) enabling Strata Vision can show you the frequency spectrum of all your tracks in one graph.

1.2 Key Uses

- See a complete graphical overview of your song (at each point in time).
- Observe the relative volumes of tracks.
- Observe the relationship between kick, bass, and sub in the frequency spectrum.
- Detect tracks that are intruding into the low end or high end.
- Identify which tracks to boost or cut to boost or cut part of the spectrum.
- Identify tracks that are NOT meant to be sounding at various points in your song.

1.3 Strata Prime And Strata Standard

Strata now supports two licence grades:

Strata Prime: Monitor up to eight tracks in your project in one realm.

Strata Standard: Monitor unlimited tracks in your project in up to one hundred realms.

There is *no* other difference between the two grades.

The rest of this user manual will mostly ignore the distinction between the two grades as, in most contexts, there is no need to distinguish between them.

Note: The two different grades are *licensing* grades and so do not affect installation. You can upgrade from Prime to Standard without having to reinstall Strata — you just have to install the new licence by entering your Crickets Audio username and password into Strata Vision again.

Note: Strata Prime users monitoring at most eight tracks are unlikely to ever need more than one realm, so please do not be put off Strata Prime by the one-realm restriction. Realms are for power users with lots of tracks!

2 Features

2.1 Headline Features

- Drop Strata Track on your tracks and then look at the graph in Strata Vision. Simple!
- Displays the frequency spectrum of all your project's tracks in one graph.
- Engineered for simplicity, speed, and stability.
- Excellent for immediately detecting tracks that are intruding into the low end or high end.

2.2 Audio Technical Features

- Supports a frequency range of from 2Hz to 96kHz.
- Supports DAW sample rates of 44.1KHz, 48KHz, 96KHz, and 192KHz.
- Supports sample block sizes from 64 samples to 32768 samples.
- Supports the channels Stereo, Left, Right, Mid, and Side.
- Frequency resolution as low as 0.73Hz (at 65536 block size).
- Specify the slope of the graph in decibels per octave.

2.3 Graphical User Interface Features

- Automatically picks up your DAW project track colours in some DAWs.
- Re-sizeable window. Adjusts font sizes and other design elements depending on window size.
- Dropdown control panel allows you to make changes, but then allows you to hide the controls.
- A range of graphical themes to blend in graphically with all major DAWs.
- A range of track colour palettes.
- Custom track colours (if you can be bothered).
- Track List can be displayed on the left or right side, or made invisible.
- Grid: Specify whether you want vertical and/or horizontal lines on your graph.
- Zoom in on any frequency range within 2Hz to 96kHz.
- Automatic graph vertical scaling in accordance with the signal.
- Temporal smoothing from 0 seconds to 10 seconds.
- Spatial smoothing from 0% to 10% of the X axis.

2.4 Stability Features

- Low/no crashes. As Strata Track is added to each of your tracks, it has to be stable, and it is.

2.5 Automation Features

- Almost everything inside Strata is presented as a plugin parameter that can be automated inside your DAW.
- You can even automate crazy stuff such as the window size and colour theme!

2.6 Licensing Features

- You can try out Strata before purchasing it.
- No iLok! Register Strata by entering your Crickets Audio username and password.
- No subscriptions! Once you purchase Strata, it will work "forever" (subject to OS upgrades etc).
- No online licence check! If you take your laptop to the wilderness, Strata will still work.
- Free updates for five years.
- Use Strata on multiple computers for your own use or on one computer for multiple users.
- As you can see, I have strongly prioritised the experience of paying customers above foiling pirates.

2.7 Resource Use Features

- Low RAM footprint. As Strata Track is on each of your tracks, it has to be small, and it is.
- Low CPU footprint. As Strata Track is on each of your tracks, it has to be fast, and it is.
- Displays the amount of RAM it is using, so you can confirm Strata is not the problem.
- Displays the amount of CPU it is using, so you can confirm Strata is not the problem.

2.8 Miscellaneous Features

- Supports multiple "realms" so you can have multiple sets of tracks and views in the same DAW project.
- Strata Track provides gain and volume controls.

3 Technical Requirements

As a general rule, Strata will run in any DAW, running on macOS or Windows, that supports the AAX, AU, or VST3 plugin format. However, it's a bit more complicated than that. This section goes into this in more depth.

3.1 Supported CPUs

Processor	Supported?
Intel	Yes
Apple M1	Yes
Apple M2	Yes
Apple M3	Yes
Apple M4	Yes

3.2 Supported Operating Systems

Most music producers use desktop operating systems because they need desktop processing power to run DAWs with a zillion tracks. There are currently three main desktop operating system platforms: MacOS, Windows, and Linux.

I have decided to support MacOS and Windows as they both have huge market share in the music producer market. I have a Mac and a PC, but my mac is my primary working computer, so mac support will tend to get priority over Windows as I develop Strata on my mac and build it on Windows for each shipment. It also means that Windows-specific bugs are less likely to be spotted than Mac-specific bugs because I'm spending much more time running Strata on my mac than on my PC.

Linux is awesome and represents software freedom, and the Crickets Audio website runs on Linux (specifically Rocky Linux), but sadly represents a tiny proportion of the music producer market. As Strata is a new plugin, and I have to take some shortcuts to bring to market in a reasonable about of time, I have decided not to support Linux for the time being.

3.2.1 Supported macOS Versions

My policy is to support the latest two versions of macOS.

OS	Supported?

Mac OS X 10.0..10.7	No
OS X 10.8..10.11	No
macOS 10.12 (Sierra)	No
macOS 10.13 (High Sierra)	No
macOS 10.14 (Mojave)	No
macOS 10.15 (Catalina)	No
macOS 11 (Big Sur)	No
macOS 12 (Monterey)	No
macOS 13 (Ventura)	No
macOS 14 (Sonoma)	Supported
macOS 15 (Sequoia)	Supported

3.2.2 Supported Windows Versions

My policy is to support the latest two versions of Windows.

OS	**Supported?**
Windows Before Vista	No
Windows Vista	No
Windows 7	No
Windows 8	No
Windows 9	Does Not Exist
Windows 10	Supported
Windows 11	Supported

3.2.3 Supported Linux Versions

Crickets Audio Strata is not available for Linux.

OS	Supported?
Linux	No

3.3 Supported Plugin Formats

My policy is to support the minimum number of plugin formats required to run Strata on all the supported DAWs.

Format	Supported?
AAX	Supported
Audio Unit (AU)	Supported
CLAP	No
VST1	No
VST2	No
VST3	Supported

3.4 Supported DAWs

This table lists supported DAWs and the major version numbers that are supported. For example, if V10 is listed, this means that Strata will run in V10.1, V10.2, and so on. My policy is to support the two most recent major versions of each DAW. This doesn't mean that Strata won't work on older versions of the DAW. It just means that if you find that it doesn't work on an older version, I'm not going to pursue and resolve the problem.

Vendor	DAW	Versions	MacOS	Windows	Name?	Colours?
Bitwig	Bitwig Studio	V4, V5	Supported	Supported	Yes	Yes

Steinberg	Cubase	V12, V13	Supported	Supported	Yes	Yes
Image-Line	FL Studio	V20, V21/ V2024	Supported	Supported	Yes	Yes
Apple	Garage Band	09, V10	Supported	N/A	Yes	No
Ableton	Live	V11, V12	Supported	Supported	Yes	Yes
Apple	Logic Pro	V10, V11	Supported	N/A	Yes	No
Avid	Pro Tools	2024.x, 2025.x	Supported	Soon	Yes	No
Cockos	Reaper	V6, V7	Supported	Supported	Yes	Yes
Reason Studios	Reason	V12, V13	Supported	Supported	No	No
PreSonus	Studio One	V4, V5	Supported	Supported	No	No

Name: Strata Track sends its DAW track's name to Strata Vision on nearly all DAWs. However, Studio One does not provide the track name to Strata Track. To solve this problem, I have added a control panel called "Name" to Strata Track that allows you to enter the track name manually.

Colours: All DAWs can use all of Strata's built-in colour palettes to paint the tracks in the graph. However, when the user wants to automatically use the existing DAW project colours, I have been unable to extract automatically extract these colours from some DAWs.

Note: Instances of Strata Vision and Strata Track communicate with each other using TCP/IP rather than shared memory. This means that Bitwig users in the Plugin settings can quarantine each instance of Strata Track and Strata Vision individually if they wish. My recommendation is to mark Strata Vision as being hosted individually, but leave Strata Track in your preferred overall hosting mode.

3.5 Unsupported DAWs

This table lists unsupported DAWs.

Vendor	DAW	Reason	Will Be Supported?
Adobe	Audition	Niche	Maybe
BandLab	Cakewalk	Niche	Maybe
Acoustica	Mixcraft	Niche	Maybe

Steinberg	Nuendo	Niche	Maybe
SoundBridge	SoundBridge	Niche	Maybe
Steinberg	Wavelab	Niche	Maybe

Note: If your DAW is listed as unsupported, it does not necessarily mean that Strata will not work on that DAW, only that Crickets Audio is not guaranteeing that it will. You are welcome to try running Strata on unsupported DAWs.

Note: If your DAW is not listed on this page, and this enrages you, please let me know.

Note: Audition, Cakewalk, Mixcraft, Nuendo, SoundBridge, and Wavelab are unsupported because they each have a very small market share (niche), and Crickets Audio needs to focus on the major DAWs to get started.

3.6 Supported Natural Languages

At this time, only English is supported.

Language	Support
English	Supported
Other Languages	No

3.7 System Requirements

Resource	System Requirement	Typically Uses
RAM	4GB	200MB
Storage	1GB	100MB

Note: The RAM typical use figure is a conservative estimate of total RAM use for one instance of Strata Vision (typically 50MB of RAM per instance) and twenty instances of Strata Track (typically 5MB of RAM per instance).

4 Installation

4.1 macOS Installation

On the Mac, installation should take just a few minutes.

Your starting point should be a zip file that you have downloaded with a name such as:

strata_macos_v1.0.zip

Double click on the Zip file to unpack it. This should yield a folder that contains something like:

0README.txt
Strata User Manual V1.0.pdf
Strata Installer V1.0.pkg

Copy the user manual file somewhere where you can find it easily.

Double click on the .pkg file and follow the bouncing ball.

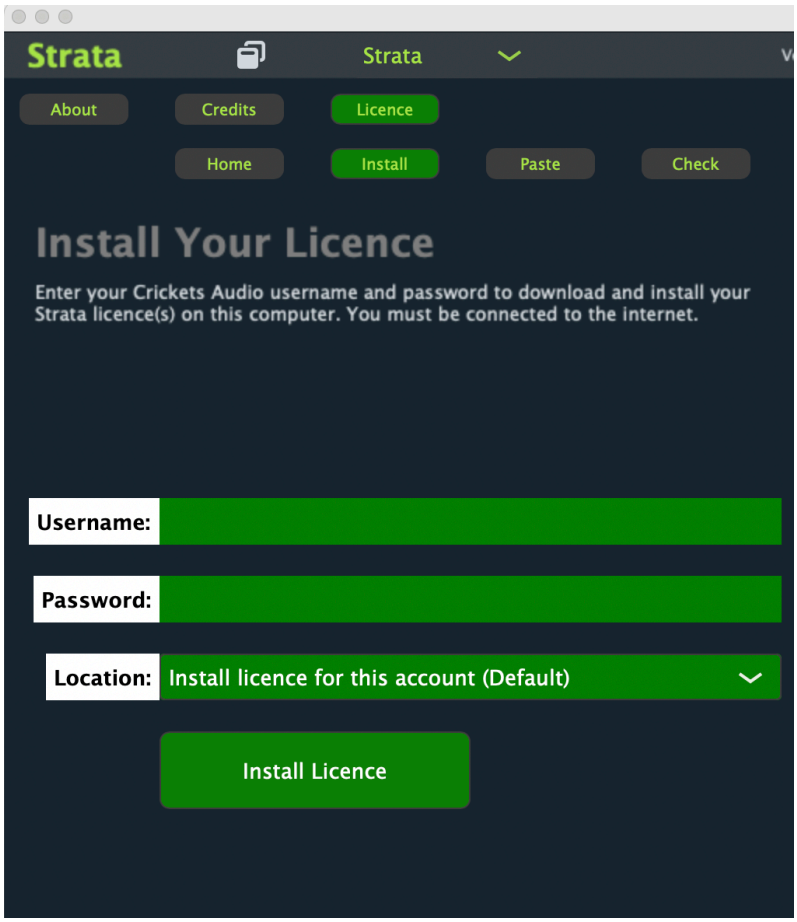
Strata distribution files for macOS are code signed under the Apple code signing framework.

Important: If macOS displays an alert saying something like "This software is from an unknown developer", then you are not installing a legitimate copy of Strata and should stop the installation process immediately!

Strata is now installed, and you should now be able to access Strata from your DAW. If you can't find Strata in your DAW's plugin list, restart your DAW. If you're new to all this, see the section "Finding The Strata Plugins Within Your DAW (For Noobs)" in this manual.

Once you've found Strata in you DAW, you must install a user licence certificate. When you first run Strata Vision, it will display the Licence Install page, prompting for your Crickets Audio username and password (see screenshot below). It also asks for whether you want to install the licence certificate in your own account for your own use, or whether you want to install it in a system directory for use by all accounts on the computer. The default personal installation is almost always best. If you're offline, you can paste the licence certificate text that was emailed to you using the Paste page.

Strata Track doesn't require a separate licence installation.



Once the licence is installed, the next step is to read the Quick Start Guide in the next chapter.

4.2 Windows Installation

On Windows, installation should take just a few minutes.

Your starting point should be a zip file that you have downloaded with a name such as:

strata_windows_v1.0.zip

Double click on the Zip file to unpack it. This should yield a folder containing something like the following files:

strata_windows_installer_v1.0.exe
Strata User Manual V1.0.pdf

Copy the user manual file somewhere where you can find it easily.

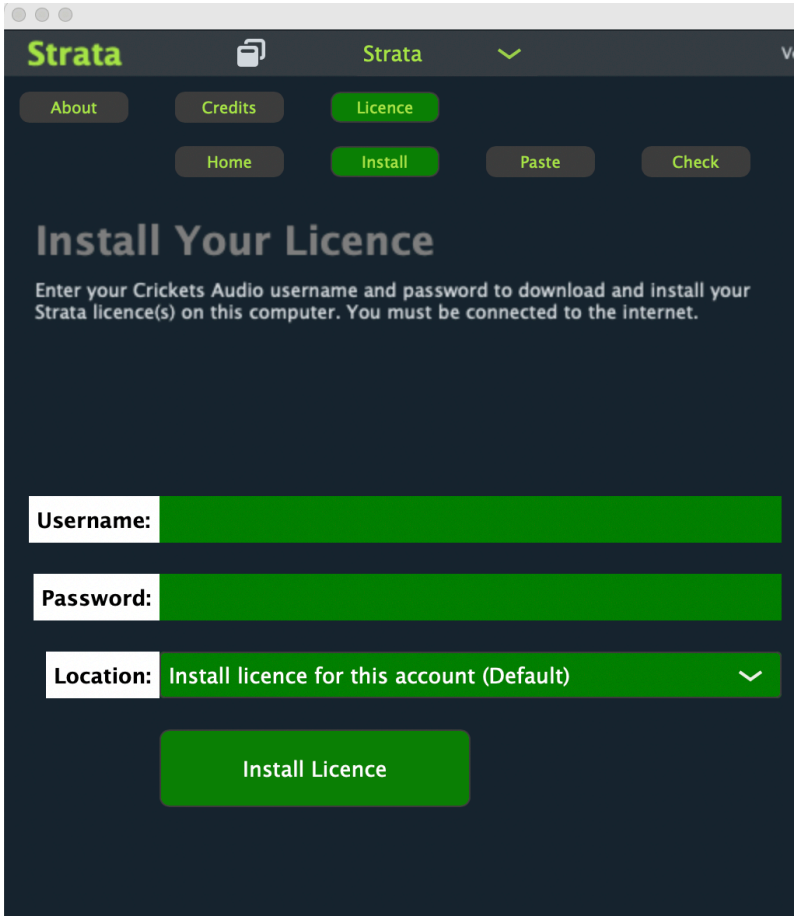
Double click on the .exe file and follow the bouncing ball.

Important: Strata distributions for Windows are code signed under the Windows code signing framework. If Windows displays an alert saying something like "This software is from an unknown developer", then you are not installing a legitimate copy of Strata and should stop the installation process immediately!

Strata is now installed, and you should now be able to access Strata from your DAW. If you can't find Strata in your DAW's plugin list, restart your DAW. If you're new to all this, see the section "Finding The Strata Plugins Within Your DAW (For Noobs)" in this manual.

Once you've found Strata in you DAW, you must install a user licence certificate. When you first run Strata Vision, it will display the Licence Install page, prompting for your Crickets Audio username and password (see screenshot below). It also asks for whether you want to install the licence certificate in your own account for your own use, or whether you want to install it in a system directory for use by all accounts on the computer. The default personal installation is almost always best. If you're offline, you can paste the licence certificate text that was emailed to you using the Paste page.

Strata Track doesn't require a separate licence installation.



Once the licence is installed, the next step is to read the Quick Start Guide in the next chapter.

4.3 Linux Installation (Not!)

Unfortunately, at this time, Strata does not support Linux. This might change in the future.

5 Quick Start Guide

5.1 Finding The Strata Plugins Within Your DAW (For Noobs)

If you're used to installing and using plugins, you won't need this section. Just get to it! This section is for new music producers who are unfamiliar with how to deploy a plugin once they've installed it.

Almost all DAWs only scan for new plugins when they are starting up, so, if your DAW was running when you installed Strata, ***quit and restart your DAW!*** You don't need to restart your computer, just the DAW. Then follow the following instructions.

Ableton: In Ableton, you can find the Strata plugins by opening the browser on the left side (Option-Command-B to open and close the browser pane) and going to "Plug-ins" and then "Audio Units" and then "Crickets Audio" and then they should be inside that folder. Just drag the plugins from there onto your tracks.

Bitwig: In Bitwig, you can add a plugin to a track by clicking on the track header on the left to reveal the track's plugin chain at the bottom of the window. Then click the "+" in that window. Then click on the asterisk icon on the left to show all plugins and then enter "Strata" in the the search box. You can then just double click on Strata Track or Strata Vision to add them to the track.

Cubase: In Cubase, click on the track's header on the left (making it light grey). Click on the little "e" in the header. A window will popup with a list of "Inserts" (plugins) down the left side. Click on an empty slot in the insert list and a second popup will appear. Click on "Analyzer" and then you should see Strata Track and Strata Vision. Double click on the one you want to add to the track.

FL Studio: In FL Studio, all plugins are applied to mixer channels. So open the mixer view and select the mixer channel to which you want to add Strata. Then click in a slot on the pane at the very right of the mixer channels. A window should pop up. Select "More plugins…" at the very top of the popup menu and another window should pop up with a huge list of plugins. Click on the "Find" text entry window at the bottom and type "Strata". You can then double click on Strata Track or Strata Vision to add it to the track. If you are on macOS and it gives you a choice of AU format or VST3 format, either is fine, but I would recommend VST3.

Garage Band: Click on your track's header on the left. This will show a panel at the bottom (with top buttons "Track Master Compare … Controls EQ"). You will see a section "Plug-ins". If it's closed, open it. On the right is a list of plugins on the track. Click in the grey square area. A menu should appear. Select "Audio Units" then "Crickets Audio" then choose "Strata Track" or "Strata Vision".

Logic Pro: In Logic Pro, click on a track's "Audio FX" button to add a plugin. Then go to "Audio Units" then "Crickets Audio" then "Strata Track" with Stereo or "Strata Vision" with stereo.

Pro Tools: In Pro Tools open a track. There will be slots with dots and slots with letters. Click on an empty dot slot and select Strata Track or Strata Vision.

Reaper: In Reaper, click on the green button marked “FX”. This will pop up the track’s plugin window. Click on “Add” in the bottom right corner. Then enter “Strata” in the filter box. Strata Track and Strata Vision should appear. Double click on the one you want to add.

Studio One: In the mixer window at the bottom, click on the track that you want to add Strata to. Click on the “+” at the top and then choose Crickets Audio and then either Strata Track or Strata Vision. If you are on macOS and you have a choice of AU or VST3, either will do, but I recommend VST3. Strata Track will startup with its control panel open on the Name view and you should immediately enter the track’s name there (Studio One doesn’t automatically tell Strata Track the track’s name so it has to be done manually).

I’ve had to learn all these DAWs to get Strata working on them all. So I’m DAW-lingual. :-)

5.2 Create A New Track And Add Strata Vision

Create a new track and put Strata Vision on the new track.

It doesn’t actually matter which track Strata Vision is on because it does not process any audio itself (apart from passing through and ignoring any audio it receives). It only receives spectrum data via TCP networking from instances of Strata Track. However, it’s a good idea to put Strata Vision on its own track because:

1. Depending on how many tracks you want to monitor, Strata Vision can sometimes use a significant amount of CPU. Some DAWs (such as Ableton) strive to assign all the plugins on each track onto a single CPU core. This means that if you put Strata Vision on your master chain, the DAW is likely to allocate it to an already overloaded CPU core. It’s far better to put Strata Vision on its own track so that it can get its own dedicated CPU core and not impact the other signal chains.

2. Having Strata Vision on its own track means that you can always find Strata Vision quickly. I usually put the Strata Vision track near the top of the tracks list and colour the track red so I can always find it quickly.

Strata Vision will complain if it is put on the Master/Main track in your project.

So create a new dedicated track in your project specifically for Strata Vision. I recommend that you name the track “Strata” or “Strata Vision” and put it near the top or bottom of your project’s track list so you can find it quickly.

Open Strata Vision and you should see a window with an empty graph in it.

Warning: ***Don’t add more than one instance of Strata Vision to your project!*** The world won’t end if you do, but it might be very confusing, as the Strata Track instances will attempt to connect to two different Strata Vision instances which might be fighting for TCP ports. Perhaps future

versions will notify you if there is more than one instance of Strata Vision running. For now, just be careful.

5.3 Licence Certificate Installation

Once you've installed Strata Vision, it will complain about not having a user licence certificate. Your user licence is the legal licence to use Strata that you receive when you make a purchase. The licence certificate is a block of XML text that Strata needs to see on your computer to run.

To install the licence certificate, enter you Crickets Audio username and password into Strata Vision. Unless you have good reason to do otherwise, use the default "Personal" mode. Strata will talk to the Crickets Audio website, retrieve your licence certificate, write it to a file on your computer, and then you're good to go.

5.4 Add Strata Track To Each Track You Want To Monitor

Add the **Strata Track** plugin to the *end* of the plugin chain of a few tracks. *Don't worry! The plugin does not affect the signal!*

If you have Strata Vision open, and you have set your project playing, then when you add Strata Track to a track, after a few seconds, it should appear in the track list on the side of the Strata Vision window.

5.5 What You Are Seeing

The Strata Vision graph shows the frequency spectrum of each track (with Strata Track on it) rendered in decibels and layered on top of each other so that they look like geological strata.

The tracks are stacked ***on top of each other***. They are ***not*** in front of each other, or behind each other. The baseline of each track is the track underneath it, not the bottom of the graph.

5.6 The Control Panel

If you click on the triangle at the bottom right corner of the spectrum pane, a control panel will open underneath the spectrum graph. The control panel pane has several different views. You can switch between views by pressing the left and right triangle buttons on the bottom left and right of the control panel. You can go back to the home panel by pressing the little house icon at the middle bottom.

Each control panel view allows you to modify one aspect of the plugin's configuration and graph view.

If you want to controls to disappear so that you can focus on the graph, hit the open/close triangle again.

5.7 Recommendation: Deploy Strata In An *Old* Project

To truly get the feel for Strata, I suggest that you deploy Strata within one of your ***existing projects***, not just deploy it next time you create a new project. So grab one of your favourite old projects and use the rapid deployment guide (below) to rapidly drop Strata Track on all the tracks in your project. Create a new track and put Strata Vision on it and then ***play your song*** from start to finish. You will be able to see each track of your song animated in the graph and see what's going on throughout the whole song.

Often this is surprising. You might discover that a track is playing throughout the breakdown that you didn't think was active then! You might discover that your high hats have presence down below 100Hz! You might discover that five of your instruments are all fighting each other in the midrange during part of the song.

5.8 Technical Support

Technical support is available through the Crickets Audio website at:

http://www.cricketsaudio.com/support

where you can create a "conversation" to:

- Ask for help with a technical problem.
- Ask a question about the product.
- Tell me how awesome Strata.
- Express your rage.
- Suggest a new feature.
- Report a bug.

- Report an error in this manual.

Or anything else.

I am aware that filling in a web form feels less personal than just sending an email, but the “conversation” framework means that I can track everything and nothing will be missed or end up in a spam folder.

6 Themes

Both Strata Track and Strata Vision allow you to choose a graphical design theme. This section provides a description of all the available themes.

It is amusing to me that Strata has themes before Bitwig does. Probably GTA6 will be released before Bitwig gets themes. :-)

6.1 Default Theme

Strata: This is the default theme. It is currently set to be the same as the FL Studio theme.

6.2 DAW-Based Themes

Bitwig: This theme seeks to make Strata feel at home with the graphic design of the Bitwig DAW. As you might expect, there's a lot of orange.

FL Studio: This theme seeks to make Strata feel at home with the graphic design of the FL Studio DAW. I like this theme so much that I've made it the default theme (under the name Strata).

Logic Pro: This theme seeks to make Strata feel at home with the graphic design of the Bitwig DAW. The theme paints the graph background a lovely blue.

Cubase: This theme seeks to make Strata feel at home with the graphic design of the Cubase DAW. It features a refined grey background with orange highlights.

Reaper: This theme seeks to make Strata feel at home with the graphic design of the Reaper DAW. It's all about black and white here!

Ableton is somewhat of a special case because it has a range of its own themes. Rather than create themes for the combinatoric explosion of graphical options it provides, I have chosen to create just the following four themes to make Strata feel at home in four different Ableton Live theme styles.

Live Default Dark: This theme seeks to make Strata feel at home with the graphic design of the Ableton DAW in one of its colour modes.

Live Default Light: This theme seeks to make Strata feel at home with the graphic design of the Ableton DAW in one of its colour modes.

Live Classic Medium Dark: This theme seeks to make Strata feel at home with the graphic design of the Ableton DAW in one of its colour modes.

Live Classic Medium Light: This theme seeks to make Strata feel at home with the graphic design of the Ableton DAW in one of its colour modes.

6.3 Inspiring Plugin-Based Themes

FabFiller: This theme is inspired by the graphic design of the excellent FabFilter plugins.

iZotope: This theme is inspired by the graphic design of the excellent iZotope plugins.

6.4 Miscellaneous Themes

Arctic: The theme to use if you like polar bears and snow. You might need your sunglasses though!

Arctic With Sunglasses: The theme to use if you like polar bears and snow. However, this time you remembered your sunglasses.

Australian Cigarette Packet: Australian Federal Government bureaucrats found the colour that humans most hate and then mandated it for all cigarette packets. LOL. Enjoy this theme. Not! :-)

Green Screen: It occurred to me that some people might want to use their own background in the spectrum when making social media videos, so I provided this green screen theme. However, I have not yet got around to adding a feature to remove green from the actual colour palettes.

6.5 Custom Themes (Not!)

Perhaps a future version of Strata will allow you to make your own themes. But not today.

7 Colour Palettes

Strata provides a range of predefined colour palettes for you to choose from. I would have liked to provide even more, but shipping the product was more important. This said, I think I've included enough to make Strata V1.0.0 lots of fun!

Reminder: You can change the colour palette using the menu in the Strata Vision header!

7.1 Strata Default Palette

Strata's default colour palette is a bright rainbow. It's brash, but it's probably the best way to ensure that all the tracks are distinguishable from each other.

> **Strata:** This is the default colour palette (except for some DAWs where DAW colours are default). It's the same as the Rainbow colour palette.
>
> **Rainbow:** This colour palette allocates the colours of the rainbow across the set of tracks.

7.2 Seasons Palettes

I wanted to show off Strata's colour palette feature, so I created a colour palette for each of the four seasons. If your project has more than 100 tracks, the colours will start being reused.

> **Summer:** This is a palette of 100 summer colours.
>
> **Winter:** This is a palette of 100 winter colours.
>
> **Autumn:** This is a palette of 100 autumn colours
>
> **Spring:** This is a palette of 100 spring colours.

I am not entirely happy with these seasonal colour palettes. I might alter the colours in a future version of Strata.

7.3 Monochromatic Palettes

For some reason, I created a bunch of monochromatic colour palettes, essentially one for each colour in the rainbow (ROYGB[I]V).. I can't remember why. It seems like a daft thing to do because you can't clearly tell the tracks apart, but the thing is that they look amazing!

> **Fireplace:** Red. OMG! When you play your song, it looks like a fire is burning in a fireplace with old hot coals!
>
> **Solaris:** Orange. I don't like this one much. It looks a bit like the desert is having an earthquake.
>
> **Sunflower:** Yellow. It's OK I guess.
>
> **Forest:** Green. So forest! So lush! I just want to wander in and hug a squirrel.
>
> **Ocean:** Blue. OMG! The deep dark ocean is a bit scary. Maybe I should have called this one "Jaws".

Amethyst: Violet. I don't know what this is, but it's beautiful.

From any practical point of view, I should probably delete all these monochromatic palettes because they make it hard to distinguish one track from another. But they look so cool that I just couldn't bring myself to do it. There's probably someone that wants to use one of these palettes to animate their song in a social media video and doesn't care about the tracks themselves. :-) So the monochromatic palettes are here to stay.

7.4 Other Palettes

Unicorn: If you have a small daughter, you will be very familiar with this kind of colour palette. :-)

Solla Sollew: I decided that I should include a colour palette of light bright-ish colours and created this one. When I started using it, I felt that somehow I "recognised it". It took me a while to work it out, but I eventually realised that it reminded me of the cheerful colours of the city of Solla Sollew in the Dr Suess children's story book *I Had Trouble Getting To Solla Sollew*. So I named it after that.

7.5 The Future Of Strata Palettes

Strata colour palettes are so much fun that it's obvious that I should provide more predefined palettes, and that I should provide some way for users to make their own colour palettes. Perhaps graphic designers should be able to create and sell colour palettes for Strata. The only reason I didn't implement all this is because, after about four years of delays, it was more important to actually bring the product to market. :-)

8. General Usage Notes

8.1 Track Naming And Ordering

The Strata Vision plugin will display a list of tracks on which the Strata Track plugin has been deployed. Unfortunately, while the DAW/plugin interface allows the DAW to communicate to Strata Track or Strata Vision the names and colours of the tracks in the project, the DAW/plugin interface does not allow the DAW to communicate to Strata Track or Strata Vision the number or order of the tracks within the DAW, so Strata Vision has to determine for itself in what order to display the tracks.

Strata Vision sorts the tracks by track name in alphabetical order. If, however, there are decimal digits at the start of track names, Strata Vision sorts first by the number the digits form, and second by the rest of the name. So for example, tracks named as follows would be sorted as shown:

Bass
Kick
Snare

and tracks named as follows would be sorted as shown:

1 Snare
2 Bass
3 Kick

It doesn't matter if the numbers have leading zeros. Strata will still sort them correctly as numbers. Thus, in the following list, Strata will put "03 Kick" after the other tracks because "03" is being treated as the number "3". If it were treated alphabetically, then "03 Kick" would appear first because "03 Kick" is less than "1 Snare" alphabetically (because "0" is less than "1" alphabetically).

1 Snare
2 Bass
03 Kick

This number feature means that you can determine what order you want tracks to appear in Strata just by putting a number at the start of each track name in your DAW.

The number sorting feature is primarily designed to support Ableton. Ableton allows you to insert a # character within your track name to insert the number of the track (within the DAW) in the track name. So in Ableton, if you name your tracks:

Snare
Bass
Kick

The track names will appear as:

1 Snare
2 Bass
3 Kick

and Strata can use these numbers to display the tracks in the same order that you placed them within Ableton.

I wish that Bitwig and other DAWs had this handy # feature.

As Ableton sends Strata Track both the track names and track colours, if you include a # at the start of each track name in Ableton and give all the tracks a different colour, and turn on DAW colouring, the list of tracks in Strata Vision will look almost identical to the list of tracks in Ableton. This was done completely on purpose, and Strata even uses the same track height as Ableton so that you can line them up visually. This makes Strata almost feel like part of Ableton!

8.2 The Fader Problem (Important! Read This!)

When you add the Strata Track plugin to a track, the Strata Track plugin analyses what it is "hearing" and sends the result to the Strata Vision plugin which displays it together with the spectrums of all the other tracks reporting to it.

However, what it is "hearing" is ***not*** the final output of the track that is sent to the master or the return channels. It it is what the Strata Track plugin is hearing. When you decide to add Strata Track to a channel, you should always put it at the very end of the plugin chain so that it is hearing what the track is actually producing.

There is one trap though. If you set the volume (gain) of a track in your DAW to something other than 0dB, then the Strata Track will misrepresent the volume of the track in the final graph. For example, if Strata Track is at the end of a track chain that has a signal of -6dB, then Strata Track will report a signal strength of -6dB. But if you have the track volume set to -3dB, then a signal of -9dB will be sent to the master track. This will mean that the Strata Vision plugin will be displaying the wrong signal strength for the track.

This is such an important problem for Strata that I've devoted a whole section ("The Fader Problem") to the problem later in the manual. Be sure to read it at some stage.

8.3 The Top Line Is NOT Your Song's Frequency Spectrum!

The graph shows each track's frequency spectrum rendered in decibels above a decibel baseline (which you can set in the Amplitude control panel). This means that the height of a track's strata in the graph at each point in the frequency spectrum will be proportion to its decibel loudness (less the Min dB parameter). This is great for comparing the loudness of the tracks in your song. However, it can be super confusing too…

Take a look at this web page:

https://amesweb.info/Vibration/Decibel-Addition-Subtraction.aspx

The page contains a decibel calculator so that you can calculate how loud a signal will be if two or more signals of specified decibel loudness are mixed together. Try a few additions. Here are some examples:

-3db + -3dB ~= 0dB

-6dB + -6dB ~= -3dB

-10db + -10dB ~= -7dB

-20db + -20dB ~= -17dB

-20db + -20dB + -20dB = -15.24dB

Confused yet? Well, it's not so hard to understand what's going on. Decibels is a ***logarithmic*** (or power) scale so values on this scale don't sum *linearly*. The reason why we use this logarithmic scale for audio is because our ears are able to hear sounds of several orders of magnitude of volume from the slightest pin drop to a jet engine.

What does this mean for our graph though?

Well, the graph plots the decibel level of each track (from a baseline Min dB) at each frequency, and the decibels don't add up linearly. This means that if one frequency of your spectrum has several tracks active, and another frequency of your spectrum has just two tracks active, the frequency with several tracks will be higher in the graph than the frequency with just two tracks ***even if the decibel level of the sum of each set of tracks is the same!***

This means that the top of the strata graph is NOT the overall frequency spectrum of your song. Rather it is the simple sum of the decibel levels of the active tracks.

This graph has the advantage of allowing you to compare the volume of your tracks at each point in the frequency spectrum.

For more information on this issue, see the section "Decibel Maths" later in this manual.

8.4 Apply It To Mutually Exclusive Tracks

If you drop Strata Track on *all* your tracks *and* your group tracks, then there's going to be an overlap. You are very welcome to do it, but you'll see strata in the graph for tracks X, Y, and Z in a group and G for the group itself, and that might be confusing to you.

So it's best practice to apply Strata Track to ***mutually exclusive*** *tracks*.

One simple way to do this is to apply Strata Track only to your track **groups**. So long as every track is included in a group, this should work fine. Similarly, you could apply Strata Track to every top-level track, whether it is an individual track or a group.

Another way to go is to apply Strata Track to every track except for group tracks. Then you'll get the real detail of your song. This can work well, but can also be a bit confusing if you have lots of tracks. One can find oneself referring to the track colours all the time to see which track is which.

8.5 Track Names

Each instance of Strata Track transmits a track name to Strata Vision, and it is these names that Strata Vision displays in its graph. Strata Vision makes no attempt to figure out track names itself (the VST3 interface does not permit it to).

By default, Strata Track transmits the name of the DAW track (it is on) to Strata Vision. This is almost always the most sensible intuitive thing to do. However, there are two exceptions:

> **Studio One:** Unlike all other DAWs, Studio One does not tell Strata Track what the track name is. So in Strata Track within Studio One, you have to go to the Strata Track Name control panel view and enter a track name manually.
>
> **Multiple Instances Of Strata Track On One Track:** In normal operation, you'd just put an instance of Strata Track at the end of each track's plugin chain. However, there's no rule that says that you can't put multiple instances of Strata Track within a track's plugin chain. In fact there may be good reason for doing so. For example, you might wish to see the effect that the plugins on your track are having by placing an instance of Strata Track at the beginning AND end of the plugin chain. Then you'll get two strata in the Strata Vision graph showing you the before and after spectrums. In this case though, if you use default naming, both instances of Strata Track will send the track name to Strata Vision and you won't be able to tell the difference (apart form the signal shape) between the two strata in the graph. So in this case, you might want to go to the Name control panel view in each instance of Strata Track and name them (say) "Before" and "After".

For these and other reasons, Strata Track allows you to specify the name manually. For completeness, I have also added a naming option where Strata Track will send the DAW's *custom name* of the plugin instance instead of the track name. So you have three naming options: Track Name, Custom DAW Plugin Instance Name, and Manual Name.

8.6 Track Colours

Just as Strata Track sends a track name to Strata Vision, it also sends a track colour which is the colour of the track within your DAW project. Strata Vision uses that colour in its strata graph if you have selected the DAW colour scheme.

Most DAWs tell Strata Track what the track colour is, but three DAWs don't: Garage Band, Logic Pro, and Studio One. In this DAWs, Strata Track just sends the colour red to Strata Vision. So if you are using these DAWs, and you select the DAW colour scheme, all your tracks will be red. If you don't like this, write to Apple or Presonus, not to me. :-)

Strata Vision provides a whole bunch of predefined colour palettes which you can access using the colour palette menu in the Strata Vision header or the Palette control panel view. You can also create a custom colour palette, and these colours will survive a DAW project save.

8.7 Managing CPU Usage

Strata is designed to distribute its CPU load as widely as it can across your CPU's cores. It achieves this by performing its Fast Fourier Transform (FFT) calculation in the Strata Track plugin rather than the Strata Vision plugin. This means that the Strata CPU load is mostly distributed across all your project's tracks rather than on just Strata Vision's track. This is a good thing because DAWs typically attempt to assign each track to a different CPU core (if they are available). So if the DAW is doing a good job of assigning tracks to cores, then all the Strata Track plugins (which are performing the FFT analysis) will be carried along for the ride and will (broadly) be assigned different CPU cores.

This aspect of Strata's architecture might backfire in the case where you have one track that has been assigned its own core, but has lots of plugins on it and is currently sitting on 100% CPU load! In this case, adding Strata Track to the track will tip the track over the 100% CPU limit and if the DAW isn't smart enough to split the track's plugin chain over two cores (and a lot of DAWs are *not* that smart), then the DAW will start to stutter. It's possible that this problem (if it matters at all in practice) could be fixed in a later version of Strata by allowing the user to specify that the particular instance of Strata Track should send samples to Strata Vision for FFT analysis rather than the result of the FFT analysis. This would transfer most of the CPU load from the Strata Track instance to the Strata Vision instance. However, CPUs are getting faster, and, on my old Intel iMac, Strata Track only used 1% of a CPU core, so it is quite possible that production use of Strata will show that this concern is not an issue in practice and the feature will never be added.

Assuming that the Strata Track plugins won't overload their track's assigned CPU cores, that leaves just the central Strata Vision plugin to cause CPU problems. Strata Vision doesn't have to do an FFT analysis, but it does have to receive FFT spectrums and plot perhaps as many as one hundred different tracks. Because of this networking and graph display task, Strata Vision can use as much as 40% of a CPU core.

The most important thing you can do to reduce the impact of Strata Vision's CPU usage is to place Strata Vision on its own dedicated track. If you do this, with luck, your DAW will assign it its own CPU core and it probably won't hit 100% use of that core.

If giving Strata Vision its own track doesn't solve the problem, the next thing you can do is remove Strata Track from every track in your project and only put it on each track ***group*** in your project. This is generally a good idea anyway as looking at a graph of a hundred tracks can sometimes be a bit confusing, but it can certainly help with CPU too.

For example, instead of adding Strata Track to every FX track in your FX group, just add it to the FX group track itself. If, at a later point, you want to dive deeper into what is going on within the FX group, you could add Strata Track to each track within the FX group. Remember also that instead of deleting Strata Track from tracks, you can just turn the Strata Track plugin off using the DAW's on/off control.

I have also found that, in my DAW projects, it is frequently the case that I have several different vocal tracks, each with its own different vocal sample and plugin chain, but never sounding at the same time. In this case, I don't put an instance of Strata Track on each vocal track, but rather just place one instance of Strata Track on the Vocal Group. This is simpler, uses less CPU, and it's usually pretty obvious what's going on.

8.8 DAW Sample Rate

Strata currently supports the following DAW sample rates (in samples per second).

44,100
48,000
88,200
96,000
176,400
192,000

If you change the sample rate within your DAW, there is no need to tell Strata; Strata will automatically adjust.

Note: Changing the sample rate can change the blocks-per-second and frequency resolution of Strata. If you change your DAW's sample rate, you might wish to visit the Block view of the control panel and ensure that you are happy with the values you see there. If you are not happy, change the block size.

8.9 Block Size

Each instance of Strata Track organises the incoming audio signal samples into blocks and performs the Fast Fourier Transform on each block. You can specify the size of these blocks using the Block Size control panel. Strata currently supports the following block sizes (in samples) for analysing the signal:

64
128
256
512
1024
2048
4096
8192
16384
32768
65536

Important: *This is NOT the same as your DAW's block size! The DAW has its own block size and Strata has its own block size and they are completely independent!*

The block size can be set in the Strata Vision plugin in the Block Size control panel. It defaults to 4096. In choosing the block size, there is a tradeoff between graph updates per second and frequency resolution. For example, if the DAW has a sample rate of 44.1KHz, then a block size of 2048 will allow the graph to be updated about 20 times per second, but will only provide a frequency resolution of 20Hz. In contrast, a block size of 16384 (again at 44.1KHz) will allow the graph to be updated about four times a second, but will provide a frequency resolution of about

3Hz, which provides a much more detailed view of the low end. So the tradeoff is between spectral and temporal resolution.

8.10 Strata Track/Strata Vision Disconnection

Once a Strata Track plugin instance has managed to connect to a Strata Vision plugin instance, the connection should be stable and last indefinitely (so long as the DAW doesn't crash). However, it's possible for something can go wrong, and such a connection can fail. If this happens, the Strata Vision plugin will gracefully drop the connection and keep going, and the Strata Track plugin will gracefully drop the connection and keep going.

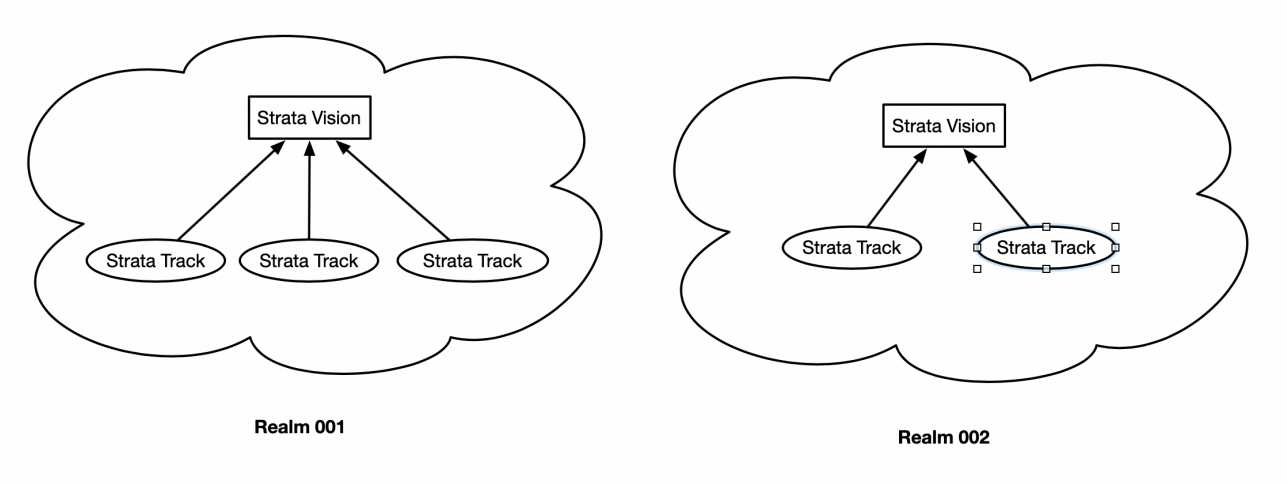
Once the connection has dropped, the Strata Track plugin will attempt to reconnect to the Strata Vision plugin. For complicated technical reasons related to TCP port timeout windows, this might take as long as ten seconds. So if you see a track disappear from the Strata Vision track list, be a little patient before deciding that it has failed and that you must delete and restart Strata or your DAW. It will very likely reappear in the few seconds.

Note: If you assign a custom colour to a track in Strata Vision, Strata Vision will not forget the custom colour if the corresponding instance of Strata Track disconnects and reconnects.

8.11 Using Realms

Note: Strata Prime allows the use of only one realm (realm 001).

A realm is like a little world within which one or more instances of Strata Track and Strata Vision communicate. Each instance of Strata Track and Strata Vision can be in only one realm at any moment in time. You can change an instance's realm using the realm control panel.



There are one hundred realms. The realms are numbered 001 through 100. The default realm is 001. Most of the time, you won't even need to think about, or use, realms, but if you do, you probably will need only two or three realms. The diagram above shows how instances of Strata Track and Strata Vision can be organised into separate realms.

Each realm can have as many Strata Track instances as you like, but only one instance of Strata Vision. Furthermore, it's perfectly acceptable to place more than one instance of Strata Track on the same track in different realms if you want to see that track in two different Strata Vision

instances. It's actually even acceptable to place two instances of Strata Track on the same track in the same realm! The track will simply appear twice in Strata Vision. This might be useful if you want to observe the effect of a plugin on an audio signal, as you will be able to see the "before" and "after" spectrum together. Furthermore, Strata Track allows you to set the Strata Vision display name of the track through it's Name control panel. So you could name the before track "Before" and the after track "After"!

What are realms good for? Well, one use is to allow you to dig down into groups of tracks within your DAW. I find that if I have a song that has a large number of tracks (e.g. 100), I don't want them all showing up in Strata Vision as it just gets too messy. So instead, I only place Strata Vision on each track group within the project. There might be just ten track groups within a hundred-track project. This usually works very well. However, sometimes when I notice that a group is causing a problem within the frequency spectrum, I want to take a look at the tracks within the group to see which one is the culprit. This can be done by placing an instance of Strata Track on each track within the group, and assigning them all to a new realm, and then creating one new instance of Strata Vision (somewhere) that views that realm. This allows me to view just the tracks in the group.

So, for example, you could have one Strata realm for all the groups in your project, and one Strata realm for each group with one instance of Strata Vision for each realm.

But what about CPU use! Placing a Strata Track instance on every track in a project might work fine, or it might load up your CPU so your DAW starts to stutter. For this reason, Strata Vision allows you to turn off all the Strata Track instances within the realm with one click (the "Stop" button) in the Run/Stop control panel view.

Another way to use realms is to create a realm for each group of tracks in your project (as above), but use just ***one*** instance of Strata Vision, and simply change its realm to view the different track groups!

Let me know if you discover another use for realms!

Technical Note: Realm one uses the ten TCP ports from 61180 to 61189 inclusive. Realm one uses the ten TCP ports from 61190 to 61199 inclusive. And so on up to realm 100.

8.12 Using Strata In Multiple DAWs Simultaneously

Instances of Strata Track and Strata Vision communicate with each other using the TCP network protocol (within your computer) rather than by using shared memory (or pipes). This means that there is nothing stopping you from using Strata across multiple DAWs simultaneously! For example, you could have a Logic Pro session open with ten tracks each running Strata Track. If you also had Ableton open with five tracks each running Strata Track and one track running Strata Vision, then the instance of Strata Vision would be able to see all fifteen tracks!

There is nothing stopping you from using realms with multiple DAWs too. In the above example, if the Logic Pro ten tracks were in Realm 001 and the Ableton tracks were in Realm 002, then an instance of Strata Vision in either DAW could view either group of tracks by switching between Realm 001 and Realm 002. You could also have two instances of Strata Vision within Ableton, one

set to Realm 001 and the other set to Realm 002. Then you could display both groups of tracks at the same time.

The main constraint here is that you cannot have more than one instance of Strata Vision within the same realm.

One reason why I chose to connect Strata Vision with Strata Track using TCP (rather than shared memory or local pipes) is because I could see the potential for Strata to be used in the future across different computers. This is not supported in the current version, but in a future version, you might be able to run Strata Vision on one computer and observe tracks on several other computers. This might be useful in a teaching environment. I should note that you could actually do this using the current version if you set up the right TCP tunnelling (e.g. using stunnel).

8.13 Resizing The Plugin Window

Strata Vision can be (within limits) resized to any size in both the X and Y dimensions! I am aware that it can be convenient to have several monitoring plugins open at the same time jigsawed together on the screen when analysing a song. To this end, I have taken some care to engineer Strata Vision so that when you reduce the window in size, everything shrinks smartly: the fonts shrink, and the axis labels are reduced in number. There is a minimum X and Y size so that you can't make the plugin window so small that it's hard to find on your screen. The main constraint on the plugin window size is that the width has to be quite wide if the control panel is open. If you want to make the plugin window small, you have to close the control panel first.

9 Operating System-Specific Notes

9.1 macOS

There are currently no issues that are specific to macOS.

9.2 Windows

There are currently no issues that are specific to Windows.

10 DAW-Specific Notes

10.1 Ableton Live

Ableton was my first DAW. I've since moved to Bitwig (mainly for sandboxing and support for third-party MIDI-to-MIDI plugins), but am still very fond of Ableton. In fact, Strata was originally created when I was using Ableton, and you can see this in the track list on one side of Strata whose graphic design closely matches that of Ableton. I wanted Ableton Strata users to be able to line up the Strata track list against the Ableton track list to be able to immediately visually check that all the Ableton tracks are present in Strata!

Another feature that directly supports Ableton is Ableton track numbering. Ableton allows you to number your tracks automatically by placing a # at the start of each track name. This yields track names like "1 Kick", "2 Bass" and so on. In its track list, Strata sorts the tracks by name, but I have particularly coded Strata to support Ableton track numbers by sorting any leading number numerically rather than lexicographically. This means that, for example, the track "10 Snare" will appear between tracks "9 Shaker" and "11 Ride" rather than after "1 Kick".

Ableton is the only DAW that has its track "headers" on the right side of the screen. Strata supports Ableton by allowing you to place the track list on the left or right side of its window, and, in fact, defaults to the right side for Ableton. This allows you to move the Strata Vision window across so it is next to the Ableton track list to visually compare the two lists to look for tracks you've forgotten to put Strata Track on.

10.2 Bitwig Studio

Bitwig is my primary DAW, and I use Strata in Bitwig for all my music projects. So you'll likely find that Strata works best in Bitwig than any other DAW because the moment any problem arises with Bitwig (at least on macOS), I'm going to notice it and fix it immediately. I love Bitwig!

10.3 Cubase

Strata works fine on Cubase.

10.4 FL Studio

Strata works fine on FL Studio.

10.5 Garage Band

Garage Band is supported even though it's a minor DAW, because, why not? It's technically similar to Logic Pro, so it's unlikely to yield technical problems that are not already associated with Logic Pro. I have tested Strata in Garage Band, and it works fine except that, like Logic Pro, it does not communicate the track colours to Strata Track. Happily, Strata provides a wide range of colour palettes to choose from, and if you really want to use the colours in your project in Garage Band, you can set the colour of each track manually in Strata to the same colour.

10.6 Logic Pro

Strata works well in Logic Pro except for track colours. Logic Pro makes life difficult for Strata by not communicating the track colours. There seems to be no way around this problem, so Logic Pro users will be unable to use the “DAW” colour palette setting. Happily, Strata provides a wide range of colour palettes to choose from, and if you really want to use the colours in your project in Logic Pro, you can set the colour of each track manually in Strata to the same colour.

10.7 Pro Tools

Strata works well in Pro Tools except for the track colours. Pro Tools makes life difficult for Strata by not communicating the track colours. There seems to be no way around this problem, so Pro Tools users will be unable to use the “DAW” colour palette setting. Happily, Strata provides a wide range of colour palettes to choose from, and if you really want to use the colours in your project in Logic Pro, you can set the colour of each track manually in Strata to the same colour.

10.8 Reaper

Strata works fine in Reaper. One thing I would like to mention though is that you can tell Reaper to “float” a particular plugin in its own separate window. This can be useful for Strata Vision when you have two screens and want to put Strata Vision on one of them.

10.9 Studio One

Studio One is problematic for Strata because Studio One will not provide to Strata any of the track names or colours! This seems to be a problem with Studio One that is not specific to Strata.

The problem of Studio One not communicating track colours is not a very serious problem because Strata provides a wide range of colour palettes. So you will still be able to view the spectrum graph. You just won’t be able to see them in your Studio One track colours unless you set them manually in Strata.

The problem of Studio One not communicating track names is more serious because the spectrum graph is far less helpful if you don’t know which stratum corresponds to which track! I have addressed this problem by adding a Name section to Strata Track that allows you to manually enter the name of the track. This is not as good as having the track name communicated automatically, but at least his feature makes Strata useable in Studio One.

11 Strata Rapid-Deployment Guide

11.1 Rapid Deployment Matters

Once you've got past the stage of experimenting with Strata to learn how to use it, you'll eventually find yourself in the situation where you have a project with (say) 100 tracks and you want to deploy Strata in the project. Adding a new track to hold Strata Vision is quick and easy, but adding Strata Track to the end of the plugin chain of each track in your project can be tedious and time consuming. The purpose of this page is to inform you of the fastest way to deploy Strata Track on large numbers of tracks in each of the supported DAWs.

One thing to know is that it's perfectly acceptable to deploy an instance of Strata Track and then Copy the instance and Paste it into another track. With some plugins, this might cause confusion, but Strata has been specifically engineered to handle this case gracefully. So feel free to copy and paste in order to deploy Strata Track in your DAW project.

11.2 Deploying Strata Vision

To deploy Strata Vision, just create a new dedicated track for it. It can be a MIDI track or an instrument track. Then add a new instance of Strata Vision to the track's plugin chain. As you only have to do this once, it doesn't much matter how long it takes (within reason), so just do whatever you normally do to add a plugin to the plugin chain of a track in your project.

It's best to put Strata Vision on its own track so that it doesn't impact your signal chains. I have even programmed Strata Vision to complain if it finds that it has been added to the Master (or Main) track!

11.3 Deploying Strata Track

The rest of this section describes how to deploy Strata Track, on lots of DAW project tracks, in each supported DAW.

11.3.1 Ableton Live

I have done some experiments in Ableton Live and have discovered the following:

- If you copy an instance of Strata Track and then click on another track and paste, nothing happens.
- If you copy an instance of Strata Track and then double click on another track and paste, it creates a copy of the Strata Track instance at the START of the track's plugin chain (where we don't want it).
- If you select Strata Track from the plugins section on the left and drag-and-drop it to a track, it creates a new instance of Strata Track at the END of the track (where we want it).

So I’ve arrived at the following recommended method for Ableton:

1. In the pane at the top left, search for "Strata Track" until the plugin appears in the results pane below.

2. Drag and drop Strata Track from the plugin pane to a track.

3. Repeat the drag-and-drop for each track onto which you wish to deploy Strata Track.

On 24 May 2025, I (Ross Williams) did a test where I measured how long it took me to deploy Strata Track in Ableton onto ten different tracks by dragging and dropping Strata Track from the plugin pane on the left to each of the ten tracks. It took me 39 seconds (very close to the FL Studio time - see below). That's about four seconds per track. That's less than three minutes to deploy Strata Track in a typical 30-track project.)

The only annoying thing is that when you drag and drop, it opens Strata Track's window and you will have to close (or move) it or it will get in the way so you can drag and drop again.

11.3.2 Bitwig Studio

Deploying Strata Track in Bitwig Studio is quick and easy:

1. Put Strata Track onto one track and select it and Copy it with Command-C.

2. Now press Downarrow then Paste (Command-V) and repeat and you will add Strata Track to the end of each track's plugin chain. It's very fast.

I tested this method for deploying Strata Track on ten tracks and it took 21 seconds (including creating the first instance). So that's about two seconds per track to deploy Strata Track in Bitwig.

11.3.3 Cubase

I have not yet developed a fast-deployment method for Cubase. If you know how, please let me know.

11.3.4 FL Studio

I couldn't figure out how to deploy Strata Track on several tracks quickly in FL Studio, so I contacted Image Line support and they were very helpful and informed me (on 30 Dec 2024) of the following technique, which works well:

1. Open the mixer view. That's the one with all the vertical slider volume controls.

2. Pick any track and put Strata Track on the track (in the way you usually add a plugin to a track).

3. Now this is a little tricky, but it DOES work. Do the next steps EXACTLY.

4. RIGHT CLICK on the instance of Strata Track on the track you put it on AND RELEASE THE MOUSE. A menu should pop up.

5. MOVE THE MOUSE into the menu until it is OVER the entry "Save preset as...", but DON'T CLICK on the entry!

6. Now CLICK on the "Save preset as..." AND DRAG to another track. (Don't release the mouse before you drag).

7. You should now have a copy of Strata Track on the second track.

This technique might feel a little counterintuitive with the clicking, but it does work, and if you practice a little, you could get fast. I (Ross Williams) did a test (on 24 May 2025) where I measured how long it took me to do ten such Strata Track deployments. It took 38 seconds. So that's about four seconds per track. My test was with almost no practice, so experienced FL Studio and Strata users should be able to get it down to two seconds. In any case, even at four seconds per track, that's less than three minutes to deploy Strata Track in a typical 30-track project.

11.3.5 Logic Pro

There are several ways to add Strata Track to every track in Logic Pro.

The best most intuitive method that I have found is:

1. Top menu View > Show Mixer to show the mixer view.

2. Put Strata Track on any track.

3. Option-Drag the instance of Strata Track to any effect slot on any other track. Repeat. This is very fast!

Here's another method I discovered:

1. Top menu View > Show Mixer to show the mixer view.

2. Select a bunch of tracks.

3. Add Strata Track on any track. It will appear in the same slot in all the other tracks.

This second method suffers from the problem that some of the other tracks might already have something in the slot into which you deploy Strata Track. This is why I like the Option-Drag method better.

11.3.6 Pro Tools

I have not yet developed a fast-deployment method for Pro Tools. If you know how, please let me know.

11.3.7 Reaper

1. Choose any track and click on FX on the track.
2. Add Strata Track to the plugin chain of the track.
3. Drag-and-Drop Strata Track to any other track. A copy will be added to the end of the track's plugin chain.
4. Repeat for each track.

Overall, this is pretty fast. The only annoying thing is that when you drag and drop, it opens Strata Track's window and you will have to close (or move) it or it will get in the way.

11.3.8 Reason

I have not yet developed a fast-deployment method for Reason. If you know how, please let me know.

11.3.9 Studio One

I have not yet developed a fast-deployment method for Studio One. If you know how, please let me know.

11.4 Add Strata Track To Your Default Plugin Chain

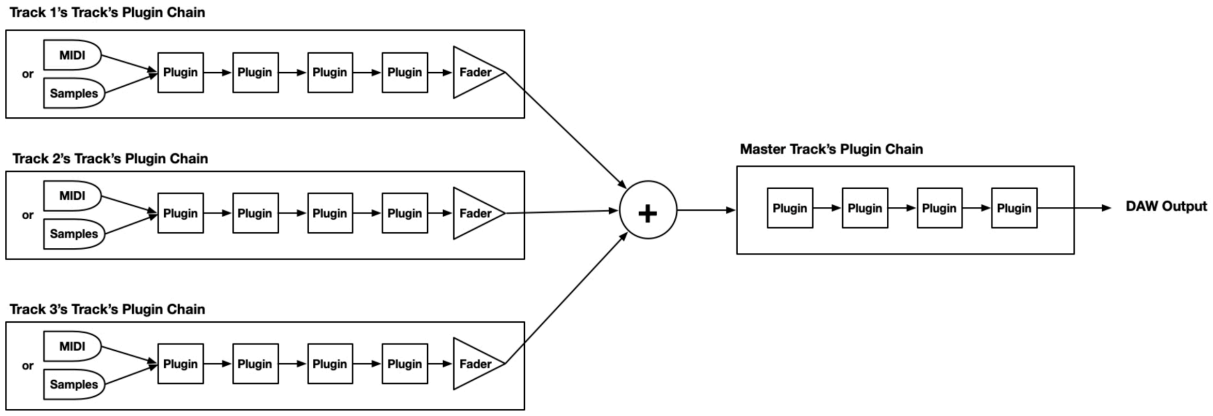
If you find yourself using Strata in all your projects, one way to avoid deployment altogether is to add Strata Track to your Default Plugin Chain setting in your DAW, if it has one. Then, whenever you create a new track, Strata Track will already be there.

12 The Fader Problem

Unfortunately, because of the architecture of current popular DAWs, Strata has to deal with a deployment problem, which I call ***The Fader Problem***. This section describes this problem and offers three solutions to it.

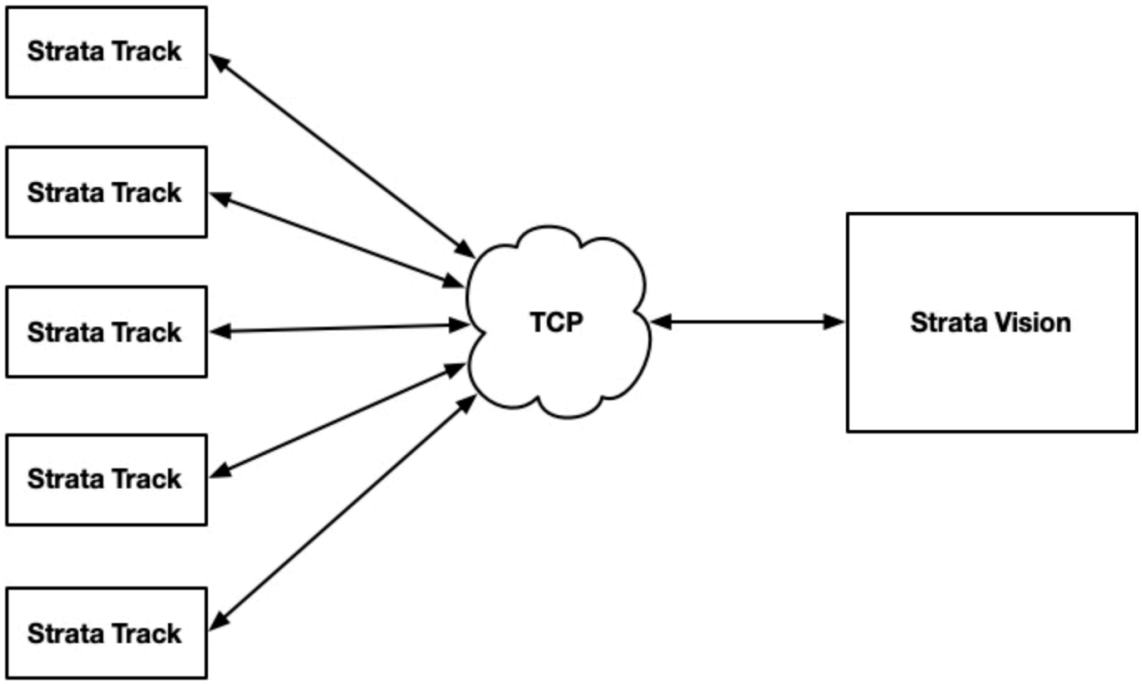
12.1 DAW Audio Signal Flow Architecture

The diagram below shows how signals flow within a typical DAW project. For the purpose of simplicity, this diagram ignores return tracks and inter-track routing. As you can see, each track has a sound source consisting of either blocks of MIDI feeding a soft synthesizer (or a sampler), or a collection of audio clips. This sound source is then fed into a plugin chain. This goes to the track's fader and then gets summed with the other tracks into the Master track.



12.2 How Strata Communicates With Itself

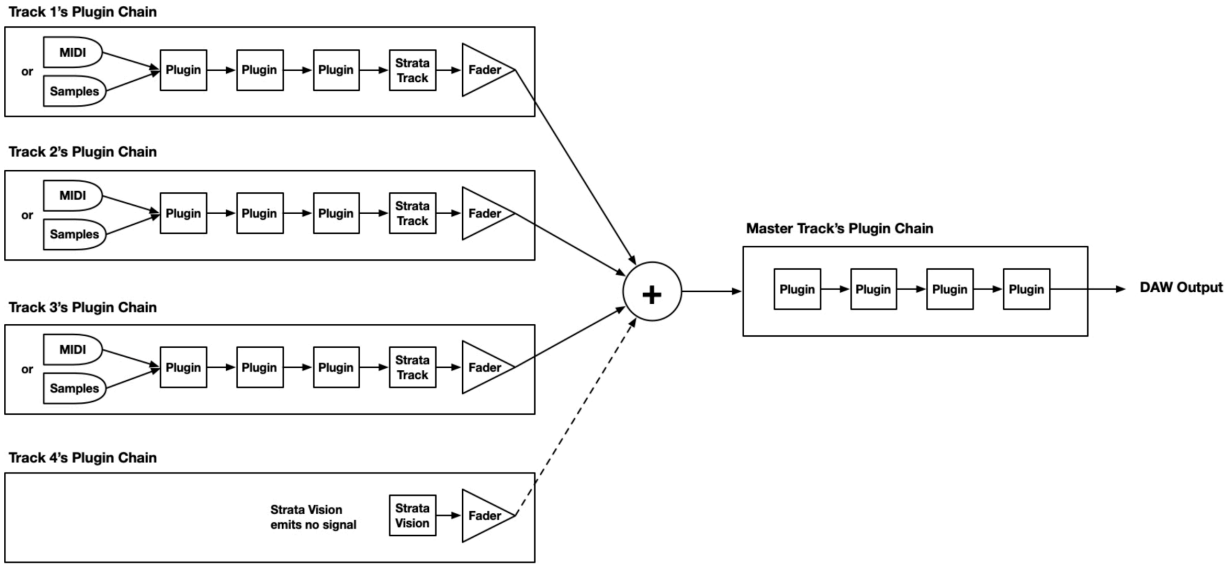
As current DAW architectures provide no inbuilt way to enable plugins to talk to each other, instances of Strata Track and Strata Vision communicate via the TCP networking protocol (within your computer only).



12.3 Strata In Your DAW Project

Now let's look at how Strata is deployed in your DAW project. An instance of Strata Track is placed at the end of each track's plugin chain, and Strata Vision is placed on its own separate track. The instances of Strata Track send their data via TCP (not shown here) to Strata Vision which gathers up all the spectral information and displays a colourful graph.

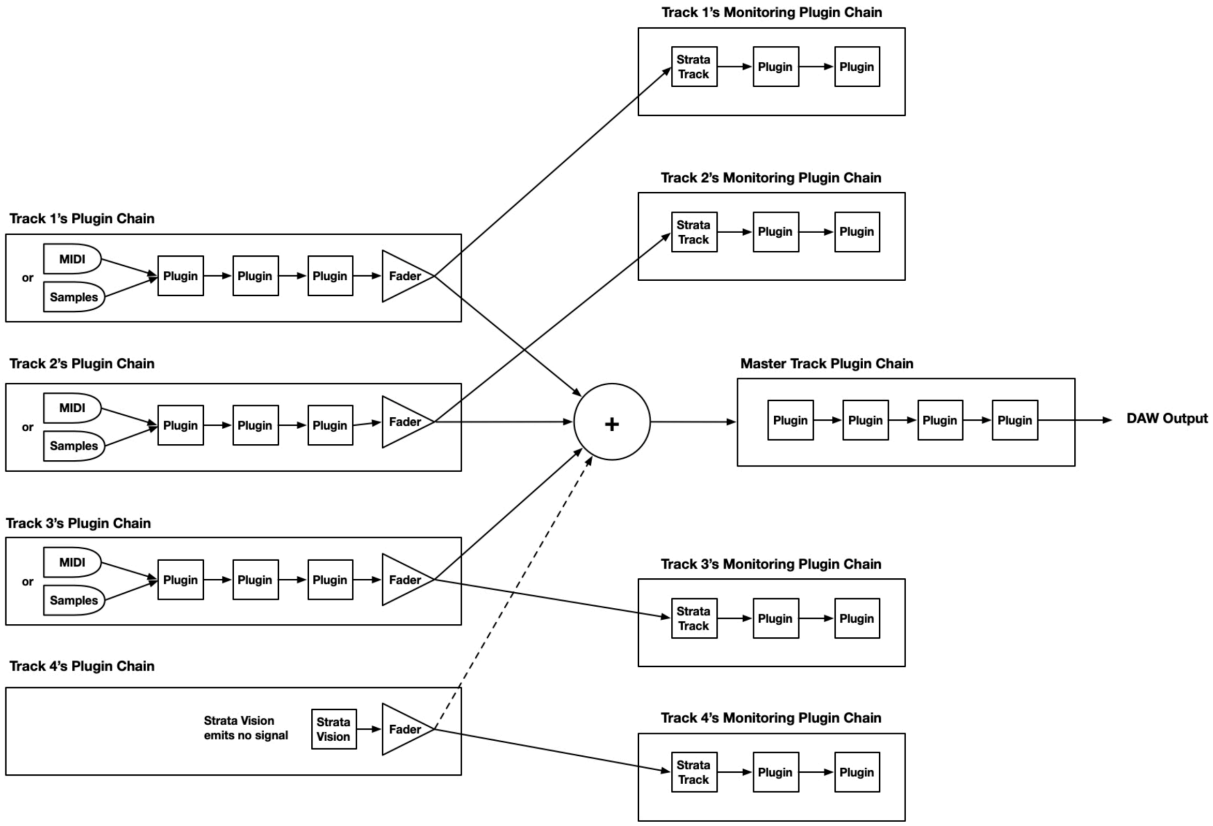
You should now be able to see the problem. Because there is no way of locating Strata Track ***after*** its track's fader, Strata Track can only see the signal ***before*** the fader reduces or increases the volume of the signal. This means that Strata Vision's graph will be inaccurate unless all your faders are set at 0dB.



12.4 How Strata Track Would Be Deployed If DAWs Had Monitoring Chains

Before I discuss solutions to this problem, take a look at the next diagram which shows how Strata would be deployed if DAWs had (what I am naming) ***monitoring chains*** attached to each track. As you can see, this would completely solve the problem!

If you are a DAW developer, please add a monitoring chain feature to your DAW!

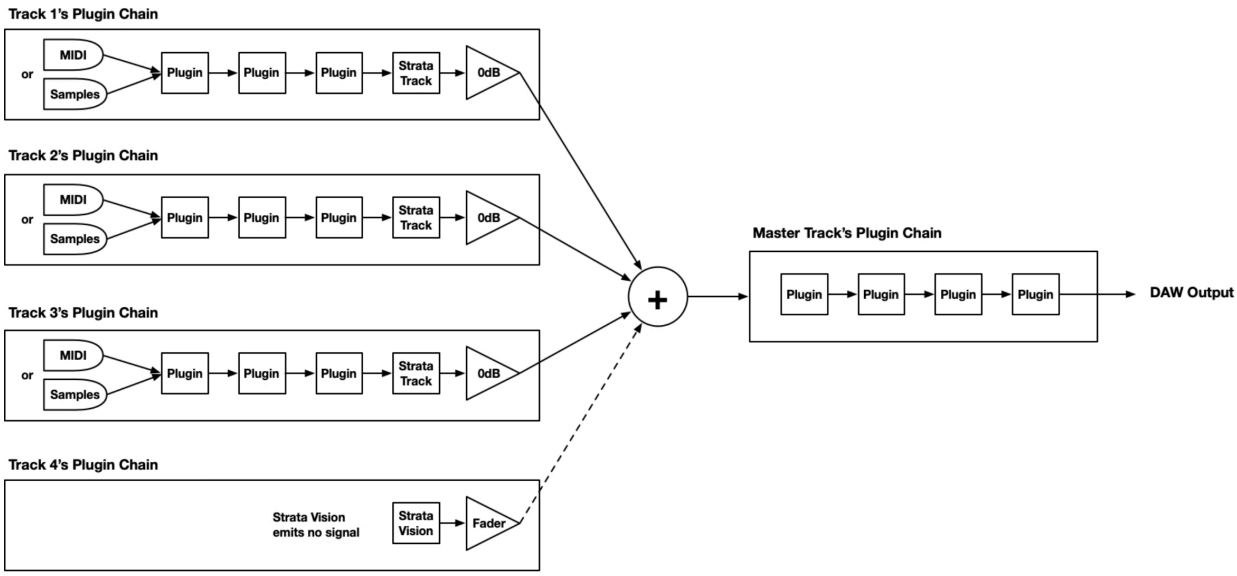


12.5 Solution 1: Don't Care About Volumes

One way to address this problem is not to solve it at all! If all you want to do is use Strata to see which parts of the frequency spectrum each track is occupying, then the volumes of the tracks doesn't matter (unless a track is so quiet that it falls below Strata's Min-dB level). You can just look at the Strata graph to see where the tracks are and live happily ever after!

12.6 Solution 2: Zero Your Faders

The second way to address this problem is to set all all your faders to 0dB. Just never use them! If you do this, each instance of Strata Track will see exactly what is being fed into the master track, and Strata Vision will show a completely accurate graph with all the correct volume levels.



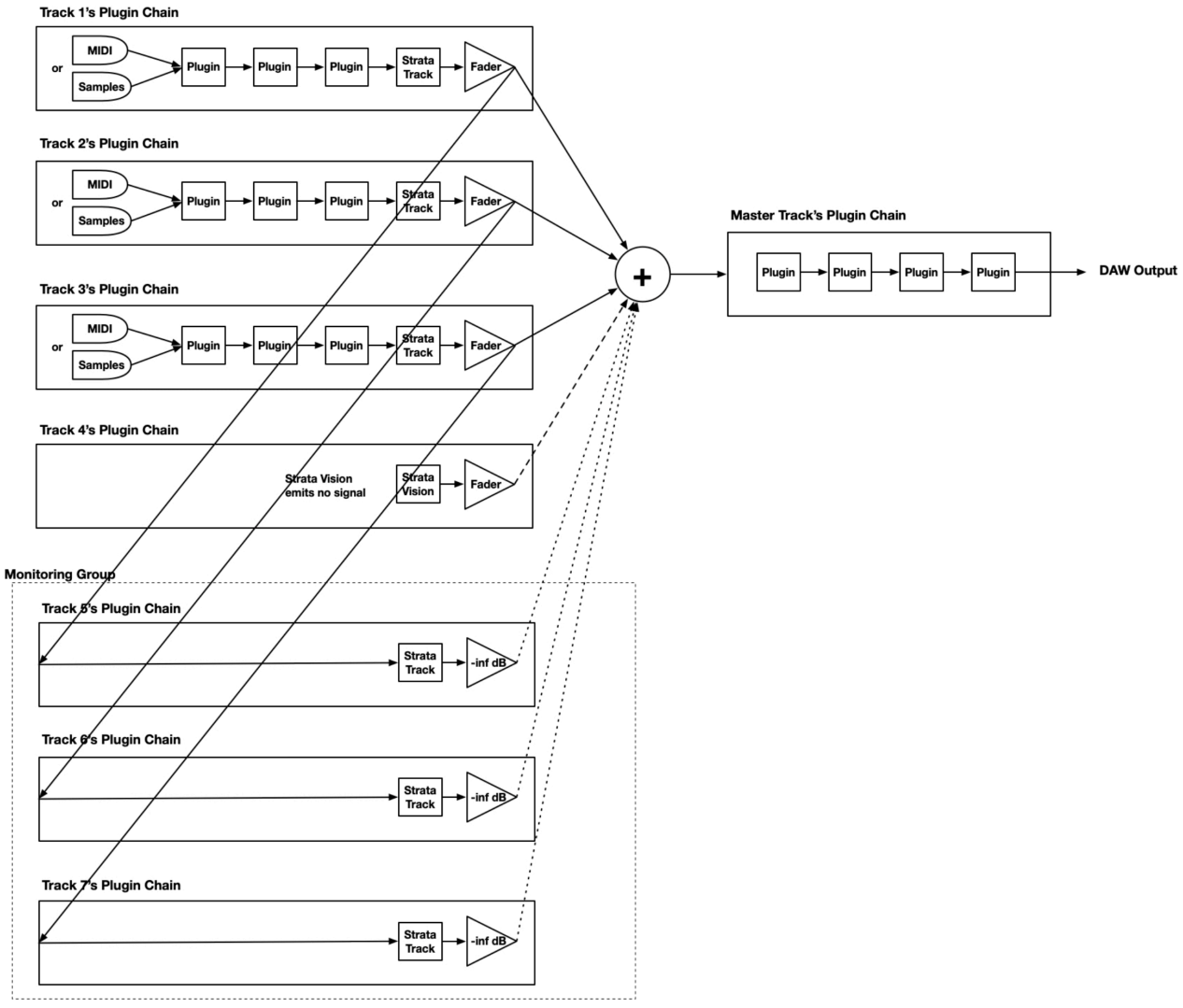
If you're used to using faders, this might seem like a completely unacceptable solution! And maybe, for you, it is. But you don't have to live without volume controls on your tracks! Just add a Utility/Tool plugin at the end of each track's plugin chain just before (to the left of) the Strata Track plugin. Then, when you want to adjust the volume of a track, just adjust the volume of that plugin.

In fact, you can go one step further and put TWO Utility/Tool plugins on each track just before Strata. Use the first one to set the track's maximum volume level, and use the other to do volume automation (from -infinity db to 0dB). This is what I do, and it works really well once you get used to it.

12.7 Solution 3: Create Monitoring Tracks

If you can't live without your faders, a third way to address the fader problem is to create a monitoring track for each track in your project and route each track's output to the corresponding monitoring track (in addition to the Master track). How you do this will vary depending on which DAW you are using.

So, for example, if you had a track called "Snare" you would create a monitoring track called, perhaps "Snare Monitor" and route the Snare track to the Snare Monitor track. Then you would put an instance of Strata Track on the Snare Monitor track. The result is that each instance of Strata Track on its monitoring track will see the signal of its corresponding track AFTER the fader has done its work, and these signals will be sent (via TCP) to Strata Vision, so Strata Vision will display all the signals showing their correct volumes.



This is a messy solution because, if your project has 100 tracks, you will need to create 100 monitoring tracks, one for each track! That can quickly make your project much more complicated. The best way to deal with this mess is to create a new track group called "Monitoring Group" and put the 100 monitoring tracks in that group out of the way of the rest of your project. Once you've done this, and collapsed the group in your DAW's track browser, you'll soon forget that you have a monitoring group at all! This solution is quite clean to use, but it does mean that whenever you create a new track, you will have to remember to create a corresponding monitoring track with Strata Track on it and route the new track to the new monitoring track. This is a lot slower than just copying and pasting an instance of Strata Track onto the end of the new track's plugin chain. This solution also suffers from the risk that you will get the routing wrong. But if you're careful, it can work really well.

12.8 Solution 4: Use The Fader Parameter

If you can't live without your faders, and you don't want to create monitoring tracks, you use Strata Track's Fader parameter to inform Strata Track of the track's fader setting. Strata Track will then apply this setting to the signal before it analyses it.

Important: The Fader parameter does ***NOT*** affect the audio output of Strata Track.

12.9 Which Is The Best Solution?

I have been using Strata in all of my DAW projects, and have found that the simplest solution is just to set all the faders to zero and add two instances of Utility/Tool to each track for overall volume and volume automation. This means I can just copy and paste Strata Track onto new tracks, which is very fast. I would recommend this method to all new Strata users. I have configured my DAW (Bitwig) so that the default track fader volume is 0dB, so I never even have to think about faders now. But if you miss your faders too much, switch to the monitoring tracks method or use the Fader parameter method.

For large complex projects where I have several monitoring plugins on each track (e.g. Strata Track + Oszillos Mega Scope + iZotope Insight 2 + MAAT DRMeter MkII), I will create a monitoring track for each track just to get all the monitoring plugins away from each track's plugin chain (DAW manufacturers: PLEASE add monitoring chains!). I will create a Monitoring Group to hold all the monitoring tracks. This works pretty well. It also means that, if I run out of CPU, I can (because I use Bitwig) simply deactivate the entire monitoring group with one click to save CPU! That's far faster than having to visit each track and turn off all its monitoring plugins!

13 Decibel Maths And The Shape Of The Strata Graph

13.1 What's Up With The Graph?

If you've used Strata for a little while, you might have noticed that the shape of the top of the Strata graph is not the same shape as that of the frequency spectrum of your master track. There's a reason for this, and this page explains.

The purpose of Strata is to show you the frequency spectrum of ALL of your tracks together so that you can see where every track is sounding in the spectrum and how loud they are relative to each other. Strata Vision simply takes each track's spectrum and layers them on top of each other. This allows the volumes of the tracks to be compared with each other. Often a glance at the Strata Vision graph will reveal that one track is much louder than all the others (when perhaps it shouldn't be).

13.2 Get Out Your Maths Brain

While this view is excellent for comparing tracks, it leads to a distortion that means that the top of the Strata Vision graph is ***not*** the same as the frequency spectrum of the master track. This is because the Y axis is in decibels and decibels **don't sum linearly**!

Decibels are a logarithmic measure of the amplitude of an audio signal. We use them because they more intuitively represent our intuitions about audio volumes. But they do not sum linearly. Here's what ChatGPT had to say about it:

To generalize the formula for **incoherent (uncorrelated) addition** of N sources, we need to sum their powers in the decibel domain. The general equation is:

$$L_{\text{sum}} = 10 \cdot \log_{10} \left(\sum_{i=1}^{N} 10^{L_i/10} \right)$$

Key Steps:

1. Convert each level L_i (in dB) to its linear power equivalent:

$$P_i = 10^{L_i/10}$$

2. Sum the linear powers:

$$P_{\text{total}} = \sum_{i=1}^{N} P_i$$

3. Convert the total power back to dB:

$$L_{\text{sum}} = 10 \cdot \log_{10}(P_{\text{total}})$$

It is the amplitude of the waveforms that add up linearly. The decibel measure is a logarithmic measure of the amplitude.

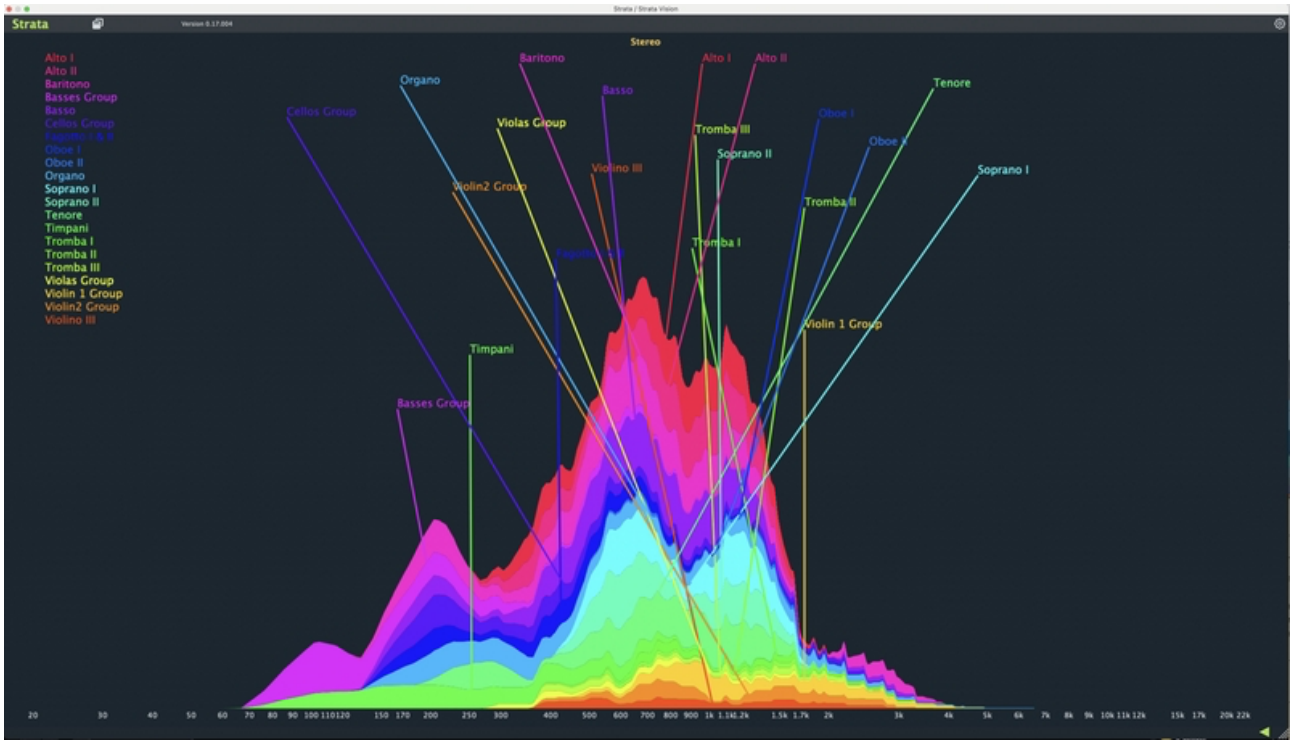
This means that if we have three (uncorrelated) tracks, each at -6dB, the master track will be at -1.23dB.

13.3 Here Comes The Decibel Floor

Strata represents the volume of each track at each point in the spectrum by calculating the decibel level *above an arbitrary Min dB level* (which is a parameter of the plugin and defaults to -80dB). This is what most spectrum display software does.

So if you have three tracks at -6db, each track will be plotted as (-6) - (-72) graphical "units" high on the graph which is 66 units. Whereas if you have one track at -1.23db, its height will be (-1.23db) - (-72) which is 70.77 units. If you plot the three tracks 66 units high they will stand 198 units high whereas if you plot the sum of the tracks it will be 70.77 units high) which is about 2.79 times less!!

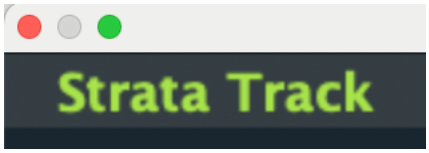
What this all means is that if you plot a bunch of tracks with the height of each track being its decibel level above a baseline like -80dB, the sum of the height of the tracks is going to be much higher on the graph than if you took the audio sum of the tracks (i.e. the master channel) and displayed that in the same way. This means that, on a graph like this, the number of tracks active at a particular point in the spectrum is going to have far more influence on the height of the graph at that point than the dB of the sum of the tracks at that point. As there are usually far more tracks active in the midrange of a typical song than the bottom or the top, the Strata Vision graph will tend to be high in the middle and low at the ends, leading to a Strata Vision graph that typically has the overall shape of a normal distribution curve, or, more poetically, a mountain.



14. Strata Track User Interface

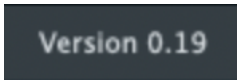
The Strata Track interface is currently very rudimentary, as Strata Track's main purpose is just to extract the signal from the track and send it to Strata Vision. The interface will likely improve in future versions.

14.1 Heading



This is just the name of the plugin and clicking on it does nothing.

14.2 Version

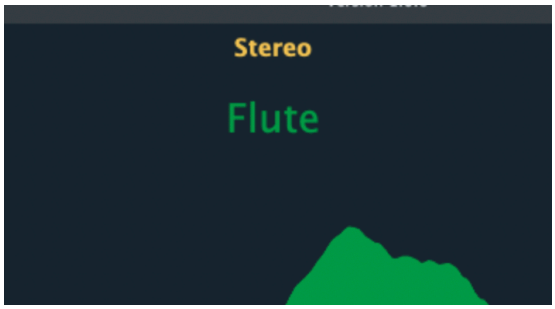


This is the Strata Track version number. It's not very exciting, which is probably why I put it in grey.

14.3 Channel Indicator

The channel indicate at the top of the window tells you what audio channel Strata Track is attending to. This will almost always be the default of *Stereo*. You can't set the channel in Strata Track. You have to do it in Strata Vision (which then tells Strata Track). The sole purpose of Strata Track is to send information to Strata Vision.

14.4 Track Name

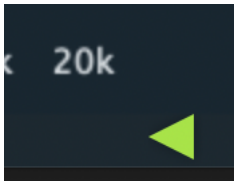


Underneath the channel is the track name painted in the colour of the track. The track name helps to avoid confusion between different Strata Track windows (which is particularly important when setting the Fader parameter). In particular, it avoids confusion between Strata Track and Strata Vision windows.

14.5 Graph

Most of Strata Track's window is taken up by the graph. The graph is currently rudimentary because it just displays the frequency spectrum of the audio signal on the track. It mainly serves to reassure you that Strata Track can hear something and is working.

14.6 Control Panel Open/Close Control

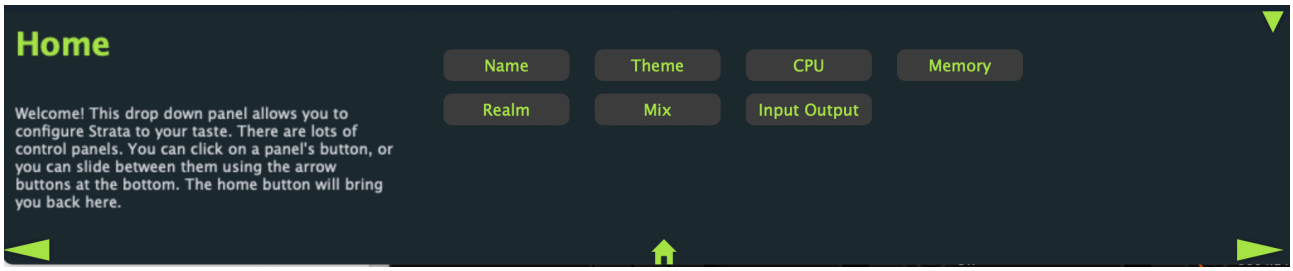


Clicking on this little triangle opens up a control panel underneath the main graph pane that presents settings for you to fiddle with.

14.7 Control Panel

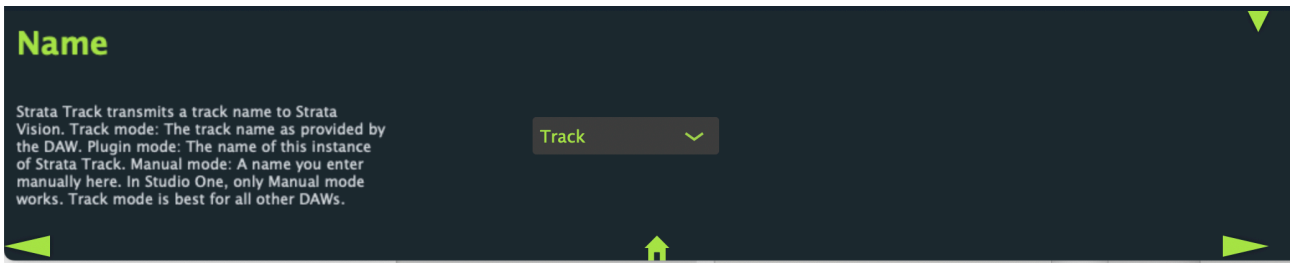
Strata Track has a control panel under the graph that can be opened and closed using the Open/Close triangle. When the control panel is open, it displays one of several views. You can switch between views using the left and right triangles at the left and right triangles of the control panel.

14.8 Control Panel View: Home



The Home control view is your home base where you can get to any other view quickly.

14.9 Control Panel View: Name



The Name control panel allows you to specify how Strata Track will transmit a track name to Strata Vision for display on the Strata Vision graph.

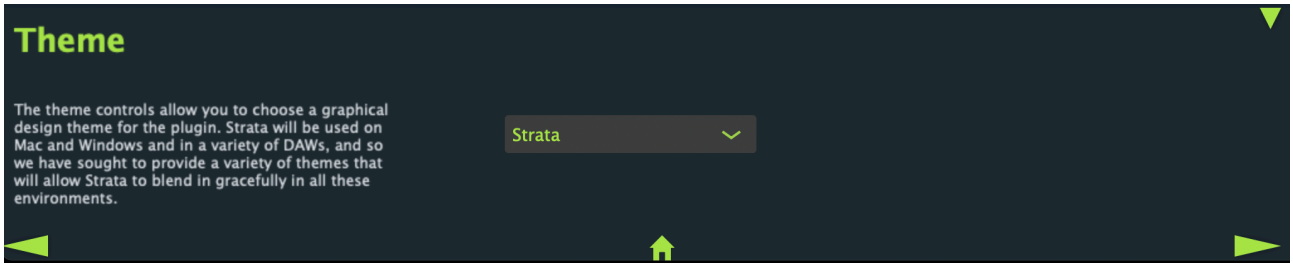
Track: The name will be the name of the track.

Plugin: The name will be the custom name of the instance of Strata Track. (Some DAWs allow you to rename a plugin instance).

Manual: Specify the name manually in a text entry box.

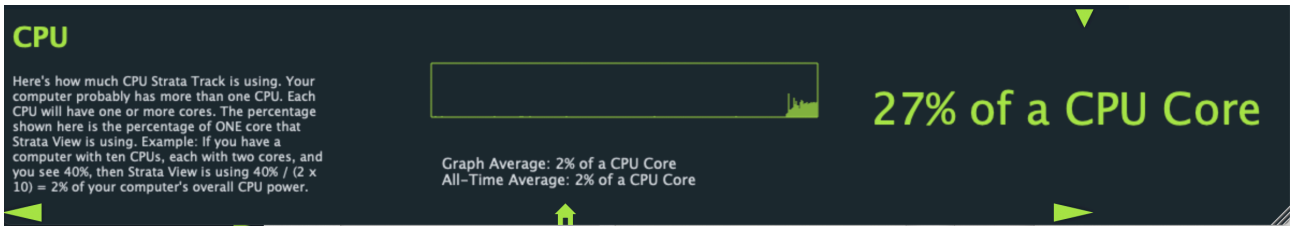
An earlier version of Strata Track just worked in Track mode. But then I realised that (because Studio One doesn't communicate track names), I couldn't support Studio One without providing some kind of way to manually specify a track name. I added the Plugin mode after that for completeness.

14.10 Control Panel View: Theme View



The theme view allows you to choose from several graphical themes for the look of the entire plugin. See the earlier Themes section for a description of all the available themes.

14.11 Control Panel View: CPU



The CPU view of the control panel shows you how much CPU Strata Track is using. It's probably not much. On my old 2020 Intel iMac, it typically ran at about 1% of a CPU core. Please be aware though, that the moment you open Strata Track up and it has to display a graph, its CPU use will skyrocket. So pay attention to the Graph Average and All-Time Average.

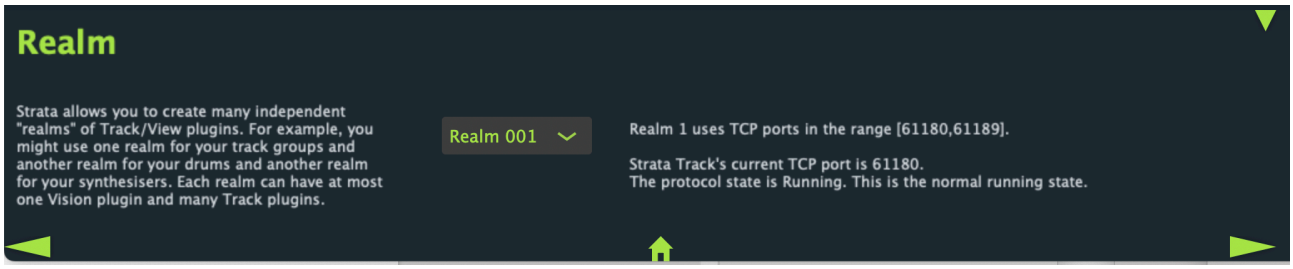
To clarify, this view shows you only the CPU used by this instance of Strata Track, not all instances of Strata Track in your project.

14.12 Control Panel View: Memory

The memory control panel view gives you an approximate idea of how much memory (RAM) Strata Track is using. It's a little tricky trying to figure out how much memory Strata Track is using. Strata Track can count exactly how many bytes its data structures are directly using on the stack and in the heap. However, the heap comes with heap management overhead, so storing 50 bytes in the heap might actually use 100 bytes of space in the heap. I have found that a good conservative rule of thumb is to triple the number of bytes to come up with an estimate of the total number of bytes used, and so that's what Strata Track does in this control panel view. It tells you the direct number of bytes in a small font and displays the triple figure in a huge font.

To clarify, this view shows you only the memory used by this instance of Strata Track, not all instances of Strata Track in your project. It also does not take into account sandbox process overhead if you have turned sandboxing on in your DAW.

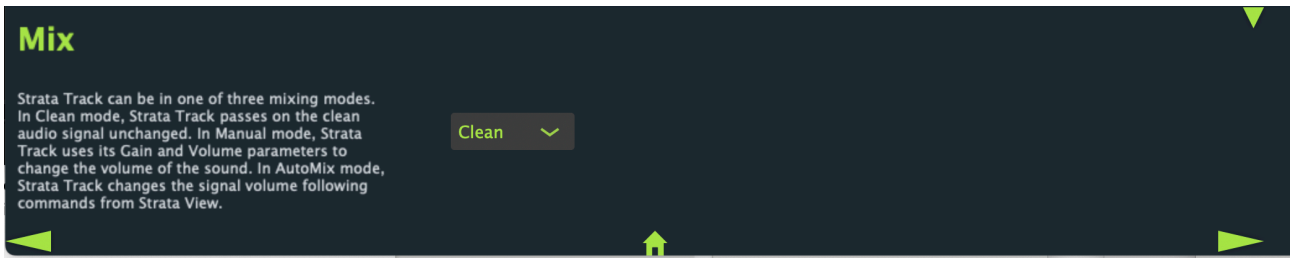
14.13 Control Panel View: Realm View



The realm view allows you to set the *realm* that the Strata Track instance is operating in. A realm is like a little hermetically-sealed world within which a group of Strata Track and Strata Vision plugins can communicate. See the separate section on Realms.

Strata Prime Note: A Strata Prime licence allows the use of only one realm (realm 001). Strata Track will allow you to set the realm to any realm (001 to 100), but Strata Vision is locked to realm 001.

14.14 Control Panel View: Mix View



The mix view allows you to specify the mix mode of the plugin, which specifies whether and how the signal will be modified as it passes through the Strata Track plugin. There are three modes:

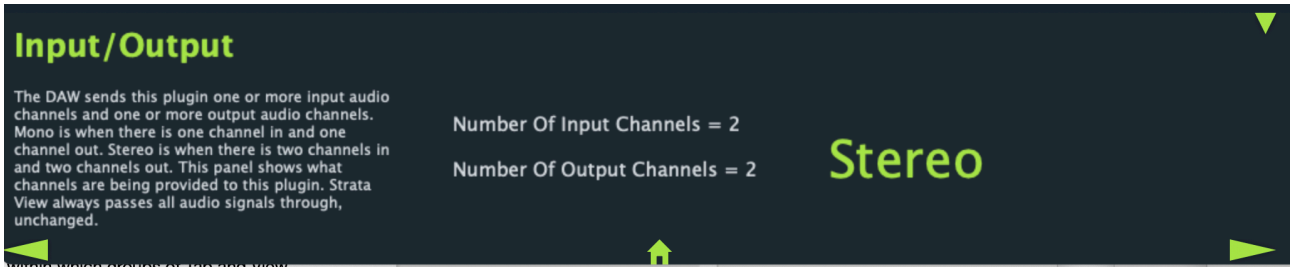
Clean passes through the signal untouched. This is the default.

Manual provides a Gain control and a Volume control which are applied in series to the signal.

Auto is reserved for future use.

Almost all users should just leave the plugin in its default Clean mode. I added manual mode to help users who decided to set their faders to zero and didn't want to add another Tool plugin, but I'm thinking it was a bad idea, and it might not be supported in future versions. Not sure.

14.15 Control Panel View: Input/Output View



The Input/Output control panel view is primarily a diagnostic tool to check what audio inputs and outputs the DAW is providing to Strata Track. In particular, the panel shows clearly whether Strata Track has been placed in a mono or stereo DAW context.

14.16 Control Panel View: Fader

The Fader control panel view allows you to set Strata Track's Fader parameter. The purpose of the parameter is to allow you to inform Strata Track of the setting of the fader that is on the DAW track that Strata Track is on. If you set this Fader parameter to be the same as the DAW track fader (including the same sign), The Fader Problem is solved. The only problem with this solution to The Fader Problem is that you have to update the Strata Fader parameter whenever you adjust the DAW track fader.

Example: Strata Track is on a track whose audio signal is -10dB. The track's fader is set to -5dB. This means that the signal will be sent to the master at -15dB. Without the fader parameter engaged, Strata Track will see the -10dB and analyse it and send it to Strata Vision, and Strata Vision will display the track as being at -10dB. However, if you set the Strata Track Fader parameter to -5dB to match the track fader, Strata Track will analyse a reduced -15dB signal and send that to Strata Vision and Strata Vision will display the track as being at -15dB which reflects the reality of what is going to the master.

Note: Set the Fader parameter to be identical to the DAW track fader setting including the sign. So, if the DAW track fader is set to -4dB, set the Strata Track Fader parameter to -4dB, *not +4dB*.

Note: This parameter does ***NOT*** affect the audio output of Strata Track.

15 Strata Track Plugin Parameters

The Strata Track plugin has several parameters. I have endeavoured to expose every significant underlying parameter of the plugin as a formal parameter that can be set and automated in the DAW. The plugin's window height and width are even automate-able parameters! This section describes all the parameters in detail.

15.1 Window Width

This is the plugin's window width in virtual pixels. You can change this either by dragging the bottom left corner of the window to a new size, or by specifying or automating the value via your DAW.

Range: [500, 3200].

Default: 700.

15.2 Window Height

This is the plugin's window height in virtual pixels. You can change this either by dragging the bottom left corner of the window to a new size, or by specifying or automating the value via your DAW.

Range: [250, 2250].

Default: 700.

15.3 Realm

This is the plugin's realm. Realms are separate little worlds within which groups of Strata Track and Strata Vision plugins communicate. See the separate sections on Realms.

Strata Prime Note: A Strata Prime licence allows the use of only one realm (realm 001).

Range: [1, 100].

Default: 1.

15.4 Theme

Strata Track provides a range of graphical themes for your pleasure.

Values: Strata, Arctic, Arctic With Sunglasses, Australian Cigarette Packet, Bitwig, FL Studio, FabFiller, Green Screen, iZotope, Live Default Dark, Live Default Light, Live Classic Medium Dark, Live Classic Medium Light, Logic Pro, Cubase, Reaper

Default: Strata

15.5 Control Panel Status

This parameter determines whether the dropdown control panel (under the spectrum graph) is visible. To open and close the control panel manually, click on the triangle at the bottom right corner of the spectrum pane.

Values: Open or Closed.

Default: Closed

The default is Closed so as not to overwhelm new users with complicated controls.

15.6 Control Panel View

This parameter determines which of the several control panel views will be shown if the control panel is Open (see “Control Panel Status” above).-

Values: Home, Name, Theme, CPU, Memory, Realm, Mix, Input/Output, Fader.

Default: Home.

15.7 Mix Mode

The mix mode determines whether Strata Track is allowed to change the audio signal flowing through it, and, if so, how. There are three modes:

> **Clean:** In Clean Mix Mode, there are no gain and volume controls in the interface and the plugin’s gain and volume parameters are ignored. When the plugin is in Clean Mix Mode, you can be sure that the plugin is not changing the signal flowing through it at all. This is an important guarantee if you want to use Strata purely as a monitoring tool.
>
> **Manual:** In Manual Mix Mode, the plugin provides a gain control [-100dB,+100dB] and a volume control [-100dB,+100dB] which are applied in series to the signal as it passes through the plugin. These two controls have an identical simple amplitude effect. The purpose of Manual Mix Mode is to provide a volume control to replace the “lost” track volume control (which you should keep at 0dB once you place Strata Track on a track). As a bonus, a gain control is also provided so you can automate the track’s gain without having to add another Utility plugin to your track specifically for automation.
>
> **Auto:** This is reserved for future use.

The default mode is Clean because Strata is supposed to be a monitoring plugin and I don’t want users who think of it that way to get nasty surprises if they accidentally move a volume control. Clean mode turns off the controls. The user should have to do some work to throw the plugin into a mode where it actually changes the signal.

Values: Clean, Manual, Auto.

Default: Clean.

15.8 Volume

This parameter is provided to act as a replacement for the track master volume control if you choose to keep it at 0dB once you place Strata Track on a track. This parameter is ignored unless the plugin is in Manual Mix Mode.

Values: -100dB..+100dB.

Default: 0dB.

15.9 Gain

This parameter is provided to provide a convenient way to automate the gain of a track without having to add a “Utility” plugin to the track. This parameter is ignored unless the plugin is in Manual Mix Mode.

Values: -100dB..+100dB.

Default: 0dB.

15.10 Fader

This parameter is provided as *one* solution to The Fader Problem. It is applied to the signal just before Strata Track analyses the signal, but does ***not*** affect the audio output of Strata Track. The purpose of the parameter is to allow you to inform Strata Track of the setting of the fader that is on the DAW track that Strata Track is on. If you set this Fader parameter to be the same as the DAW track fader (including the same sign), The Fader Problem is solved. The only problem with this solution to The Fader Problem is that you have to update the Strata Fader parameter whenever you adjust the DAW track fader.

Example: Strata Track is on a track whose audio signal is -10dB. The track’s fader is set to -5dB. This means that the signal will be sent to the master at -15dB. Without the fader parameter engaged, Strata Track will see the -10dB and analyse it and send it to Strata Vision, and Strata Vision will display the track as being at -10dB. However, if you set the Strata Track Fader parameter to -5dB to match the track fader, Strata Track will analyse a reduced -15dB signal and send that to Strata Vision and Strata Vision will display the track as being at -15dB which reflects the reality of what is going to the master.

Note: Set the Fader parameter to be identical to the DAW track fader setting including the sign. So, if the DAW track fader is set to -4dB, set the Strata Track Fader parameter to -4dB, *not +4dB*.

Note: This parameter does ***NOT*** affect the audio output of Strata Track.

Values: -100dB..+100dB.

Default: 0dB.

15.11 AutoMix

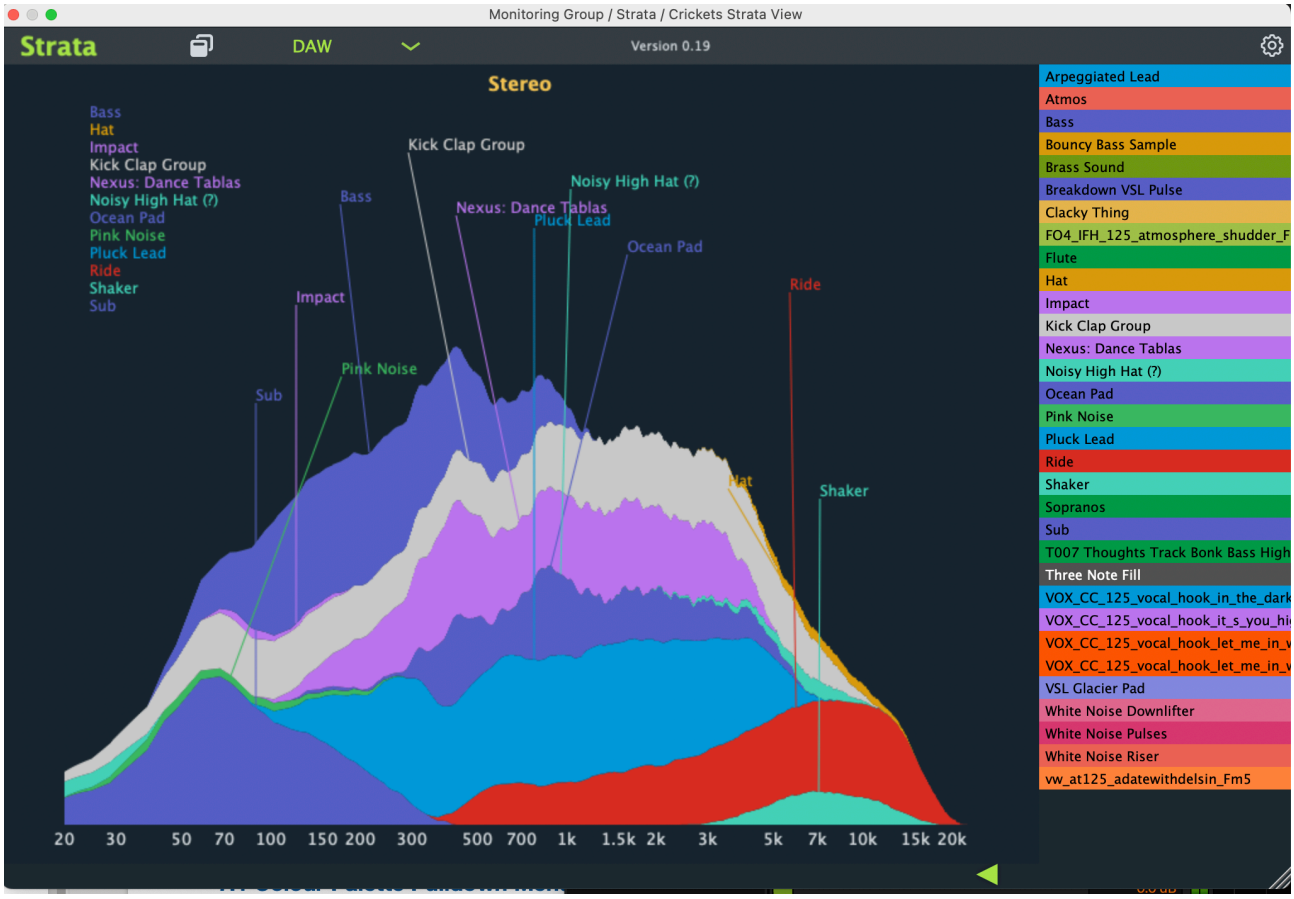
Note: The AutoMix feature is not yet implemented.

This parameter is a single volume/gain control that becomes active if the plugin is in Auto Mix Mode. In Auto Mix mode, the Strata Vision plugin takes charge of the Strata Track plugin's AutoMix parameter which is applied to the signal as it passes through the Strata Track plugin. To clarify: In AutoMix mode, the Gain and Volume parameters are ignored and the Automix parameter is observed. This parameter is ignored unless the plugin is in Auto Mix Mode. The AutoMix parameter is not intended to be automated by the user in the DAW. Its sole purpose is to be controlled by the Strata Vision plugin. It has been made a Strata Track plugin parameter solely so that you can observe in your DAW what the Strata Vision plugin is doing when it is controlling the Strata Track AutoMix parameter.

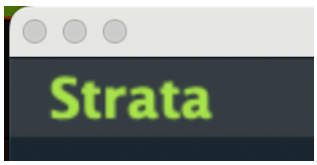
Values: [-100dB,+100dB].

Default: 0dB.

16 Strata Vision User Interface

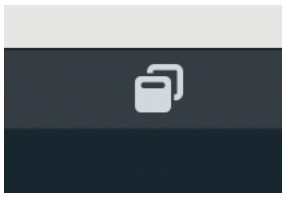


16.1 Strata Title



This is just the name of the plugin. Clicking on it does nothing.

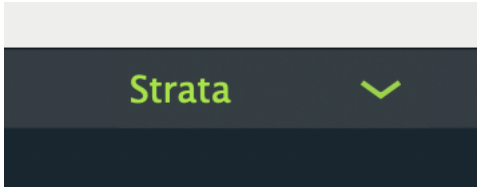
16.2 Window Resize Icon



The Window Resize Icon allows you to snap the Strata Vision window to a standard smallish size. This icon was added to the interface when it was discovered that the circumstance can arise where the top of the Strata Vision window is at or near the top of the screen and the bottom of the

Strata Vision window is off the bottom of the screen. When this happens, you can't access the bottom right corner control of the window to make it smaller. You also can't slide the window up to access the bottom right corner control because the window is at the top of the screen. So the solution is to press this button which snaps the Strata Vision window back to a standard smallish size that definitely is smaller than the screen.

16.3 Colour Palette Pulldown Menu



This pulldown menu allows you to change the colour palette of the displayed strata quickly and easily. In an earlier version of Strata Vision, you could only change the colour palette by opening the control panel and visiting the Palette view, which isn't difficult, but also isn't an obvious thing for new users to do, and changing the colour palette is so much fun that I thought I'd duplicate the functionality in the header where most curious users will probably tinker with it.

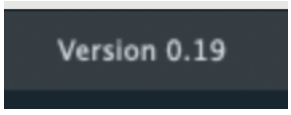
The menu actually conflates two separate Strata Vision plugin parameters. The first is "Spectrum Colour Scheme" parameter which can be one of [DAW, Palette, Custom]. DAW means that the colours provided by the DAW for each track are used. Custom means that you can manually specify a colour for each track (and these are saved).

If you choose "Palette", then the second parameter comes into effect. It is called "Spectrum Palette" parameter and chooses one of several predefined colour palettes such as "Summer".

The Colour Palette pulldown menu in the header conflates these two parameters into one menu by providing menu items being DAW, Custom, and then all the predefined colour palettes. This keeps things simple for new users.

For more information on the colour palettes, see the section on the Palette control panel view later in this user manual.

16.4 Version Number



This is the Strata Vision version number. It's not very exciting, which is probably why I put it in grey.

16.5 Cog Icon

Every audio plugin has to have a cog item somewhere that leads to a world of pain in the form of licensing and mysterious settings. Happily, Strata Vision has all its settings in the dropdown control panel at the bottom, so the cog only leads to some credits and a way to enter your website username and password to activate your licence.

16.6 Bottom Right Corner Window Resizing Control

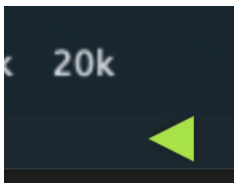
This control allows you to resize the Strata Vision window.

Public Service Announcement: Resizing the Strata Vision window is *awesome* fun and allows you to position Strata Vision on your screen in any way you like: tall, wide, square, big or small. If you have multiple screens (I don't), you can park Strata on a second screen with all your other monitoring windows, fitting it in with whatever you've got. Maybe you just want it in letterbox format: wide and not high, so it can hang around at the top or bottom of your screen; it's up to you. If, for whatever reason, it doesn't work, I want to know.

16.7 Channel Indicator

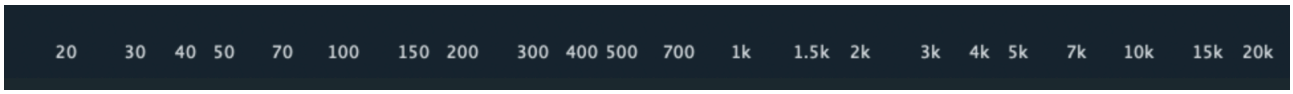
The channel indicate at the top of the window tells you what channel you're looking at. This will almost always be the default of Stereo. If you want to see a different channel, visit the Channel control panel view.

16.8 Control Panel Open/Close Control



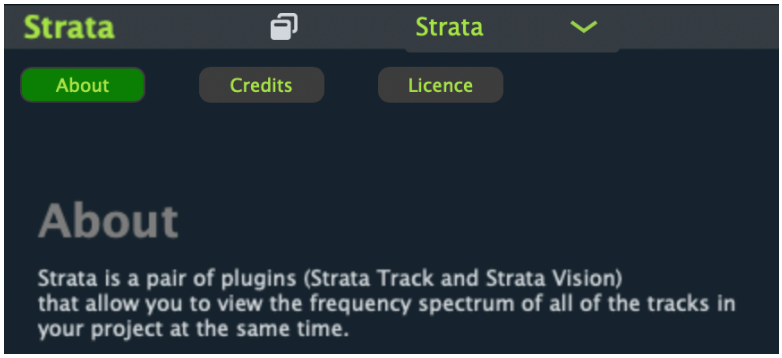
Clicking on this little triangle opens up a control panel underneath the main graph pane with a multitude of settings for you to fiddle with. I wanted to provide lots of settings to allow you to modify Strata Vision's behaviour, but I also didn't want to make the main window look complicated. I also didn't want to put the settings in the "cog" section where many plugins hide them because many of the settings change the look of the graph and I wanted this to be instantly visible (rather than than having to return to the main pane to see what effect changing the setting had). The solution was to have a dropdown panel with a separate "view" for each setting.

16.9 Frequencies



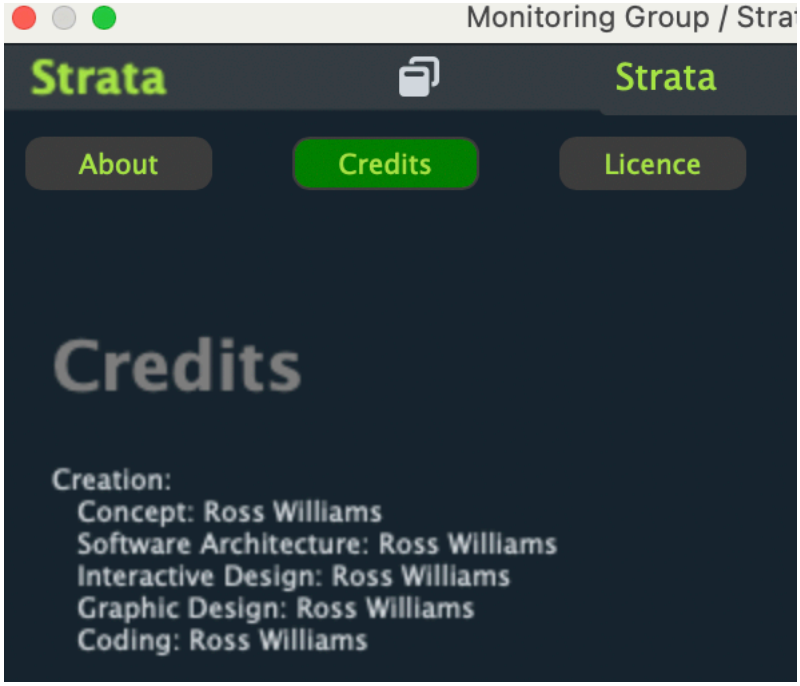
The numbers at the bottom of the graph are frequencies in Hertz.

16.10 About Page



The About page provides basic information about Strata for the 99% of users who won't read the user manual.

16.11 Credits Page

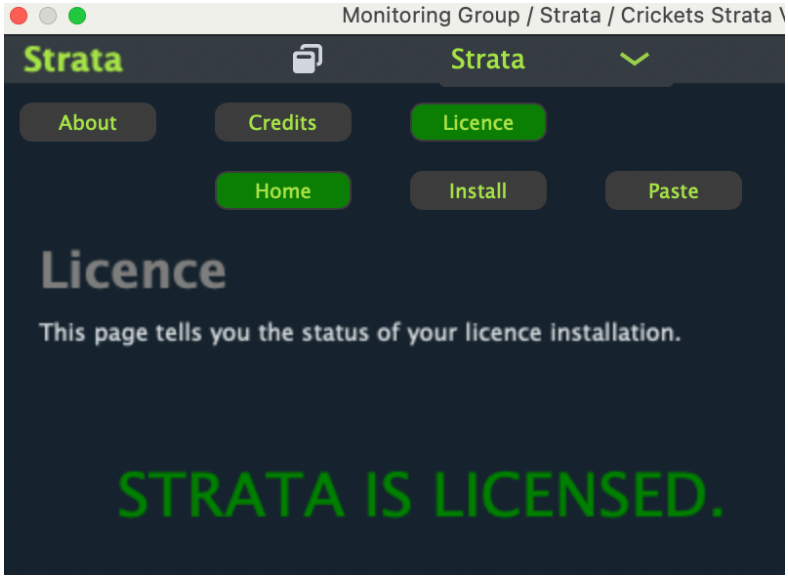


The credits page provides information about who created Strata for the 99% of users who won't read the user manual. The credit section is the place where egos can be set aside, and credit can be given where it is due.

16.12 Licence Pages

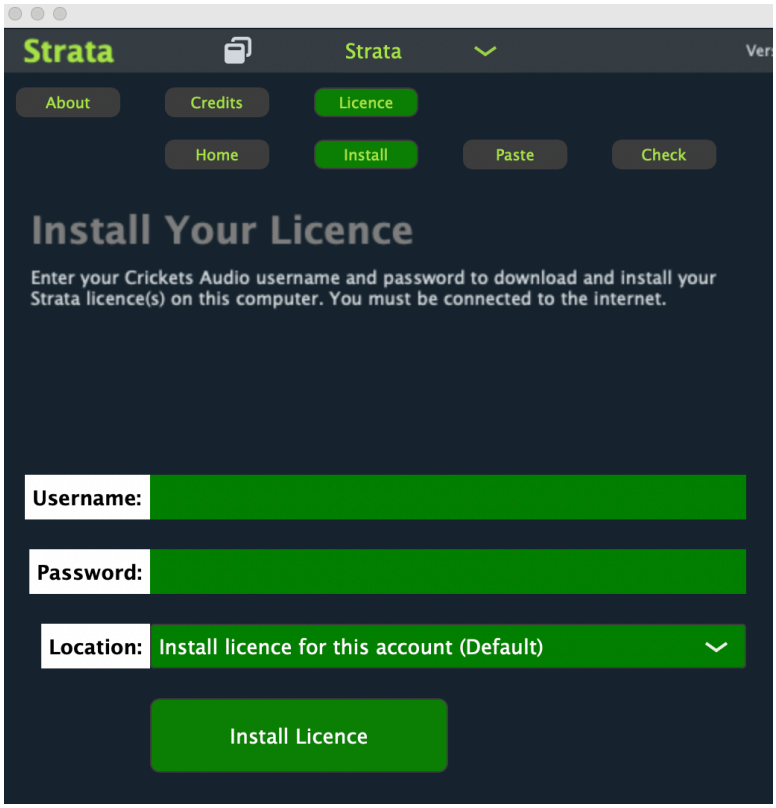
The Licence section allows you to install, activate, and manage your user licence so that the plugin will actually work. There are three licence pages:

16.12.1 Licence Page: Home



The Licence Home page tells you the current status of your user licence installation.

16.12.2 Licence Page: Install



The install page is where the licensing action is. Strata Vision won't run without an licence certificate which is a complicated block of XML text generated by the Crickets Audio website when you purchase a licence. Happily, you don't have to deal with the XML. You can just enter your Crickets Audio username and password here to install your licence certificate on your computer. Strata will communicate with the Crickets Audio website to fetch your licence certificate. You can choose to install the licence just for you, or for all users of your computer, depending on whether you are using your user licence to use Strata for all users on one computer or just you on several computers.

Here is where the licence certificate ends up if you install Strata on your computer for *your* account only:

macOS: ~YOURUSERNAME/Music/CricketsAudio/Strata/Strata Licences.xml

Windows: C:\Users\YOURUSERNAME\AppData\Roaming\Crickets Audio\Strata\Strata Licences.xml

Here is where the licence certificate ends up if you install Strata on your computer for *all* accounts:

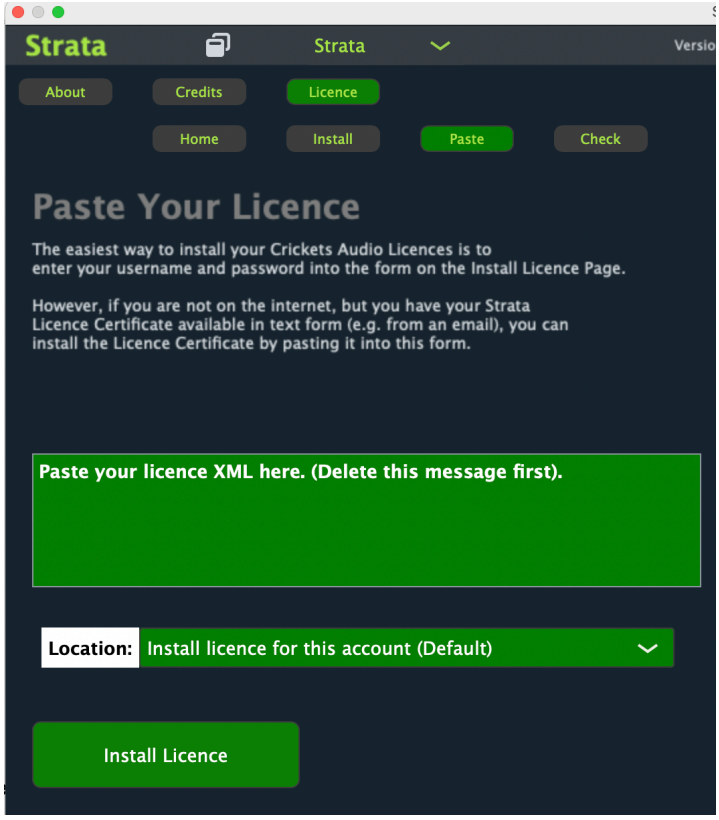
macOS: /Library/Application Support/CricketsAudio/Strata/Strata Licences.xml

Windows: C:\ProgramData\Crickets Audio\Strata\Strata Licences.xml

Note: Once the licence certificate is installed, you should never need the internet again to use Strata on that computer.

Note: The licence certificate purposely does not have any machine-ID information in it so that if you upgrade your computer, Strata will not require any kind of reinstallation. It should just keep working. I realise how daunting it is to have to face dealing with all the chaos that arises from upgrading one's computer, and I don't want Strata to contribute to the problem. (This is a separate issue from operating system or architectural upgrades which are capable of rendering the software inoperative without an update). The downside (for me) is that it makes unlicensed copying easier.

16.12.3 Licence Page: Paste

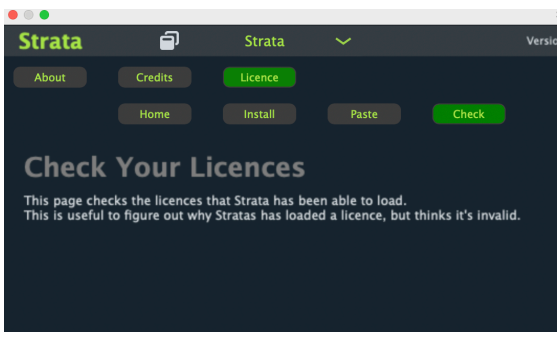


Uh oh. You've gone to a Tibetan monastery (where there's no internet) to focus on music production and now you want to use Strata. But you can't install it because the Install page above requires the internet. What to do? Well, when you purchased a Strata Licence, the Crickets Audio website will have emailed you a licence certificate for exactly this circumstance, so if you go copy the XML text of that certificate from that email, you can paste it into this form and off you go! And say hi to the monks from me (but only if it's not a silent order).

Note: In Strata V1.0.0, the Paste page does not support a choice of personal or computer licences. This will be fixed in a later version.

16.12.3 Licence Page: Check

The Licence Check page is a diagnostic page for figuring out what has gone wrong when someone's licence isn't working.

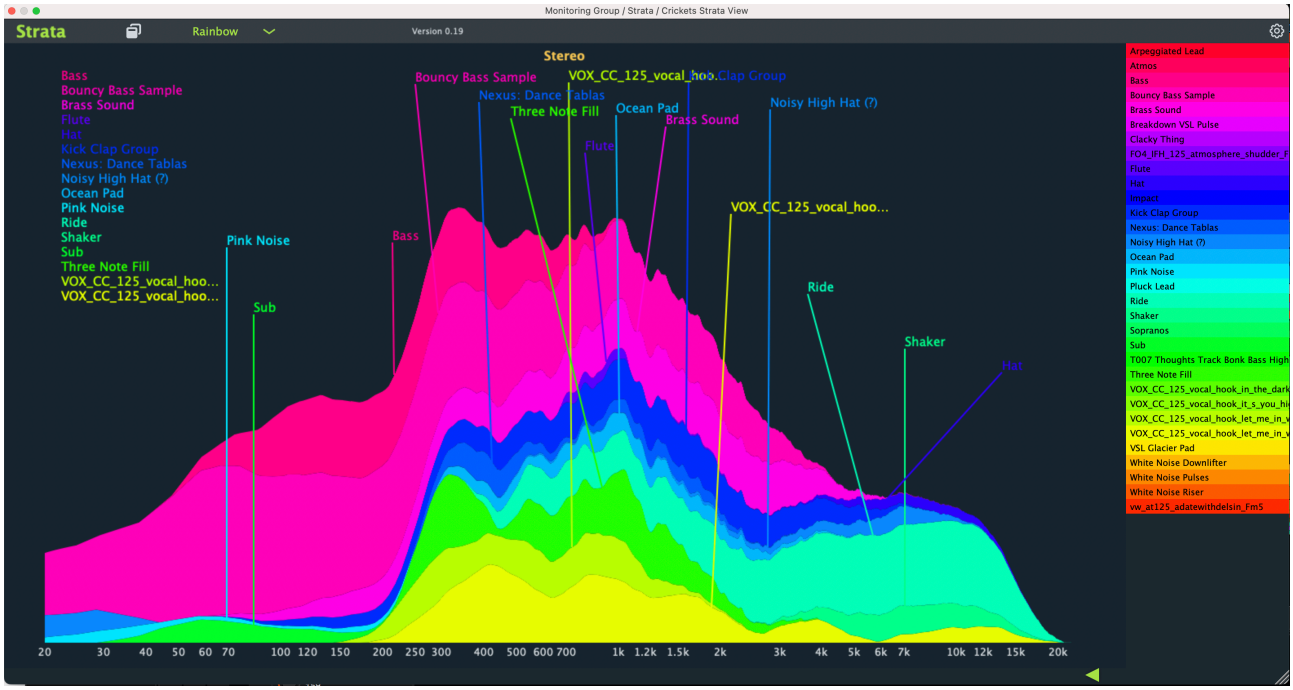


16.13 Heading

The Strata Vision heading displays the name of the plugin and its version.

16.14 Graph

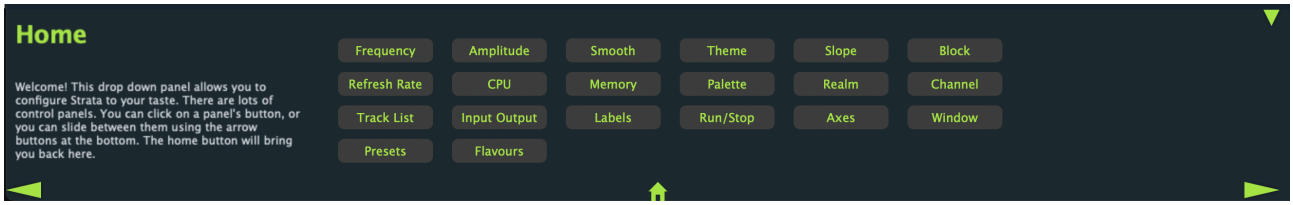
Most of Strata Vision's window is taken up by the graph which displays the main layered "strata" graph.



16.15 Control Panel

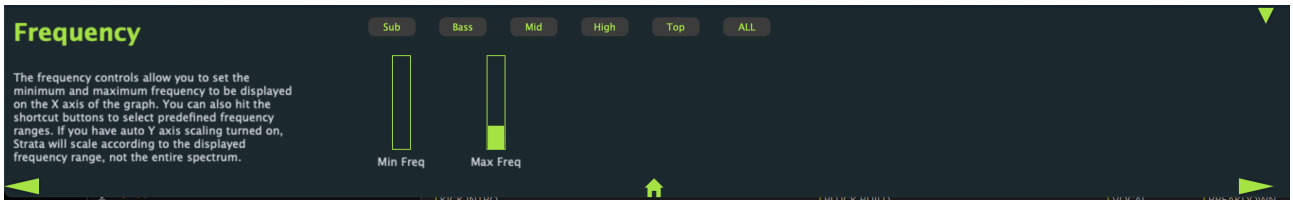
Strata Vision has a control panel under the graph that can be opened and closed using the triangle at the bottom right corner of the window. When the control panel is open, it displays one of several views. You can switch between views using the left and right triangle buttons at the left and right of the control panel view. You can return to the control panel home panel by clicking on the little house at the bottom middle of the control panel.

16.16 Control Panel View: Home



The Home view of the control panel presents an array of buttons, one for each control panel view. This enables you to go to any particular view very quickly after opening the control panel. You can also use the left and right triangle controls on the left and right of the bottom of the control panel to cycle between all the control panel views.

16.17 Control Panel View: Frequency

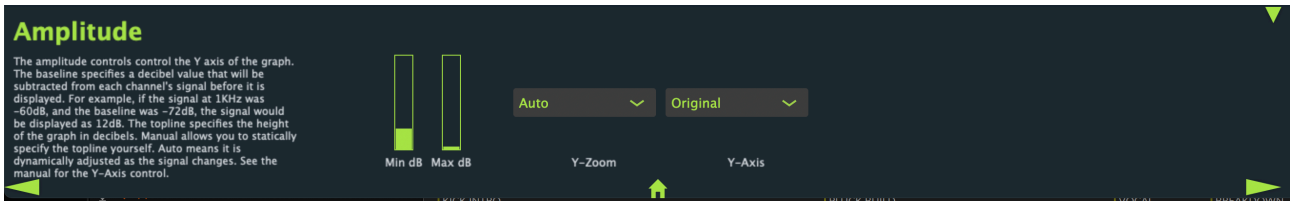


The Frequency view of the control panel allows you to specify the minimum and maximum frequency to be displayed in the graph. In other words, this allows you to specify the frequency at the ends of the graph's X axis. The panel also has some buttons that allow you to go directly in one-click to predefined parts of the frequency spectrum:

Button	Minimum	Maximum
Sub	20Hz	100Hz
Bass	60Hz	250Hz
Mid	250Hz	4KHz
High	4KHz	10KHz
Top	10KHz	22KHz
ALL	20Hz	22KHz

The ALL button gives you the entire spectrum and is the default setting.

16.18 Control Panel View: Amplitude



The Amplitude view of the control panel allows you to control the Y axis. The Min dB and Max dB settings effectively allow you to set the bottom and top of the Y axis of the graph.

The Min dB setting is a decibel value that is subtracted from a signal of each track before it is plotted. So, for example, if a track's signal (at a particular moment and frequency) were -62dB, and the Min dB setting were -72dB, then the track would be plotted on the graph as 10dB high.

The Max dB setting is a decibel value that is how many decibels the top of the Y axis is going to be. The difference between the Min dB and the Max dB is the height of the graph in decibels.

As the signals arriving from the various tracks can vary a lot within a track, adjusting the Max dB value to keep the graph in view (and not too small) can become tiresome. For this reason,

management of the Max dB can be handed over to Strata Vision by setting the Auto setting. This works so well that it is the default setting!

There is also an Original/Experimental setting. Just stick to Original for now. The Experimental setting will be implemented in a future version.

16.19 Control Panel View: Smooth

The Smooth view of the control panel allows you to specify how the signal will be smoothed temporally and graphically.

The Decay Seconds control allows you to specify how long a momentary signal will affect the graph. Strata performs temporal smoothing using the very simple algorithm of multiplying all the amplitudes of a spectrum by a decay constant (eg. 0.95) and then adding in the latest spectrum. This parameter has been configured so that if you specify a certain number of seconds S, the decay constant will be set so that an impulse in the spectrum at time T will have decayed to almost zero after S seconds.

The Smooth control allows you to set how the shape of each Stratum will be smoothed before being plotted.

16.20 Control Panel View: Theme

The theme view allows you to choose from several graphical themes for the look of the entire plugin. See the Themes section of this manual for a description of the available themes.

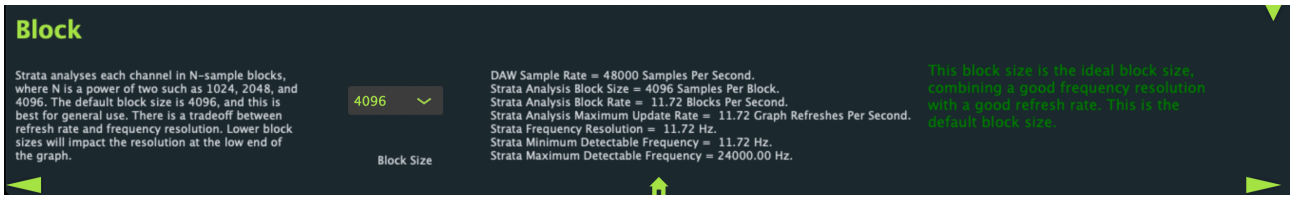
16.21 Control Panel View: Slope

The Slope view of the control panel allows you to specify a “slope” of the graph in decibels per octave. The human ear is generally more sensitive to high frequencies than to low frequencies, and, for this reason, many audio graphing applications allow the user to distort the display so that

the higher frequencies are plotted artificially high so that a sound that is pleasing to the human ear will be plotted as flat. The very popular spectrum graphing plugin *Voxengo Span* uses a default slope of 4.5 decibels per octave, so I have used that as a default for Strata Vision too, even though I tend to shoot for a slope of 5.5 in my own productions.

You shouldn't have to adjust this control. If you do want to adjust it, you might want to set it to zero so that you can see the raw spectrum. However, be warned that the top of the strata does not accurately represent the decibel level of the entire signal (all the tracks summed) because decibel values do not sum linearly (see the Decibel Maths section).

16.22 Control Panel View: Block



The Block view of the control panel allows you to specify a block size (in samples) that Strata will use to analyse the signal from each track. *This is completely independent from the DAW block size.* DAWs manipulate signals consisting of N samples per second where N is referred to as the "sample rate" and typically has a value of 44100 (samples per second). When Strata analyses such a signal, it breaks it up into blocks of B samples each (e.g. 2048 samples per block) and then performs a Fast Fourier Transform (FFT) on the block to obtain the block's frequency spectrum.

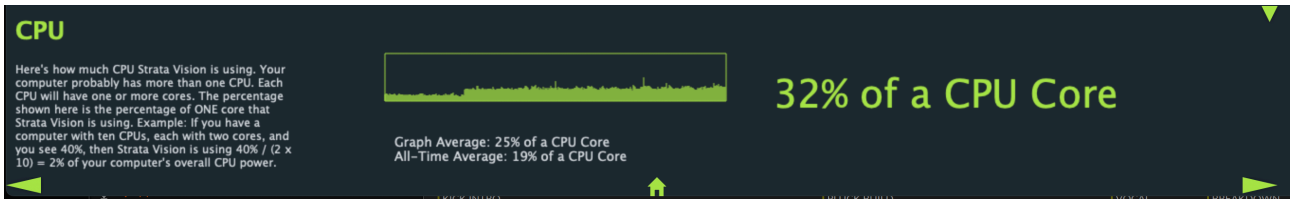
There is a tradeoff in choosing a block size. Small block sizes (e.g. 256) allow Strata to analyse the signal more often, but provide a low frequency resolution. High block sizes (e.g 32768) provide excellent frequency resolution, but mean that Strata can analyse the signal fewer times per second.

For more information on this parameter, see the Block Size section in the parameters section of this manual.

16.23 Refresh Rate

The refresh rate specifies how often Strata Vision updates its graph. This should probably be synced to the rate defined by the block size, but isn't at this point.

16.24 Control Panel View: CPU



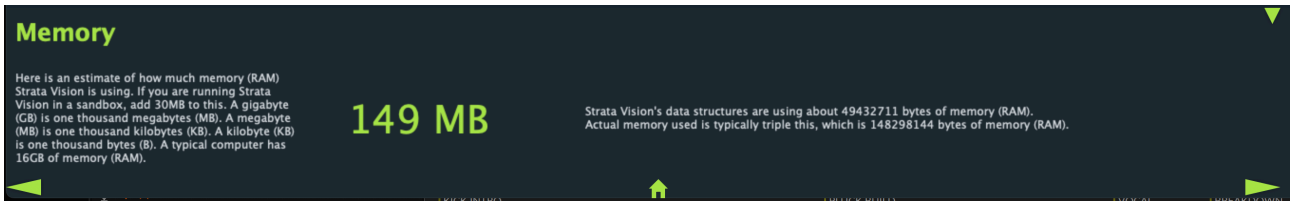
The CPU view of the control panel is a dedicated place that you can go if you feel that Strata might be using too much CPU. It provides a central control that allows you to reduce Strata's CPU usage without having to go to each track in your project and individually turn off each Strata Track plugin. The view provides two ways to reduce CPU:

The Updates/Second allows you to specify how many times a second Strata should update its graph on the screen. This has nothing to do with the DAW sample rate or the analysis block size. It is simply how many times per second Strata Vision updates its display. The default value is the maximum value of 22. My experience is that lowering this value has no significant impact on CPU usage.

The Stop button is far more powerful. If you press the Stop button, Strata enters Stop mode, and Strata Vision sends a message of all the instances of Strata Track (in the same realm) telling them to stop analysing the signal and stop sending FFT reports to Strata Vision. The Strata Vision and Strata Track plugins will still communicate with each other several times a second (so that they can all spring to life if you press the Run button to resume analysis), but the overall CPU load by Strata will reduce significantly.

As the creator of Strata, I feel that the Stop button is a critically important feature. Audio production is one of the most CPU-intense applications that exists today, and most DAW users spend a lot of time wrestling with CPU issues, doing things like "freezing" tracks and separating their master chain into a separate project and so on. If, after adding Strata to fifty tracks, the user (perhaps later) encounters CPU problems and goes on a CPU economy drive, the user might suspect that Strata is part of the problem. Without the Stop button, the only way for the user to determine if Strata is part the problem is to go through fifty tracks and turn off (or delete) all the Strata Track plugins. This is time consuming and irritating, and after one round of this, the user might just delete Strata or turn it off completely in the project and never use it again. The Stop button allows the user to turn off the Strata Vision plugin and all the Strata Track plugins with one click to see if Strata as a whole is actually impacting CPU use. If Strata is not impacting on CPU, the user can discover that instantly. If it is impacting CPU, perhaps the user will delete all the Strata plugins from the project, or perhaps the user will keep them in place and turn on Strata (with the Run button) only when they need to see the Strata spectrum display. In either case the user can find out immediately without having to turn off (or delete) fifty Strata Track plugin instances.

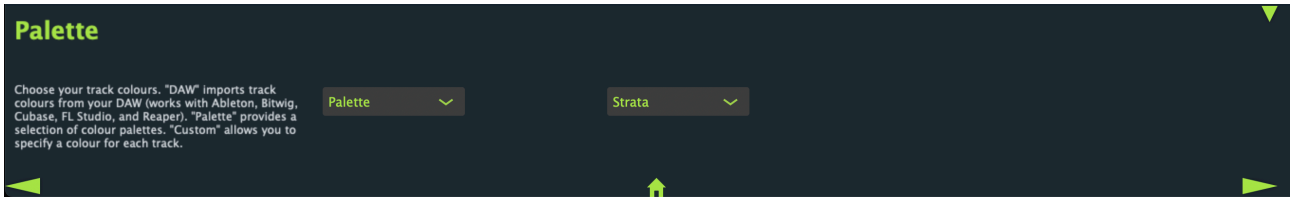
16.25 Control Panel View: Memory



The memory control panel view gives you an approximate idea of how much memory Strata Vision is using. It's a little tricky trying to figure out how much memory Strata Vision is using. Strata Vision can count exactly how many bytes its data structures are directly using on the stack and in the heap. However, the heap comes with heap management overhead, so storing 50 bytes in the heap might actually use 100 bytes of space in the heap. I have found that a good conservative rule of thumb is to triple the number of bytes to come up with an estimate of the total number of bytes used, and so that's what Strata Vision does in this control panel view. It tells you the direct number of bytes in a small font and displays the triple figure in a huge font.

Note: This control panel view shows only the memory used by the current instance of Strata Vision. it does not include the memory used by all the instances of Strata Track that are connected to Strata Vision. Perhaps that feature will appear in a later version of Strata. You can see the memory used by each instance of Strata Track by opening the Memory control panel view within Strata Track.

16.26 Control Panel View: Palette

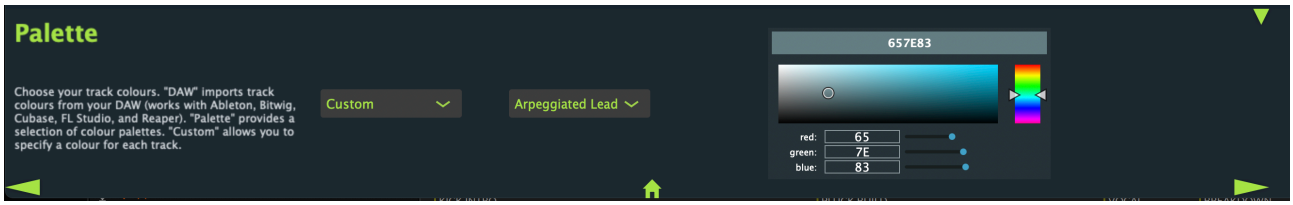


The palette view allows you to specify in what colours the tracks will be displayed in the graph. Future versions might have other controls, but currently this pane allows you to control only the colour scheme used to paint the strata layers. Here are the options:

DAW: This option attempts to use the track colours provided by the DAW. Unfortunately, Strata is unable to obtain the track colours from Garage Band, Logic Pro, and Studio One.

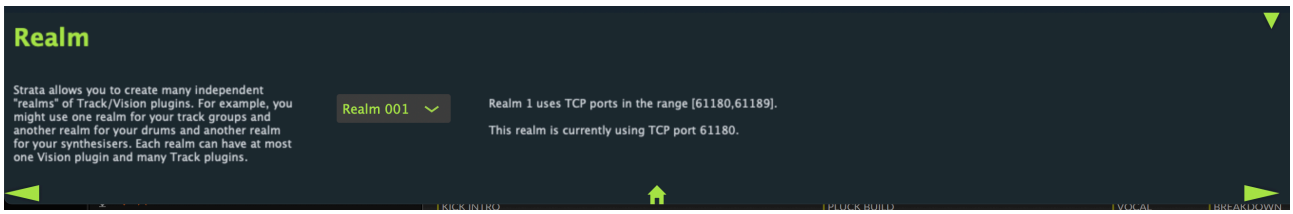
Palette: This option provides an additional menu that allows you to select one of a range of predefined colour palettes. See the Colour Palettes section in this user manual for a list of the predefined colour palettes.

Custom: This option allows you to assign colours to tracks manually. This might be useful in DAWs for which Strata Vision cannot access the DAW's track colours. When you select this option, a second menu is shown with the list of tracks. Select the track whose colour you wish to change and then set the colour using the colour picker to the right.



A Note On Custom Colours: *For the curious only!* The custom colour option was problematic to implement. When a custom colour is specified by the user, it must be stored in the Strata Track Plugin instance or the Strata Vision Plugin instance. I chose the Strata Vision Plugin instance because the colour display is an attribute of the view, not the track. But any Strata Track plugin can disconnect from the Strata Vision plugin at any time! If this happened, the view plugin would lose the colour unless it remembered “who” the Strata Track plugin was. For this reason, each Strata Track instance has its own unique identity and the Strata Vision plugin remembers bindings between the Strata Track instance identities and the user-assigned custom colours. The Strata Vision plugin also saves these bindings when its state is saved. All this means that the Track/Vision connection can drop or the DAW project can be saved and the colour bindings will persist. The only thing that will make Strata forget a custom colour for a track is if the Strata Track instance for that track is deleted or the Strata Vision instance holding the binding is deleted.

16.27 Control Panel View: Realm



The Realm View allows you to specify the realm that the Strata Vision plugin is to operate within. Most users will never need to use the realms feature. See the separate section on Realms for more information.

The view shows the current realm and its corresponding TCP port range. Each realm from 001 to 100 is statically bound to ten TCP ports which the realm might use. At any one time, the Strata Vision plugin runs a TCP server on exactly one port within its realm’s TCP port range. This port is shown in the Realm view too. (The Strata Track plugins using the same realm connect to the Strata Vision’s TCP server as TCP clients).

Strata Prime Note: A Strata Prime licence allows the use of only one realm (realm 001). Strata Track will allow you to set the realm to any realm (001 to 100), but Strata Vision is locked to realm 001 and will ignore any attempts to change the realm using this control panel or the plugin’s Realm parameter.

16.28 Control Panel View: Channel

The channel view allows you to specify the audio channel that you wish to analyse and display. There are five choices:

Stereo: This is the sum of the amplitudes of the left and right channels. This is the default view and most users will use this most of the time.

Left: This is the left channel.

Right: This is the right channel.

Mid: This is the left channel plus the right channels summed sample by sample.

Side: This is the left channel minus the right channel subtracted sample by sample.

The graph pane always displays the name of the currently displayed channel at the top of the graph pane. The colour of the name of the channel conforms to the colours used by FabFilter Pro-Q for these channels: yellow for stereo, white for left, red for right, green for mid, and blue for side.

Although I am happy that Strata allows you to display all these different channels, I am also aware that it's more helpful to display left+right and mid+side as pairs rather than isolation. Perhaps a future version will allow you to display these pairs together.

16.29 Control Panel View: Track List

The Tracks View allows you to specify how the list of tracks will be displayed.

Left: Left means that the tracks will be displayed to the left of the graph pane. This is probably the most intuitive position for most DAWs, as most DAWs list the tracks on the left.

Right: Right means that the tracks will be displayed to the right of the graph pane. This is probably the most intuitive position for Ableton users, as Ableton lists its tracks on the right.

None: None means that the list of tracks will not be displayed at all. This might seem to make no sense. How can you tell which track is which if there is no "key" in the form of a track list? Well, there are several methods:

DAW Colours: If you are using DAW colours and have defined for yourself standard track colours (e.g. kick is always red), you might know which colours correspond to which tracks.

Dynamic Track List: You can see a separate list of just the tracks that are playing by turning on Strata's Dynamic Track List feature.

Track Floating Labels: You can see track names floating above the tracks by turning on Strata's floating track labels feature.

Strata provides lots of different ways for you to label your graph depending upon your needs. The main reason that the track list exists is so that you can quickly visually see and check which tracks you have put Strata Track on and which you have not. Once you're happy that you've got full track coverage, you can turn off the track list and just look at the graph.

16.30 Control Panel View: Input/Output

This Input/Output control panel view is primarily a diagnostic tool to check what audio inputs and outputs the DAW is providing to Strata Vision. In particular, the panel shows clearly whether Strata Vision has been placed in a mono or stereo DAW context. It shouldn't actually matter, as Strata Vision doesn't listen to its track; it receives information from instances of Strata Track via TCP.

16.31 Control Panel View: Labels

The labels control panel view allows you to specify how you want to strata graph spectra labelled. There are three off/on controls:

Dynamic Track List: This control determines whether Strata displays a *dynamic* track list in the top left corner of the strata graph. Whereas the track list on the left or right side of the Strata window (if it is on) is to show which tracks have an *instance* of Strata Track on them, the dynamic track list shows only the tracks that are *carrying a significant amount of sound* at the time. Significance is defined by being above the minimum amplitude setting in the Amplitude control panel view.

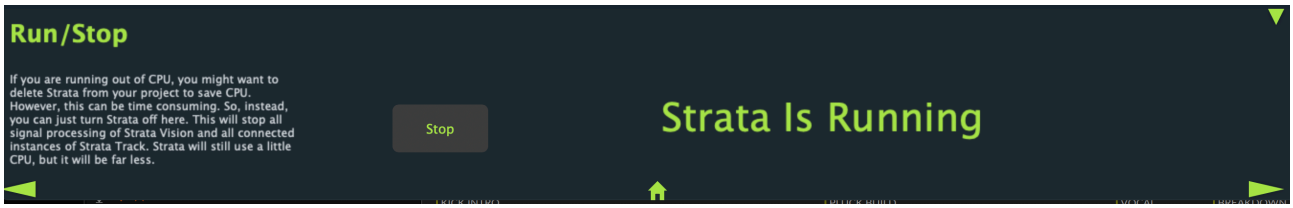
Floating Labels: This control determines whether Strata displays a floating label for each stratum in the strata display.

Floating Label Lines: This control determines whether Strata connects each floating label with its corresponding strata using a line. Lines are not displayed unless the floating labels are displayed.

All these controls provide you with a lot of flexibility in how you want to display your strata graph. You choose. Personally, my favourite configuration is to turn off the main track list and the dynamic track list and just have the floating labels with lines.

I plan to add a feature in a future version where the track labels can appear within the actual coloured strata where there is space for that.

16.32 Control Panel View: Run/Stop



The Run/Stop control panel view provides a way to turn off and on most of the processing of Strata Vision and all of the instances of Strata Track that are connected to it (in its realm). This is important if you find that Strata Vision and Strata Track are using up too much CPU. It's easy to delete or deactivate Strata Vision if it is using too much CPU, but if you have a project of 100 tracks and you have put Strata Track on every track, it would be time consuming to remove Strata Track from every track. It might also be hazardous to do so (you might accidentally remove another plugin from a track too). I didn't want users to have to remove all their instances of Strata Track if they're pushing close to their computer's CPU capacity, so I added this Run/Stop control to Strata Vision so you could turn them all off with one click.

In a test, I just did in Bitwig on macOS on a 2020 Intel iMac, hitting the Stop button reduced Strata Vision's CPU from 44% of a CPU core to 17%, so that's about half. When I looked at a few instances of Strata Track that were connected, their CPU went from about 1% of a CPU core to 0% of a CPU core. Perhaps I should implement more fine-grained measurement, but it seems to be a useful reduction. In any case, the Run/Stop control panel provides a context for future versions of Strata to reduce CPU usage even further when turned off.

Note: When viewing the CPU control panel view of Strata Track, be aware that having the Strata Track window open at all (and in particular displaying the audio signal graphically) uses up CPU. So when you take a look at the graph, look a the historical figures, not just the current CPU figure.

16.33 Control Panel View: Axes

The Axes control panel view allows you to control the labelling of the spectrum graph axes. There are two axes: the X axis and the Y axis. The X axis corresponds to frequency and the Y axis corresponds to amplitude.

> **Frequency Labels:** This control determines whether the X axis will be labelled with frequencies in Hertz. I can't think of many circumstances when you wouldn't want to have this turned on, but perhaps the minimalists among us will love this feature. :-)
>
> **Frequency Lines:** This control determines whether vertical frequency lines will be plotted on the graph at significant frequency points. I personally find them kind of annoying, so I've made them default to off. But maybe some users will like them.
>
> **Decibel Labels:** This control determines whether decibel labels will be plotted on the Y axis of the graph. See below for more information.
>
> **Decibel Lines:** This control determines whether horizontal decibel lines will be plotted on the Y axis of the graph. See below for more information.

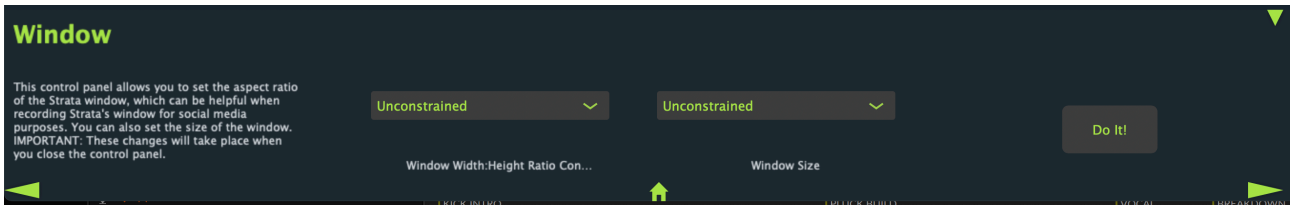
Whereas the X axis showing frequency is quite straightforward, understanding the Y axis is likely to be more problematic for most Strata users. Because the strata are plotted on top of each other, and because each stratum's thickness at any particular frequency is determined by the amplitude of that track's sound at that frequency above the amplitude minimum (as specified in the Amplitude control panel view), and as decibel values don't sum arithmetically, the Y axis is not an absolute axis, and it makes no sense to plot absolute values on it. The only thing we can do is plot relative values. One thing that all the strata that are plotted have in common is that each unit of height within one stratum will correspond to the same increase in decibel value of that of another track. So for the Y axis, Strata displays values that indicate the decibel magnitude of height. If you turn on both the decibel labels and the decibel lines, you will see that, unlike the frequency graph, the labels are plotted *between* the lines because the aim is not to indicate any absolute amplitude but to show the relationship between height on the graph and decibels.

Example: The amplitude minimum (as set in the Amplitude control panel view) is -72dB. A track T has a volume of -12dB at 1KHz. The graph has labelled the Y axis with "30dB" between lines. Then T will have a height at 1KHz of two Y axis lines (60dB = (-12dB- -72dB) / 30dB.

I expect that most users will find all this incredibly confusing, so I have turned off Y axis labelling by default so that they won't be bothered by it. Those who understand Strata might find it helpful to turn it back on.

My personal choice is to have only the frequency labels turned on and the other three turned off, and that is, in fact, the Strata default.

16.34 Control Panel View: Window



Once I had created Strata, I realised that the Strata graph sometimes looks quite spectacular, and that a lot of users might want to post a video of the graph to social media. So to help them, I have included the Window control panel which allows you to constrain the width/height ratio of the Strata window. The controls in this view are little different from those of other views because you have to hit the “Do It!” button (or close the control panel) for the change you’ve made to take effect.

Here are the ratio options available:

Modern Smartphone (6:13): This is the ratio used by many modern smartphone screens in portrait mode. I find that the graph that Strata plots looks too high. Perhaps a future version of Strata could provide a 13:6 landscape mode too or maybe a future version could plot the spectrum on the Y axis.

Square (1:1): If you want a square for some reason, I got you! :-)

HD Video (16:9) [YouTube]: This ratio is the one used by YouTube so it’s great for YouTube videos.

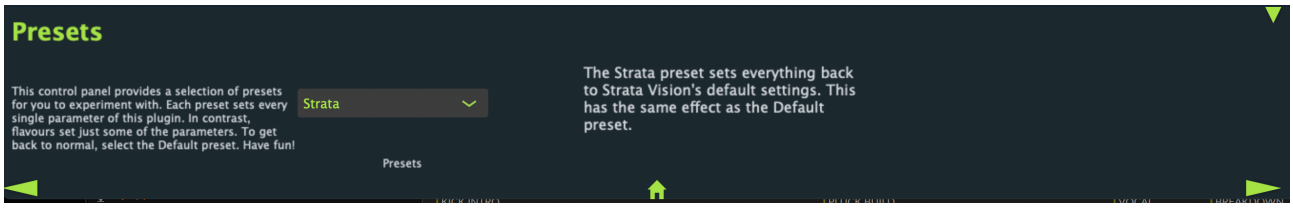
Fullscreen (4:3): I can’t remember why I added this, but here it is.

IMAX Film (143:100): I couldn’t resist adding IMAX support.

Laptop (8:5): This is a typical screen ratio of a laptop computer.

The concept is that you set one of these ratios and then activate screen capture and specify the Strata Vision window. If you do that, you will end up with a video that is exactly the size needed to post to your social media.

16.35 Control Panel View: Presets



You can’t have an audio plugin without a bunch of presets, and Strata is no exception. :-)

None: This means that no preset is active.

Default: This is the default preset. It’s the same as the Strata preset.

Strata: This is the default preset. Invoke this when you've been fiddling with various Strata controls and things have gotten crazy and you just want things to go back to normal.

DAW Native: This preset configures Strata to look as much at home within your DAW as it can. Mainly it just switches to your DAW's theme, but it also might make other adjustments, depending on your DAW.

Summer./Winter/Autumn/Spring/Unicorn: Each of these is just the default preset with the specified colour palette activated.

Low End: This is the default preset with the maximum frequency set to 200Hz so you can see just the low end of the frequency spectrum in more detail. Don't forget that the level of detail that you CAN see is constrained by the Strata block size. The greater the block size, the more low-end detail you will be able to see.

Minimalist: This preset is for those who want the absolute minimum amount of screen clutter in their Strata display. The track list, dynamic track list, strata labels, and axes labelling are all turned off! With all this turned off, you might think that this display is kind of useless, but if you select the DAW colour palette and you know what colour each of your tracks is, it could work very well for you!

Maximalist: This preset is for those who want the absolute maximum amount of screen clutter in their Strata display. The track list, dynamic track list, strata labels, and axes labels and lines are all turned on. It's kind of messy, but great if you want to see everything.

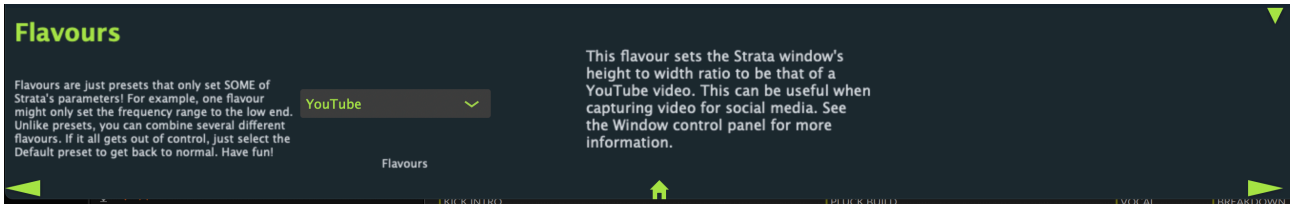
YouTube: This is the default preset with YouTube window ratio constraint turned on.

Smartphone: This is the default preset with Smartphone window ratio constraint turned on.

Smooth: This is the default preset but with the Smooth setting maxed out yielding a strata graph that looks like rolling hills.

So have fun with those. Unfortunately, Strata Vision does not yet allow you to save your own presets.

16.36 Control Panel View: Flavours



What's the difference between a preset and a flavour? So confusing! Well, I'm glad you asked. The only difference is that whereas a Strata preset sets ***every*** Strata parameter, a Strata flavour only sets ***some*** of them. So, for example, it would make sense to select a strata preset and them apply one or more flavours to it.

Here are the available flavours:

None: No flavour is active.

DAW Native: This flavour configures Strata to look as much at home within your DAW as it can.

Low End: This sets the maximum frequency set to 200Hz so you can see just the low end of the frequency spectrum in more detail.

Maximalist: This flavour is for those who want the absolute maximum amount of screen clutter in their Strata display. The track list, dynamic track list, strata labels, and axes labels and lines are all turned on. It's kind of messy, but great if you want to see everything.

Mid Range: This flavour sets the frequency range to 500Hz to 4Khz so you can see the mid range of the frequency spectrum in more detail.

Minimalist: This flavour is for those who want the absolute minimum amount of screen clutter in their Strata display. The track list, dynamic track list, strata labels, and axes labelling are all turned off! With all this turned off, you might think that this display is kind of useless, but if you select the DAW colour palette and you know what colour each of your tracks is, it could work very well for you!

Sensitive: This flavour sets the minimum amplitude to -100dB.

Smartphone: This flavour constrains the Strata window ratio to Smartphone ratio.

Smoothy: This flavour sets the smooth parameter to its maximum.

Top End: This flavour sets the frequency range to 8KHz to 20KHz so you can see the top end of the spectrum in more detail.

YouTube: This flavour constrains the Strata window ratio to YouTube ratio.

Unfortunately, Strata Vision does not yet allow you to create your own flavours.

6.36 Control Panel View: Names

The Names control panel does nothing at the moment except notify users that, currently, track names are set in Strata Track, not Strata Vision. This is in contrast to colours which are set in Strata Vision (except for DAW colours which can flow through).

I added this Names control panel in V1.1 because a user got frustrated looking for the Name control panel in Strata Vision. I thought I'd help future users with the same problem by given them something to find, with a notice directing them to the Name control panel in Strata Track.

Track names are set in Strata Track because track names are fairly static things that are unlikely to change. Track colours are set in Strata Vision because the user might want to try out different colour palettes which change the colour of every track in one action. This said, a future version of Strata might add functionality to this Names section to allow you to override track names within Strata Vision. There might be some use for that. But not today.

17 Strata Vision Plugin Parameters

The Strata Vision plugin has many parameters. I have endeavoured to expose every significant underlying parameter of the plugin as a formal parameter that can be set and automated in the DAW. The plugin's window height and width are even automate-able parameters! This section describes all the parameters in detail.

Most of the parameters appear in the control panel underneath the spectrum graph. However, some don't. You can modify those using your DAW's plugin parameter panel or your DAW's automation.

All the parameters are saved when you save your project, so the plugin will be exactly the same when you restore your DAW project.

17.1 Window Width

This is the plugin's window width in virtual pixels. You can change this either by dragging the bottom left corner of the window to a new size, or by specifying or automating the value via your DAW.

Range: [500, 5000].

Default: 1200.

17.2 Window Height

This is the plugin's window height in virtual pixels. You can change this either by dragging the bottom left corner of the window to a new size, or by specifying or automating the value via your DAW.

Range: [500, 5000].

Default: 600.

17.3 Run / Stop

To operate, the Strata plugins have to perform a Fast Fourier Transform (FFT) calculation of every track you drop the tap plugin on. If you are finding that collectively the strata plugins are using a lot of CPU, you can turn the whole system off using the Run / Stop parameter of the Strata Vision plugin. If you set the parameter to Stop, the plugin will send a message to all the Strata Track plugins telling them to stop calculating. This is much more convenient than turning off all the Strata plugins in your DAW!

This important feature means that you should never fear adding Strata plugins to your project. If they ever start causing CPU problems, you can just turn them all off with one master switch.

Note: This feature is currently only partially implemented. Changing to Stop will save a lot of CPU, but not completely reduce CPU usage to zero.

Values: Run, Stop.

Default: Run

17.4 Theme

The Strata Vision plugin comes with several graphical themes! See the section of this manual “Control Panel View: Theme View” for a description of all the available themes.

Values: Strata, Arctic, Arctic With Sunglasses, Australian Cigarette Packet, Bitwig, FL Studio, FabFiller, Green Screen, iZotope, Live Default Dark, Live Default Light, Live Classic Medium Dark, Live Classic Medium Light, Logic Pro, Cubase, Reaper

Default: Strata

17.5 Control Panel Status

This parameter determines whether the dropdown control panel (under the spectrum graph) is visible. To open and close the control panel manually, click on the open/close triangle at the bottom right corner of the spectrum pane.

Values: Open or Closed.

Default: Closed

The default is Closed so as not to overwhelm new users with complicated controls.

17.6 Control Panel View

This parameter determines which of the several control panel views will be shown if the control panel is Open (see “Control Panel Status” above).-

Values: Home, Frequency, Amplitude, Smooth, Theme, Slope, Block, Refresh Rate, CPU, Memory, Realm, Channel, Track List, Input/Output, Labels, Run/Stop, Axes, Window, Presets, Flavours.

Default: Home

17.7 Spectrum Y Scale (AKA “Y Axis”)

This parameter determines the method for plotting the strata. It can only take one of two values:

> **Original:** This plots the decibel level of each track. Because decibels do not sum linearly, the top of the strata is not the decibel level of your song. This is the default.
>
> **Experimental:** This mode is currently ***NOT YET IMPLEMENTED!***

Default: Original.

17.8 Spectrum Y Zoom

This parameter determines whether the Spectrum Topline dB parameter is being manually controlled by the user (or by DAW automation) or is being set automatically by the plugin.

Experience has shown that, as a song plays, the user can end up spending a lot of time adjusting the Spectrum Topline dB parameter so as to prevent the spectrum strata from being just a few pixels high at the bottom of the spectrum pane or soaring way above the top of the spectrum pane. The Auto setting allows the user to hand this scaling task over to the plugin to be done automatically.

To avoid a jarring experience, the plugin does not *instantly* adjust the Spectrum Topline dB parameter in accordance with the current channel volumes. Instead, it *follows* the channel volumes with a lag. This allows the user to see what's happening when the volumes are changing rather than just looking at a strata graph that sits at the same height all the time (with just the Y grid lines changing).

Values: Manual or Auto.

Default: Auto.

The default is auto as this is by far the most user-friendly setting.

17.9 Block Size

This parameter determines the size of the blocks (in samples) into which Strata will divide audio signals for analysis. This is completely independent from the DAW's own block size.

DAWs manipulate signals consisting of N samples per second where N is referred to as the "sample rate" and typically has a value of 44100 (samples per second). When Strata Track analyses such a signal, it breaks it up into blocks of B samples each (e.g. 2048 samples per block) and then performs a Fast Fourier Transform (FFT) on the block to obtain the block's frequency spectrum. It then sends the FFT to Strata Vision via TCP networking.

Unfortunately, there is a tradeoff in choosing a block size. Small block sizes allow Strata to analyse the signal more often. For example, if your DAW's sample rate was 44100 and you specified a block size of 256 samples, Strata would analyse each track's signal 172 times a second (44100/256)! However, the smaller the block size the lower the resolution of Strata's frequency graph. The frequency resolution doesn't matter much at the high end of the frequency spectrum, but at the low end it really matters. At a 44100Hz sample rate and a block size of 256 samples, Strata will display one histogram bar for the entire frequency range 0Hz to 172Hz! This is a very low resolution! You wouldn't even be able to distinguish your sub from your bass!

Large block sizes provide a far better frequency resolution, but reduce the number of times per second that Strata can analyse the signal. For example, if your DAW's sample rate is 44100Hz and you set a block size of 16384 samples per second, Strata's frequency resolution will be 2.69Hz (wow!), but Strata will only be able to analyse the signal about three times per second. (This problem could be solved by organising parallel streams of overlapping blocks, but would use much more CPU. It could also be solved by using wavelet signal processing, but I haven't had time to look into that yet).

Because of this tradeoff, the block size you choose will largely depend on how dynamically you want Strata to display the signal. If you turn the Decay parameter down and want to see the signal jumping around rapidly, then you should choose a smaller block size. If, on the other hand, you just want to see the signal averaged over time, then you should choose a larger block size so that you get the benefit of the increased frequency resolution at the low end of the frequency spectrum.

At this time, Strata's default block size is 4096 samples per second which means that, at a DAW sample rate of 44100Hz, it will analyse the signal 11.7 times per second with a frequency resolution of 11.7Hz. This is a good compromise setting. If you want to see a bit more detail at the low end, increase the block size to 8192.

Values: 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768, 65536.

Default: 4096.

17.10 Decay Seconds

This parameter controls the amount of temporal smoothing that is applied to the signal before it is plotted on the graph. This parameter is calibrated in seconds.

If you specify zero seconds, then what you will see is the instantaneous frequency spectrum. It will jump around a lot.

If you specify (say) three seconds, then what you will see is the frequency spectrum averaged over the last three seconds with the weighting of the signal at each point of time dropping exponentially. So that the signal from three seconds ago will be weighted lightly (almost zero) and the signal right now will be weighted heavily.

The default is three seconds, and that seems to be pretty good most of the time. You probably won't need to modify this parameter.

Range: [0,10].

Default: 3

17.11 Spectrum Topline dB

This parameter specifies what decibel level the top of the graph will represent. You usually won't need to change it.

This parameter is useful when your track is quiet and you want to scale the strata up so you can take a better look at them. If your strata are thin lines down the bottom of the graph, hit this parameter!

Important: If you have the YZoom parameter set to *Auto*, this parameter will be taken over and dynamically automatically set by the plugin from moment to moment. Furthermore, the control's slider in the control panel will vanish.

Range: [-100,1000].

Default: 0.

17.12 Spectrum Baseline dB

This parameter specifies the decibel level that the base of the graph represents. You usually won't need to change it.

Every track has a decibel level. What if it's really quiet? What if your track is -1000dB? Should it be plotted at all? To answer this question, a minimum is applied. When you specify a Baseline dB, you are saying two things:

1. Any track quieter than the baseline won't be plotted.
2. Any track louder than the baseline will be plotted but will have the baseline dB subtracted from it.

So, for example, if you had the baseline set to -100db and your track's signal (at a particular frequency) was -70dB, then its height in the graph (at that frequency) would be 30dB (ten 3dB vertical marker lines). Similarly, if your track was at -110dB, it wouldn't even be plotted.

This parameter is useful when you want to ignore quiet tracks and focus on the loud ones. In most cases, the default value should be just fine. It's usually more useful to play with the topline than the baseline.

Range: [-100,-10].

Default: -80.

17.13 Spectrum Updates Per Second

This parameter determines how often the graph will be updated on the screen. It is expressed in Hertz.

You should not change this parameter unless you are desperate to conserve CPU, in which case, this might not even help much. However, at least the parameter is there if you want to experiment and see if it saves CPU.

Range: [1,22].

Default: 22.

17.14 Spectrum Smoothing Width

This parameter determines what smoothing will be performed on each track's strata before plotting it.

If you set the parameter to a value of S, then the height in each track's stratum at each point X will be calculated as the (evenly-weighted) average of the original data point at X and also the pixels that are S/1000 of the proportion of the graph on each side. So if you set the parameter to 30 (the default), and the width of the graph is 2000 pixels, each strata's height in one pixel column is calculated from the 60 (= 30/1000 * 2000) pixel columns on each side. It doesn't actually matter if you understand this exactly. Playing with the parameter for a few seconds will give you an intuitive feel for what it does.

You shouldn't need to change this parameter, but it's certainly fun to experiment with!

One experiment you should try is to set it to zero. You will then see the raw Fast Fourier Transform (FFT) values (in decibels) plotted. It will look quite ugly, but you can see exactly what the underlying data/signal is, which is useful to understand. In particular, note that the resolution of the graph reduces in the lower frequencies. The left side of the graph is blocky, and the right side is fine-grained. This is because the FFT algorithm yields a spectrum that is linear in frequency (e.g. 20Hz, 40Hz, 60Hz, 80Hz, etc), but the spectrum is plotted on a logarithmic scale. So the FFT is actually providing the same resolution throughout the spectrum, but it looks much worse at the low end because the frequency scale is logarithmic, and we care so much about the low end.

Warning: If you play with this parameter, don't set it high and then forget that you've set it high, or your graphs will be very averaged and smoothed and you won't get as much value from the graph.

Technical Note: If you set the smoothing to zero, you might notice that the vertical frequency bars that are plotted have sloped tops. This is because of the Slope parameter!

Range: [1,100].

Default: 30.

17.15 Spectrum Minimum Frequency

This parameter determines the frequency that the left side of the spectral graph represents. This parameter must be less than the maximum frequency.

You usually won't need to change this parameter, but it's handy to modify the minimum and maximum frequency parameters to zoom in on a particular part of the frequency spectrum.

This parameter is (also) set by the frequency spectrum buttons in the control panel.

Range: [20,96000]

Default: 20.

17.16 Spectrum Maximum Frequency

This parameter determines the frequency that the right side of the spectral graph represents. This parameter must be greater than the minimum frequency.

You usually won't need to change this parameter, but it's handy to modify the minimum and maximum frequency parameters to zoom in on a particular part of the frequency spectrum.

This parameter is (also) set by the frequency spectrum buttons in the control panel.

Range: [20,96000]

Default: 22050.

17.17 Slope

The Slope parameter allows you to specify a "slope" of the graph in decibels per octave.

The human ear is generally more sensitive to high frequencies than to low frequencies and for this reason, many audio graphing applications allow the user to distort the display so that the higher

frequencies are plotted artificially high so that a sound that is pleasing to the human ear will be plotted as flat. The very popular spectrum graphing plugin Voxengo Span uses a default slope of 4.5 decibels per octave, so I have used that as a default for Strata Vision too.

You shouldn't have to adjust this control. If you do want to adjust it, you might want to set it to zero so that you can see the raw spectrum. However, be warned that the top of the strata stack does not accurately represent the decibel level of the entire signal (all the tracks summed) because decibel values do not sum linearly (see the Decibel Maths section).

18 Sandboxing

18.1 DAWs, Processes, And Address Spaces

When you invoke a DAW and work on some music, the DAW software typically loads as a single operating system (macOS or Windows) process. Each process in the computer has a memory (RAM) address space, which is critical to the operation of the software.

Typically, when a DAW loads an audio plugin (e.g. a VST3 plugin), it loads the plugin's code into the same process as the DAW. This means that the DAW and the plugin both reside in the same address space. This, in turn, means that the DAW and the plugin can damage each other and cause each other to crash. Specifically, it means that a plugin can cause the DAW to crash. A DAW can load fifty plugins, and it only takes one bad plugin to crash the DAW and all the other plugins.

18.2 What Is Plugin Sandboxing?

To avoid the problem of plugins crashing their host DAW, some DAWs do not load the plugin software in their own process's address space. Instead they create a new operating system process just for the plugin and load and run it there. Then, if the plugin crashes, it only crashes the plugin's process; it does not crash the DAW's process. So the DAW can notify the user that the plugin crashed, give the user the option of restarting the plugin, and keep going. This is called plugin sandboxing.

Here's a table showing the Strata-supported DAWs and whether they support plugin sandboxing:

DAW	Plugin Sandboxing	Comment
Ableton Live	No	
Bitwig Studio	Yes	Bitwig provides five sandboxing modes!
Cubase	No	
FL Studio	Yes	You can activate sandboxing on a plugin-by-plugin basis.
Garage Band	Yes	
Logic Pro	Yes	
Pro Tools	No	
Reaper	Yes	Reaper provides three sandboxing modes!
Reason	No	
Studio One	No	

Plugin sandboxing is one of the two main reasons I switched from Ableton Live to Bitwig Studio! Before I switched, Ableton Live crashes drove me nuts. It wasn’t Ableton Live that was crashing; it was one or two of the plugins I was using. Ableton Live was to blame only to the extent that it didn’t support sandboxing.

I once opened up one of my projects and it had 50 different plugins in it. That's *plugins*, not *plugin instances*. So, yeah; I'm going to use a DAW that supports sandboxing. :-)

18.3 Terminology

Before continuing, it's important to clarify a point of terminology. A "plug-in" refers to a particular plugin created by a plugin vendor. For example FabFilter Pro-Q4 is a plugin. A "plug-in instance" (or "an instance of a plug-in") is when you add a plugin to an effect chain in your DAW. For example, your DAW project might use FabFilter Pro-Q4 in seven tracks. The plugin is called "FabFilter Pro-Q4" and there is an "instance" of it on each of seven tracks. Each instance has its own parameters and settings which may be different from that of the other instances.

18.4 Plugin Sandboxing Modes

There are lots of ways of doing plugin sandboxing. The Bitwig DAW provides several sandboxing modes, so I'm going to describe those.

with Bitwig: In this mode, all plugin instances are run within the Bitwig process. This is the "no sandboxing" mode and is the most risky mode.

Together: In this mode, Bitwig creates a single other process dedicated to plugins and puts all the plugin instances in that process. This means that if a plugin instance crashes, it will take down all the other plugin instances, but will not take down Bitwig itself.

by Vendor: In this mode, Bitwig creates a new separate process for each plugin *vendor*. For example, there might be one process for FabFilter and one process for iZotope and one process for Cableguys, and so on. It then places all the instances of all the plugins of the vendor in that process. So, for example, you might have a DAW project that has five instances of FabFilter Pro-Q4, six instances of FabFilter Pro-R2, and three instances of Cableguys Shaperbox. In Vendor mode, Bitwig would create one process for FabFilter and place the five instances of Pro-Q4 it and the six instances of Pro-R2 in it. It would create one process for Cableguys Shaperbox and place the three instances of it in that process. In this mode, if a plugin instance crashes, it will take down all the instances of all the plugins made by the vendor associated with the process, but no other plugin instances.

by Plug-in: This is the same as "by Vendor" except that each *plugin* gets its own process. So, for example, you might have a DAW project that has five instances of FabFilter Pro-Q4, six instances of FabFilter Pro-R2, and three instances of Cableguys Shaperbox. In "by Plug-in" mode, Bitwig would create one process for the five instances of FabFilter Pro-Q4 and another process for the six instances of Pro-R2. It would also create one process for Cableguys Shaperbox and place the three instances of it in that process. In this mode, if a plugin instance crashes, it only takes down all the other instances of that specific plugin.

Individually: In this mode, each individual plugin *instance* gets its own process! In this mode, if a plugin instance crashes, the crash does not impact the DAW or any other plugin instances (including other instances of the same plugin). This is the safest mode of all.

Bitwig is an enlightened DAW in providing all these sandboxing modes, but is somewhat eccentric about its specific implementation of them. For example, you can mark any plugin as a special case to be hosted Individually, but you can't mark any plugin as a special case to be hosted by Plug-in. Also, when a plugin crashes, Bitwig puts up a notice telling you that a plugin has crashed, but doesn't tell you which one, information that it clearly has! It's annoying, but still vastly better than having Bitwig crash!

Anyway, if "Individually" is so great, why not run in that mode all the time? Well this might be sensible in the future, but for now, it's a little more complicated.

18.5 Memory Impact Of The Modes

The different modes have a different impact on memory (RAM) consumption. When you create an operating system process, the process comes with a fixed overhead RAM cost. Typically this is of the order of 30MB. So in "with Bitwig" mode, there will be no cost. In "Together", there will be a 30MB cost. In "by Vendor" mode, there will be a RAM cost of 30MB times the number of distinct plugin vendors in your project. In "by Plug-in" mode, each *distinct* plugin you use will incur a cost of 30MB. Finally, in "Individually" mode, each *instance* of each distinct plugin will cost 30MB.

Whether this RAM cost matters to you will depend on how much RAM you have and how many different plugin vendors and plugin instances you have in your DAW projects. Nowadays, you probably don't need to worry about the RAM impact until you get to "Individually" mode.

The "Individually" mode comes at an additional extra cost. All the other modes load just a single copy of each plugin's code into your computer's memory. However, the Individually mode will load a plugin's code once for each instance of the plugin. This means that if you have a plugin that contains a particularly large amount of code (eg. 100MB) you will be consuming this much RAM for *each* instance of the plugin. This also applies if the plugin tends to use lots of memory for its data structures. Because of these considerations, think hard before using Individually mode. It's best reserved for plugins whose sound you love, but whose software engineering you hate. :-)

18.6 Communication Speed Impact Of The Modes

One advantage of having all the plugin instances loaded into the DAW's address space ("with Bitwig" mode) is that the DAW and the plugin instances can communicate quickly. There is a small delay when different operating system processes talk to each other. It's not typically significant though. It probably mattered more a few years ago when CPUs were slower.

18.7 Communication Capability Impact Of The Modes

Some vendors that create plugins, whose instances talk to each other, have the instances to talk to each other through memory. This means that if you separate the plugin instances into separate operating system processes, they can no longer talk to each other. For example, instances of iZotope Neutron 4 talk to an instance of iZotope Visual Mixer to do mixing. If you separate the instances into different processes, they can no longer communicate. This means that "Individually" and "by Plug-in" modes will prevent iZotope Visual Mixer from working in Bitwig. It

is for this reason that I run Bitwig in "by Vendor" mode rather than "by Plug-in" mode. Until I write my own mixing plugin that uses TCP, I'm stuck in "by Vendor" mode. :-)

In contrast, some vendors have engineered their plugins to use non-memory ways of communicating (e.g. TCP networking) so it doesn't matter to these plugins if you use (even) Individually mode! Strata is in this category.

18.8 CPU Core Allocation Impact Of The Modes

In addition to the above considerations, the sandboxing mode might impact the allocation of plugin instances to CPU cores. However, we are in deep tech territory here and I am reluctant to make any pronouncements.

18.9 Bitwig's Per-Plugin Special-Case Individually Mode

Once you've set Bitwig's main sandboxing mode, Bitwig then allows you to turn on "Individually" mode for a set of plugins you nominate. So, for example, if you had selected the sandboxing mode "Together" but had marked FabFilter Pro-Q4 as "Individually", then all the instances of all your plugins would be in one process, except for all the instances of FabFilter Pro-Q4, each of which would reside in their own separate process!

18.10 Recommendation Of Sandboxing Mode For Strata

Strata has been engineered not to crash, or at least to crash so rarely that sandboxing might not matter. This said, Strata is not perfect, and the cost of sandboxing is so low nowadays that it's prudent to deploy sandboxing at some level. For Bitwig, I generally recommend "by Vendor" as an overall sandboxing mode because then iZotope Visual Mixer (and other plugins like it) will still work. Once you've done this, I then recommend marking Strata Vision (but not Strata Track) to be hosted "Individually" because Strata Vision can be heavy on CPU (depending on the number of tracks it is monitoring) and I've found that it's best to dedicate a whole operating system process to it. Note that there is no problem with placing Strata Vision in its own operating system process, as instances of Strata Track and Strata Vision communicate by TCP networking, not via memory.

18.11 TL;DR

If you use a DAW that supports sandboxing, turn it on, unless you're short of RAM.

If you use Bitwig, set the sandboxing mode to "by Vendor" and in the Individually list set Strata Vision to be individually hosted as a special case. This is not because Strata Vision is dodgy, but because it's CPU heavy enough to encourage the operating system to place it mostly on its own core.

Appendix A: Glossary

44.1KHz: The industry standard frequency of samples in a digitally-encoded sound. Other common frequencies are 48KHz, 96KHz, and 192KHz.

AAX — Avid Audio eXtension. A standard that defines the interface by which a DAW and an AAX plugin communicate. This format is supported by the Pro Tools DAW only. This format is the only plugin format supported by Pro Tools.

ABN — Australian Business Number.

ACN — Australian Company Number.

AIFF — This stands for Audio Interchange File Format, created by Apple, that allows a sound to be represented digitally with no loss of quality (other than the loss caused by the digitisation itself). A competing format is WAV.

AU — A standard that defines the interface by which a DAW and an AU audio plugin communicate. This format is supported by Apple only. It is the only format supported by Logic Pro and Garage Band.

AU$ — Indicates an amount of money in Australian Dollars.

C++ — A programming language. Crickets Strata is written in C++ using the JUCE software framework.

CLAP — A standard that defines the interface by which a DAW and a CLAP plugin communicate. This is the newest plugin standard and is designed to be a successor to VST3.

Component — Another name for the AU format software audio plugins that run on Apple computers.

Crickets Audio — A business that sells audio plugin software, including the software product “Strata”. Crickets Audio is called Crickets Audio because it was originally going to be a website that hosted sounds (such as SoundCloud). I wanted the sounds to be of very high quality with every detail audible. so I named it Crickets because crickets are tiny sounds that you don’t usually hear unless no one is talking. :-) I then later pivoted from sound hosting to plugins.

Crickets Strata — A software product sold by Crickets Audio. It consists of two plugins, being Strata Track and Strata Vision.

DAW — Digital Audio Workstation. Examples: Ableton Live, Logic Pro.

dB — Decibels. This is a metric for measuring the relative difference in the loudness of two different sounds. It is also used in an absolute mode where 0dB is very quiet and 100dB is very loud.

Gain — The decibel loudness of a signal as it enters a plugin.

JUCE — A software framework that makes it easier to create audio plugin software.

Mix Mode — Instances of Strata Track are in one of three mix mode at any one time: Clean, Manual, and Auto. Clean means that Strata Track passes the signal through untouched. Manual mode provides a Gain control and a Volume control. Auto mode places the Gain and Volume controls in the hands of the Strata Vision plugin (not yet implemented).

Realm — A realm is a self-contained digital domain within which zero or one instances of Strata Vision and zero or more instances of Strata Track communicate. Strata allows you to create several different realms. For example, you might create one realm for your percussion tracks and another realm for your synthesiser tracks.

Ross Williams — A software engineer/entrepreneur and music producer who founded Crickets Audio and conceived and wrote the Crickets Strata software.

Song — A completed song (sometimes confusingly called a track) that is sometimes released to the public.

Strata — An audio plugin software product that allows the user to view the frequency spectrum of several DAW tracks at the same time. Strata consists of a pair of plugins being Strata Track and Strata Vision. Strata is called Strata because the graph it shows you looks a bit like geological strata in a rock face.

Strata Prime — This is a licence grade of Strata that allows you to monitor up to 8 tracks in your project.

Strata Standard — This is a licence grade of Strata that allows you to monitor unlimited tracks in your project.

Strata Track — An audio plugin that listens to the track on which it is placed and sends frequency spectrum data to the Strata Vision plugin. Strata Track is called Strata Track because you typically put an instance of it on each track.

Strata Vision — An audio plugin that displays the frequency spectrums of the tracks on which the companion Strata Track plugin has been placed. Strata Vision was originally called Strata View, but is now called Strata Vision because I got overexcited when Apple released Apple Vision Pro and decided that Vision was a cooler word. :-)

Track — A sound channel within a DAW.

US$ — Indicates an amount of money in United States dollars.

Utility Plugin — In this document, this term is used to refer to the built-in plugin provided in all DAWs that allows the user to modify basic aspects of the signal such as volume and panning. In Ableton, this built-in plugin is called “Utility”. In Bitwig, it is called “Tool”.

Volume — The decibel loudness of a signal as it exits a plugin.

VST — A standard that defines the interface by which a DAW and a VST audio plugin communicate. It is obsolete.

VST2 — A standard that defines the interface by which a DAW and a VST audio plugin communicate. This standard is functionally obsolete and Strata does not support it.

VST3 — A standard that defines the interface by which a DAW and a VST3 audio plugin communicate.

WAV — This is an audio file format created by IBM and Microsoft that allows a sound to be represented digitally with no loss of quality (other than the loss caused by the digitisation itself). A competing format is AIFF.

Appendix B: Frequently Asked Questions (FAQ)

Q: Does Strata require access to the internet to run?

A: No. You must have access to the internet to install Strata, but once it is installed, you can go off into the wilderness with your laptop and use Strata without the internet, confident that it won't suddenly stop working for copy protection or licensing reasons.

Q: If I move my music production to a new computer, will your plugins stop working?

A: No. So long as you copy your file system across to the new computer, our plugins will keep working. They are not locked to your machine ID.

Appendix C: History

Strata is a plugin that I created for my own use in 2021 and then decided to let loose on the world. However, bringing a plugin to market is so much more work than just getting the plugin working that it has taken me four years to actually release it.

C.1 Conception

Strata was conceived in approximately 2020 from the frustration of not being able to see what was going on in the songs I was creating. I could see the frequency spectrum of any individual track using Voxengo Span or FabFilter Pro-Q, but I couldn't see the frequency spectrum of all the tracks at the same time. Because a song might have 100 tracks, it wasn't obvious at any moment what tracks were occupying which parts of the frequency spectrum. I wanted to see them all at once.

I searched the internet for multi-track monitoring plugins, and found a few products, but they all seemed to be restricted in the number of tracks they could display, or I didn't like the graphic design, or they looked too complicated, or they seemed to be not up to date, or seemed ancient, or seemed unsupported. In the end, I decided that I would write my own multitrack plugin and make it exactly how I wanted!

C.2 Construction

I already knew C++ well, but I had never used the JUCE framework, so I had to learn that. I created a very basic version of Strata that just showed the spectra with randomly assigned colours. Getting the TCP networking working was tricky (for various reasons), but I managed it in the end. I decided to use TCP networking for communication rather than shared memory because it is architecturally cleaner and, in the future could be modified to span multiple machines.

C.3 Using Strata

I started using Strata on every song I created and found it incredibly helpful. In particular, I could immediately see if any tracks were intruding down on the low end and interfering with the sub, kick, and bass. I could also see if any synth tracks were intruding up too high and interfering with my high hats and other high percussion. In the middle of the spectrum, it was now easy to see the volumes of various tracks in various frequency ranges. I had a habit of setting background pads at too high a volume and then forgetting about them. I wouldn't notice that they were too loud during mixing because I'd be focusing on the leads. But when I looked at my song playing in Strata, it would be immediately obvious if the pads were too loud.

Strata was also incredibly helpful at spotting tracks that should NOT be playing. Time and again, I would play a song through, watching it in Strata and suddenly realise that a track was playing that shouldn't even be making a sound at that point! I would say to myself "Why is the sub still running during the breakdown!" or "Why is there only one bass layer playing here?" or "Why is the white noise for the drop still playing now?" It's not that I couldn't detect these things using my ears; it was just that it was far more obvious in Strata. Simply playing through the song and watching the song in Strata became a great way of detecting a myriad of problems.

As I used Strata, I kept adding features to it as I needed them. The X axis became labelled. I picked up the track colours from the DAW. This worked wonderfully in Ableton, which was my DAW at the time (I now use Bitwig). A particular breakthrough was making the Strata window resizable. This allowed me to make Strata huge when playing through a song, and also allowed me to make Strata small and park it in one corner of my screen when working on other aspects of a song.

C.4 Product

At some point, I realised that Strata was so useful to me that other people might find it useful too, so I started cleaning up the user interface and making it look more professional. When you make software only for yourself, you don't care about such niceties; you just want it to work. I got it working for Windows. I created a beta tester group on Facebook and got a few people to try out Strata. The reaction was mixed; some people got quite excited about it, but others didn't really seem to care that it existed.

I had to make a decision of whether to release it, whether to release it for free, or whether to turn it into a commercial product. I felt that it was too useful not to release, so I decided I would release it. I considered releasing it for free, but realised that it would be a huge amount of work to release a plugin and support it, and decided that Strata would only be sustainable if I wrapped a business around it. I also wanted to receive some money for all my efforts. So I started down the commercial path.

I had registered the domain name cricketsaudio.com many years before (I had wanted to build my own SoundCloud), so I decided to go with Crickets Audio as a business name. In 2022, I started work on the website and built it out over the next two years in spare moments alongside continued development of Strata.

I guess it was predictable, but bringing Strata to market turned out to be much more work than building the plugin in the first place. The original version of Strata that I used in my own projects was only a few thousand lines of C++. Now, Strata is about 40,000 lines of C++ code, and the Crickets Audio website to present and sell Strata is about 110,000 lines of (Go) code!

C.5 Launch

Strata was released on 27 October 2025, and November 2025 and December 2025 showed that there was strong interest in it. If sales continue, I will likely build Crickets Audio into a software company with marketers and engineers and more products. If it doesn't continue to sell well, I will endeavour to keep it on the market anyway as I love Strata.

C.6 Mission

If Strata has a mission at all, it is to make multi-track frequency spectrum monitoring normal in music production.

At the moment, as far as I can tell, multi-track frequency spectrum monitoring plugins are an obscure niche of the audio plugin market, and hardly anyone uses them. I want to change all that!

My hope is that Strata will make music producers realise how helpful it is to see the frequency spectrum of every track all at once, and will make it a normal routine part of their workflow.

I hope to achieve this by making multi-track frequency spectrum monitoring ***fun*** by:

- Making Strata incredibly simple to use.
- Making Strata lightweight (CPU and memory), so it's not "heavy".
- Providing dynamic track labelling so it's clear what's going on.
- Providing themes and colour palettes to make it beautiful and fun.
- Making Strata rock solid so users never have to worry about crashes.
- Making Strata re-sizeable so that it fits into various workflows.

This is all basic stuff, but *so* important!

I hope that by bringing this product to market, I can help music producers realise how helpful it is, and how much *fun* it is to see all of the tracks in a song at once! I hope that Strata can become a normal part of producers' workflow.

Appendix D: Credits And Thanks

D.1 Creation

Concept: Ross Williams

Software Architecture: Ross Williams

Interactive Design: Ross Williams

Graphic Design: Ross Williams

Coding: Ross Williams

D.2 Family

My spouse **Esther** for her support while I was creating Strata.

D.3 Early Beta Testers

Nikita Romanova (https://soundcloud.com/devushka3)

Michael Pos (https://soundcloud.com/user-724900641)

Ricardo Mendes

Guillaume Portalier

Darren Mullan (https://www.singitlive.world)

D.4 Music Production Communities That I Have Found Helpful

Hyperbits (hyperbits.com)

Industry Set (industry-set.com)

Mastering Accelerator (mastering.com)

SoundGym (soundgym.co)

ToneGym (tonegym.co)

D.5 Inspiring Companies

Bitwig: For creating my favourite DAW.

FabFilter: For inspiring me with the beauty of FabFilter Pro-Q.

iZotope: For creating the inspiring Tonal Balance Control plugin.

Voxengo: For creating the benchmark spectrum analyser Voxengo Span.

D.6 Graphics

Edward R. Tufte for his inspirational statistical graphics books.

The cog icon in Strata was created by **Pavel Kozlov** (Flaticon website):

https://www.flaticon.com/free-icons/cog

https://www.flaticon.com/free-icon/settings-cog_70314

D.7 Software Engineering Tools

JUCE: The C++ framework for creating audio plugins.

Xcode: The Interactive Development Environment (IDE) for macOS.

C++: Thanks Bjourne Stroustrup for creating the C++ language.

Packages App: Mac installer creator software.

Inno Setup: Windows installer creator software.

Google: For enabling me to look up technical problems instantly.

Stack Overflow: For providing a database of technical problems for Google to find!

ChatGPT: For providing instant detailed answers to some technical problems.

Tower: The excellent Tower Git GUI tool.

GitHub: The excellent Git repository hosting website.

D.8 Hardware

Apple: Thanks for making great computers. I love my Mac Studio!

Neumann: Thanks for making great studio monitors. I love my KH310s+KH750DSP!

Cranesong: Thanks for making the Cranesong Solaris DAC! I love my Solaris!

Appendix E: Features Not Currently Supported

I have a huge To-Do list of hundreds of features that could be added to Strata. I am not going to reproduce that list here. However, here is a list of some seemingly obvious features that Strata does not support (or does not yet support). This list is included here because one of the most frustrating things about user manuals is that they don't tell you what a product *doesn't* do, and so users have to visually scan the entire manual to confirm that a feature *doesn't* exist. It's much faster if the lack of a feature is states explicitly. So here goes…

Linux: I like Linux and the Crickets Audio website runs on Rocky Linux. However, I'm not prepared to produce Strata for Linux until I've got some sales traction in macOS and Windows.

Internationalisation: No, you can't have Strata in French! :-) It is possible that Strata will support non-English languages in future versions, but there is no timeline for this.

Track Soloing: It would be good to be able to click on a track in Strata and hear only that track. There is no timeline for this feature though.

Inter-Computer Networking: Strata uses the TCP network protocol to communicate between instances of Strata Track and Strata Vision. So in theory, there should be no problem with having an instance of Strata Track sending a track's signal to an instance of Strata Vision on a different computer on the other side of the world. However, despite this obvious potential, instances of Strata Track and Strata Vision currently can only communicate within a single computer. It is not clear whether inter-computer networking will be supported in future. There might be no use case for this feature.

Appendix F: Version Log

V1.0.0 (26 October 2025)

The first ever released version, and it wasn't bad, even if I do say so myself. Unfortunately, there were some problems with the licence installation code, so it had to be fixed and a new version shipped quickly.

V1.1.0 (11 November 2025)

A new version had to be shipped quickly to fix the licence installation problems, but I took the opportunity to add some new functionality as well.

Strata Vision

- Changed default window size from W1000xH500 to W1200xH600.
- Changed settings window size from W600xH800 to W1200xH600.
- Changed minimum control panel open width from W1500 to W1200 and adjusted content to fit.
- Changed spectrum pane max height from 2000 to 5000.
- Updated Credits page.
- Updated About page.
- Fixed bug where the licensing system was interpreting date+time fields in the licence in local time instead of UTC time.
- Added personal/machine menu to Licence Paste page.
- Added Licence Check page.
- Added Names control panel.
- Added much more detailed licence diagnostic messages.
- Fixed a bug with licence installation.
- Strata Vision now logs all licence installation attempts to the Crickets Audio server (for diagnostic and licensing monitoring reasons).
- When you install a licence, you can now provide your email as your username.
- Fixed problem where an unlicensed Strata did not start up on the licence page when unlicensed.

Strata Track

- Volume, Gain range changed from [-80,+40] to [-100,+100].
- Fader parameter added
- Fader control panel added.
- Changed default control panel from Name to Home.
- Added track name to the top of the graph in the track colour.

V1.2.0 (12 January 2026)

This version was created to support the Strata Prime offering and to improve diagnostics for resolving problems when they arise.

Strata Vision

- Now supports two licence grades: Standard and Prime.

Strata Track

- Fixed minor bug where if you visited the Name control panel and set a manual name, and then closed the window and opened it again, the Name field would be empty.

Appendix G: Known Bugs In Strata V1.2.0

Sometimes bugs are difficult to identify or fix and it's more important to ship a new version, so that users can benefit from the product, than it is to fix the bugs. Here is a list of known bugs in this version of Strata:

Strata's Resizing Corner In Ableton On Windows Doesn't Work: In Ableton on Windows, you can resize the Strata Window by dragging on the right and bottom edges of the window or by dragging the very tip of the bottom right corner of the window. However, Strata's inbuilt corner resizing control (the diagonal lines in the bottom right corner) don't work. They work in Ableton on macOS, so this is very puzzling.

Strata Vision's Resizing Corner In Pro Tools On macOS Doesn't Work: There is a problem with this. Strangely, it works in Strata Track. I felt it was more important to bring Strata to market for Pro Tools rapidly than to get bogged down fixing this. Clearly I need to do a complete review of the window resizing code, and test it on all platforms, so this problem doesn't arise again.

Graph Jitter: The graph display seems to jump around more than expected given that the graph is temporally smoothed. I plan to look into this, and maybe future versions will be calmer.

***Extremely* Rare Strata Track Crashes:** I use Strata in Bitwig and, when a plugin crashes, Bitwig lets me know. I use Strata a lot and have found that very occasionally Strata Track will crash. It's so rare that I haven't been able to reproduce the problem. I recently spent several hours in Bitwig+Strata doing all kinds of crazy things to get Strata Track to crash, but I couldn't get it to crash. It's incredibly frustrating. I have now decided to address this problem not by attempting to reproduce the problem, but by continually cleaning up the Strata Track code, adding more and more assertions and checks and taking extreme care in relation to memory management. If anyone out there can reliably make Strata Track crash, I would be grateful if you contacted me immediately as crashes are completely unacceptable in an audio plugin, particularly in un-sandboxed DAWs such as Ableton.

I am not aware of Strata Vision crashing in *years* (except when adding new features when I make a silly coding mistake and instantly fix it).

Malfunctioning When Block Size Is 65536: If you set the Strata block size to 65536, then Strata doesn't crash, but on my old 2020 iMac computer it would start to drop tracks and behave a bit oddly. I have since upgraded to a Mac Studio and this problem seems to have disappeared. No one has reported a problem with this, but perhaps it still is a problem. I don't know.

Minor Mismatch With Voxengo Span: I've noticed that if I look at a signal in Voxengo Span, it sometimes doesn't quite match what I'm seeing in Strata Vision. That's a mystery that I should investigate. It's usually looks fairly close though, so I decided that it wasn't worth delaying the product launch for.

Appendix H: Oh No! Why Is This User Manual So Long?

I just noticed that this user manual is about 100 pages long. That's about one seventh of the length of the Bitwig User Manual which is about 676 pages, and it's an ***entire DAW*** and Strata is just a ***little monitoring plugin***. How did this happen?

Love, my friends. Love made this happen. :-) I love my Strata plugin so much that once I started writing the user manual, I just couldn't stop. So this is the end of my love letter to Strata.