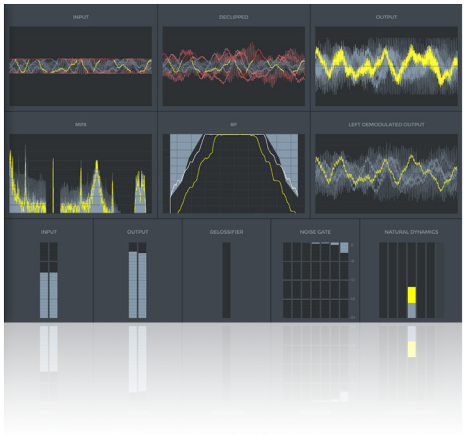
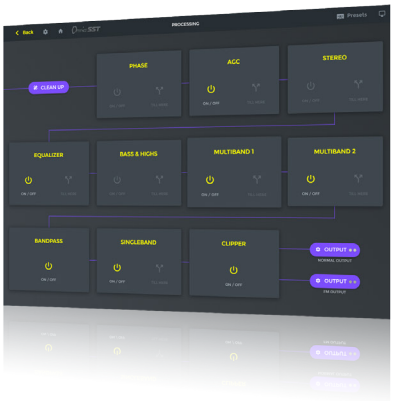
Omnia® SST

Powerful, full featured audio processing software for your PC.





USER'S MANUAL

For part numbers: 3001-00070, 3001-00071

Omnia®
THE TELOS ALLIANCE

End-User Software License Agreement

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17. TAXES: You are responsible for paying all sales, use, excise valuated or other taxes or governmental charges in addition to freight, insurance and installation charges and import or export duties.

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War of the Waves

Dear Valued Customer,

It's with great pride and a tip of the hat to an incredible team that I congratulate you on your new Telos Alliance product. Everything we do here at the radio division of the Telos Alliance is with one end goal in mind: To help broadcasters declare victory in extremely competitive environments. By purchasing this product from us, in essence, you have declared war on your competition.

After all, the majority of Telos Alliance employees were broadcasters themselves once, and the products we've developed over the years have been designed as solutions to specific issues faced on the front lines of our industry. We're right there in the trenches with you and have the weapons you need in your arsenal.

Telos Systems is a catalyst to out-of-this-world sound, with the most powerful and popular broadcast telephone systems in the industry; IP/ISDN codecs and transceivers; plus processing/encoding for streaming audio. We built an industry on the back of these amazing telephony systems, and they are still going strong.

While we at the Telos Alliance never forget our roots, we are also blazing trails in terms of new technologies like stream-encoding and AoIP, so that all types of broadcasters can excel in this ever-evolving digital world.

Omnia Audio not only lets you stand out on the dial with your unique signature sound via legendary audio processors, audio codecs, and microphone processing, it lets you give your listeners a better streaming experience across devices with innovative stream encoding/processing software and hardware.

Axia Audio is a driving force behind the AES67 AoIP standard, and its networked AoIP radio consoles, audio interfaces, networked intercom, and software products continue to move AoIP adoption forward and help broadcasters streamline operations with cohesive, smart, and feature-rich AoIP ecosystems.

Last, but certainly not least, **25-Seven** has traditionally been known for its audio delays, but its Voltair watermark monitor/processor has made a name for itself more recently as the disruptive product that helped broadcasters take back their ratings and harness the true power of their listening audiences.

You work so hard on your programming day-in and day-out, it deserves technology that will optimize sound and performance at every point in the airchain and online. Armed with Telos products, you have what you need to set your competition squarely in your crosshairs.

With that, I'll leave you to prep your armaments. I hope that you will enjoy your Telos Alliance products for many years to come!

Sincerely,
Frank Foti
CEO, The Telos Alliance

Omnia SST User's Manual

Preliminary (October 2016)

Introduction

Thank you for purchasing Omnia SST, a fully-featured software-based audio processor for FM and digital broadcast. SST offers a powerful suite of tools to both repair and process audio.

Audio cleanup tools include our acclaimed de-clipping technology, as well as hum and noise removal, and the unique "de-lossifier" to restore life to bit-reduced audio files. Processing sections include AGC to tame inconsistent input levels, equalization to fine-tune the overall spectral balance, stereo enhancement for managing the stereo image, the aptly named "bass in your face" to add low end punch, and two stages of multiband compression（each with up to 9 bands depending on the preset）to further tailor your one-of-a-kind sonic signature.

For FM broadcast, SST includes a fully-featured stereo generator, dynamic RDS generator with UECP, and a final clipper which maximizes loudness while minimizing the typical tradeoffs in distortion, even when driven to extremes. Some excellent sounding presets complete the package, providing you a fast path to a signature sound, or a starting point for you to customize your own settings.

System Requirements

Omnia SST requires some knowledge of general computer configuration and administration. SST should be run on a dedicated, stable computer that is not shared with other applications. This will, after all, be your on-air audio processor.（You probably don't want the morning guy using it to play Solitaire or looking at videos on YouTube.）

Once you have a stable system up and running, it should be treated like an "appliance". Windows updates should only be applied as absolutely necessary and the machine should be kept well secured behind a firewall. While other applications can co-exist with SST, the fewer variables in your computer environment and the fewer changes you make to your "processor PC", the lower the risk. Standard IT best practices apply here, though you will want to at the very least disable any "power saving" features and set the machine to log in automatically so SST can launch at startup and run in the background. You will also want to assign a static IP address to the system so the Omnia SST interface can be accessed remotely.

Since the software is fully controlled via HTML 5 web interface, you may even consider removing the keyboard, monitor, and mouse after setup—after of course making any necessary BIOS changes to ignore keyboard errors, and testing to make sure the system will reboot properly without operator intervention.

Hardware

The actual requirements for SST are fairly modest but as a general rule, the faster the machine and the more RAM the better (though choosing a relatively modern multiple core processor is far more important here). A 2.4 GHz Core i3 with 4 GB of RAM is a good starting point, though a 3.6 GHz Core i7 with 8 GB of RAM would be even better.

Operating System

SST will work with most modern Windows operating systems, but we recommend Windows 7 Professional. This has proven to be a very stable platform. Windows 10 can also work, but is not currently recommended due to the fact that updates (as well as reboots) are often forced and cannot easily be disabled.

SST and Audio Cards

While any audio interface supported by Windows *SHOULD* work with SST, there are several considerations. There are thousands of choices for Audio cards in the PC world, from state of the art professional gear, to utilitarian junk. Special caution is given that some consumer grade PC sound cards contain hidden AGC's and other "enhancements" that may not be apparent or under user control. Such devices will conflict with Omnia SST processing, and should be avoided. While SST will work with just about anything, sound card quality is important, especially in what can be a high noise environment like a PC case, or a high RF environment like a transmitter room. In general, we recommend you buy the best hardware that you can afford. That said, cards using either WDM or ASIO drivers are supported and will work simultaneously, though ASIO is preferred for stability and lower latency.

Sample Rate

SST is capable of generating an entire MPX baseband (including 57 kHz RBDS, as well as 67 and 92 kHz SCA signals). For proper MPX output performance, a high-quality sound card capable of a 192 kHz sampling rate must be used. Many onboard audio interfaces are in fact capable of 192 kHz operation, but often suffer from poor noise performance and other issues. If you do not plan to generate MPX from SST, any audio card of reasonable quality supporting sample rates below 192 kHz should suffice.

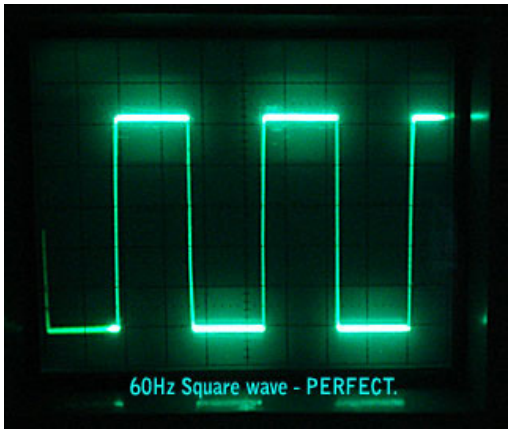
Balanced I/O

Choosing an audio card with professional level (+4 dBu) balanced I/O will offer optimum performance, and ensure that more than enough headroom is available when used to generate MPX or otherwise. Since most MPX inputs are unbalanced on a BNC connector, you will need to wire a cable with XLR pin 2 (or TRS "tip") connected to the center pin of the BNC, and pin 1 connected to the shield of the BNC.

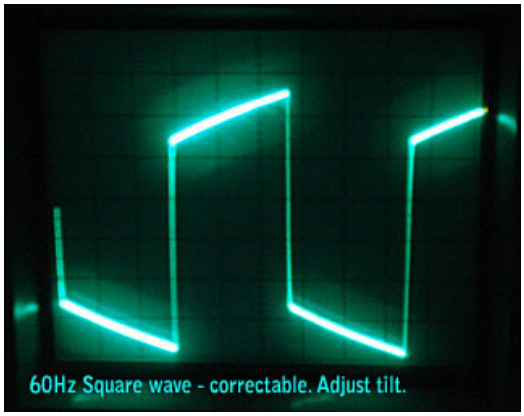
Commercially manufactured adaptors from XLR or TRS to BNC are available from various sources. Avoid audio cards which only provide miniplug (headphone) outputs. These interfaces typically lack shielding or isolation of analog sections and are more prone to noise and interference.

DC Coupling

When used to generate MPX, the card should preferably have "DC Coupled" outputs for best performance. If the card outputs are not DC coupled, overshoots and loss of loudness can occur.



To determine whether or not the outputs of a card are DC coupled, a quick test is to use the test signal generator in SST to produce a 60 Hz square wave (or lower) and look at the output of the audio card on an oscilloscope set to ***DC input coupling***. If the waveform is perfectly square (or relatively close to it) as shown in the image above, your audio card is likely DC coupled and should not need additional correction.



If there is any "tilt" to the square wave as demonstrated in this second image, the card's output is likely NOT DC coupled. Adjust the FM tilt correction as described later in this document until the waveform is square.

If you don't have an oscilloscope handy, you can also measure the modulation level at various frequencies with a modulation monitor, or (as a last resort) the internal modulation metering on your exciter. The modulation level should be fairly consistent with a 15 Hz square wave, as well as sine waves at 15 Hz, 1 kHz, and 60 kHz. If it is not, adjust the tilt correction until modulation levels are fairly consistent at each of these frequencies.

Suggested Cards

SST has been tested and known to work with a DC coupled version of the AudioScience 5811 (hardware rev B2 or later). The Marian Trace Alpha and Marian Seraph AD2 have also been tested and known to work well. Additional cards are currently in test and will be added to this list in the near future. Many cards are capable of working with SST, but performance varies.

Installation and Activation

Whether you are loading purchased software or a demo version, installing SST on your computer is a multi-step process that involves the installation of CodeMeter software (a software registration and licensing system) in addition to the actual SST application. Note that the CodeMeter installation will occur in the middle of your SST installation, and this is normal.

As part of the installation process, you will be generating a key, specific to the computer you are installing SST on, and this key will need to be validated in order for the software to work. License verification will take some time, so please plan accordingly. Internet access is required.

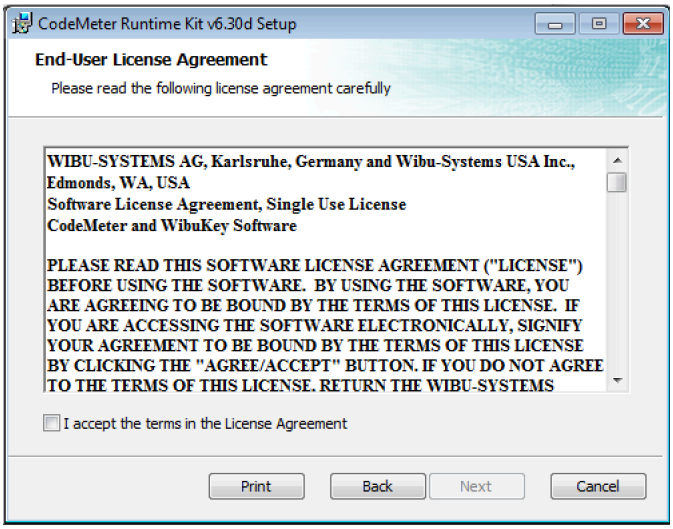
Download and launch the SST installer. Click "Next" to continue.

Note:

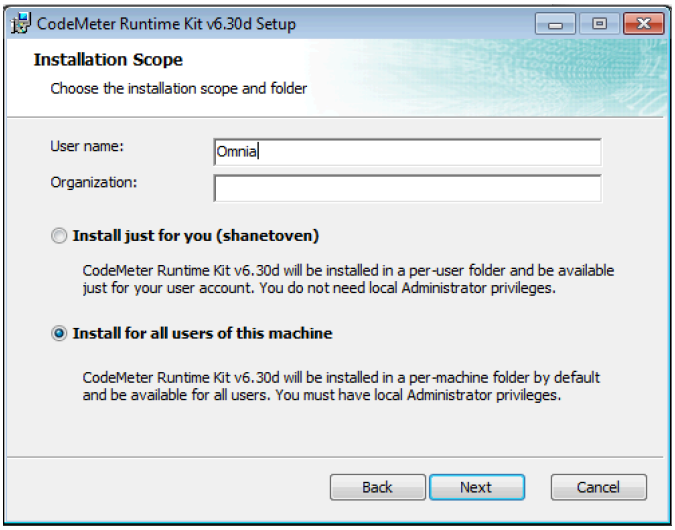
Make sure you are installing SST on the system that you actually plan to run it on. Licensing will be tied to that specific machine. A USB dongle is available to store licenses if you plan to move Omnia SST to another machine. Contact technical support via support@telosalliance.com for additional information on licensing considerations.

Accept the license agreement and click "Install".

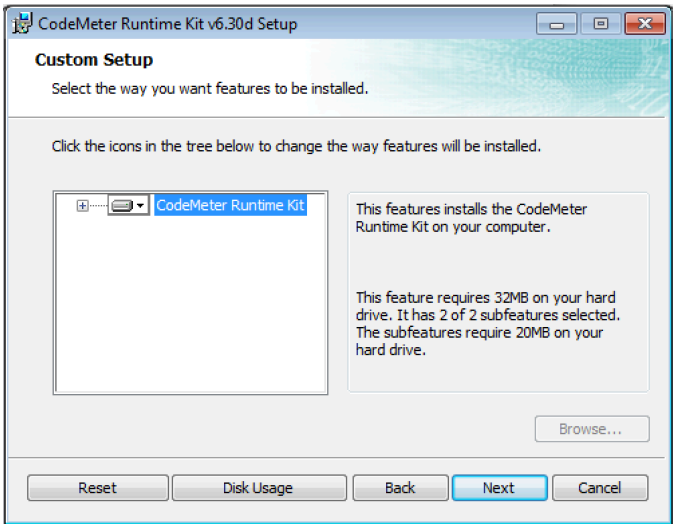
During the SST installation, a second software package called "CodeMeter" will be installed as well. This is normal and part of the licensing mechanism for SST. CodeMeter installation must complete before the SST installation can finish.



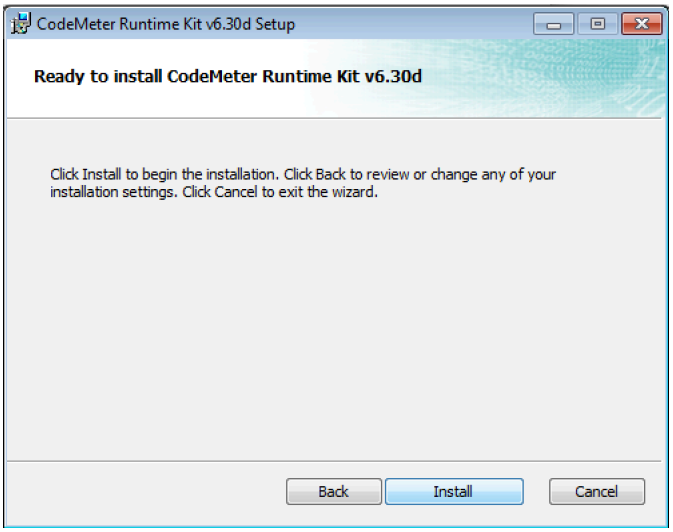
Accept the license agreement for CodeMeter and click "Next".



Verify that "Install for all users of this machine" is selected and click "Next".



Accept the defaults and click "Next" to continue setup.

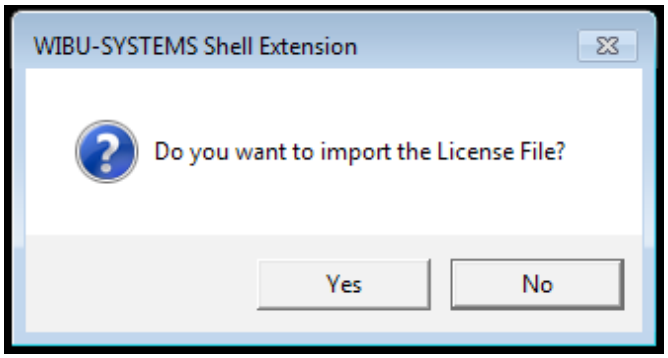


Click "Install" to complete the CodeMeter installation process.

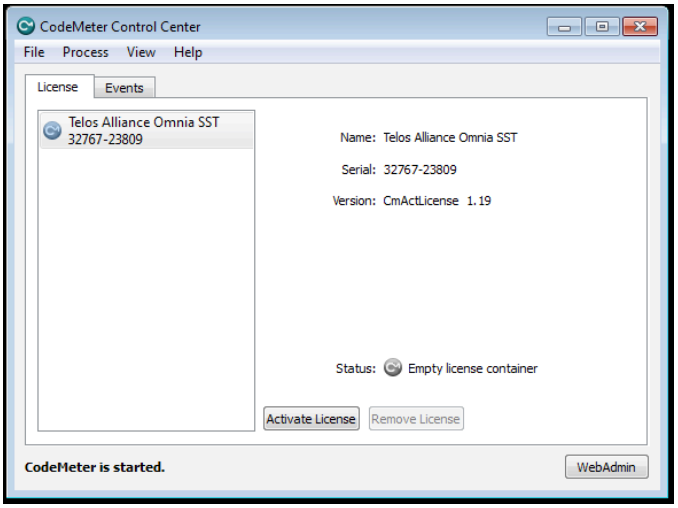
Click "Finish" to complete the CodeMeter software installation. Once CodeMeter installation completes, SST installation can conclude.

Click "Finish" once again to exit the SST installer. A "Readme" file will appear detailing the licensing process. Please read this file. Note that you will not be able to run SST until your software license is validated.

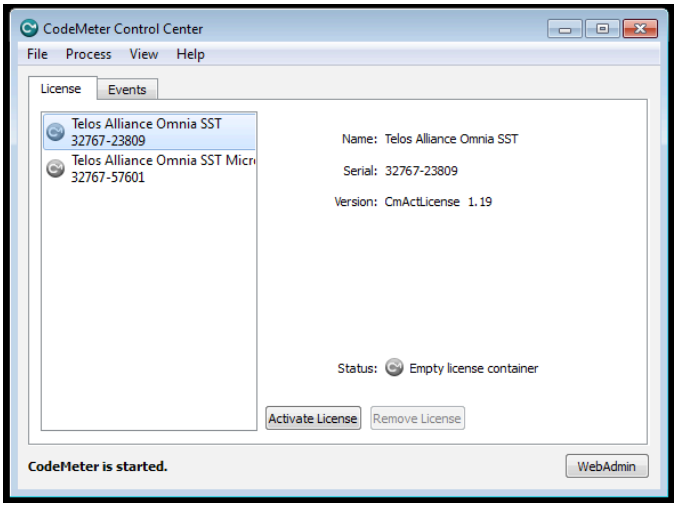
Three new icons will be placed on the desktop—One to launch SST, and two for licensing both Omnia SST and MicroMPX（if purchased）.



Double-click the first "CM" icon. This will allow you to import the license file for SST. Click "Yes".

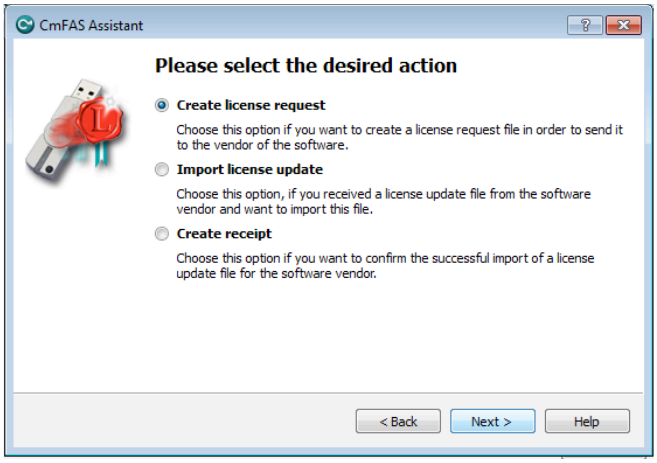


The imported license file will appear in the CodeMeter Control Center.

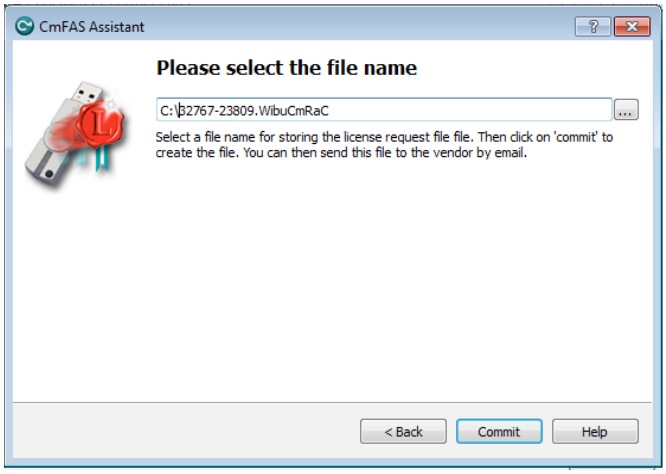


Repeat this process for the second license file (if applicable) from the desktop. Both license files (Omnia SST and MicroMPX) should now appear in the CodeMeter Control Center. The files can be safely removed from your desktop once they have been imported. Select "Telos Alliance Omnia SST" and click "Activate License".

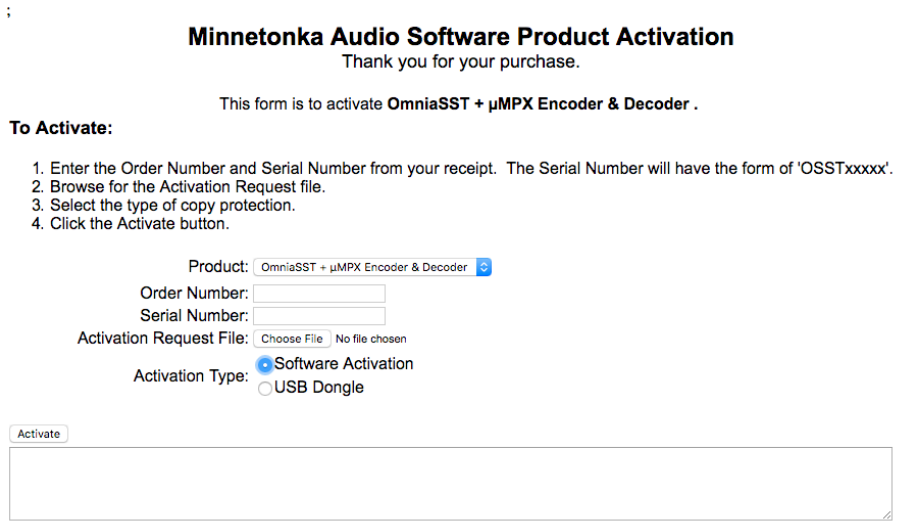
Once you select "Activate License" you should see this dialog. Click "Next" to begin the process of requesting a license key for Omnia SST.



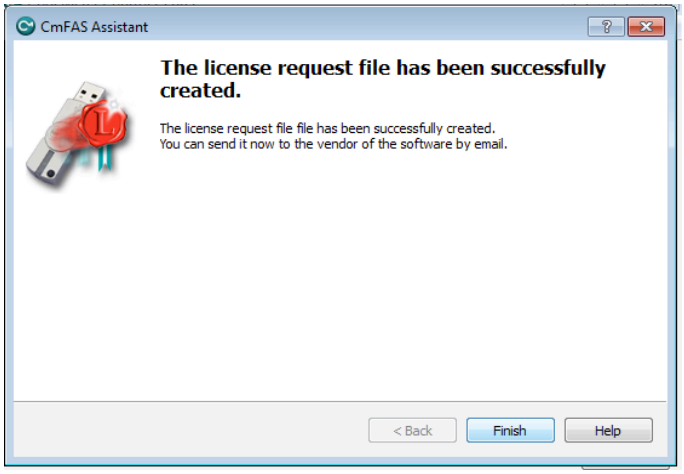
Verify that "Create license request" is selected and click "Next".



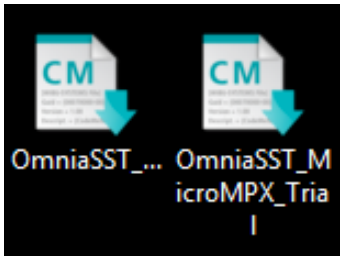
A license activation request file will be generated. You can provide any name and directory you want. You can provide any name and select any directory to store it in. Click the "…" to select a location by browsing. Once you have saved it, you will need to e-mail this license request file to activations@minnetonkaaudio.com to receive your license key, or visit the SST web activation portal at http://minnetonkasoftware.com/OmniaSSTActivation/.



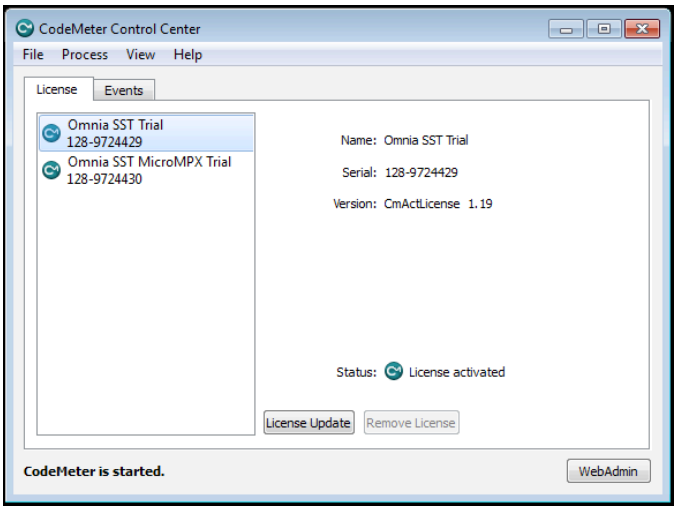
To complete the process, you will need this license activation request file, as well as the order number and serial number (OSSTxxxxx) from your receipt.



Once the license file has been successfully created, click "Finish" to return to the CodeMeter Control Center. Repeat this process for the MicroMPX License if purchased. Within less than an hour, you should receive your license key file(s) via e-mail. If you have uploaded your request via the web activation portal, you should receive a response instantaneously.



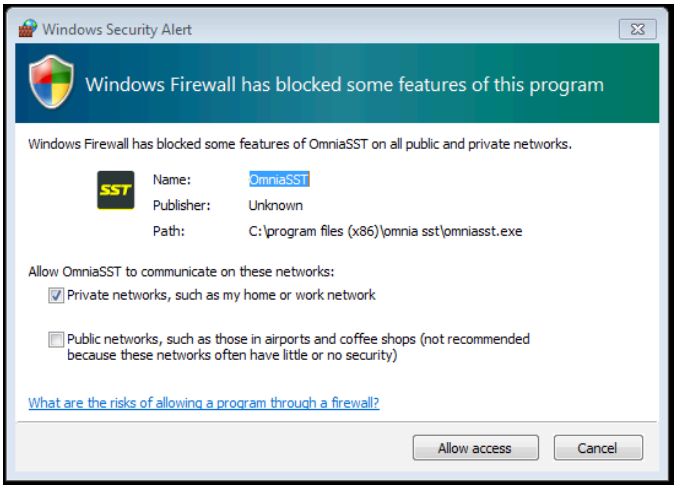
Open the received license file(s) on the same computer where SST and CodeMeter were installed.



There will be no prompts, but the licenses will now show as "Activated" in the CodeMeter Control Center. CodeMeter Control Center can now be minimized or closed and will hide in the system tray. To re-open the CodeMeter Control Center, click the icon in the system tray.

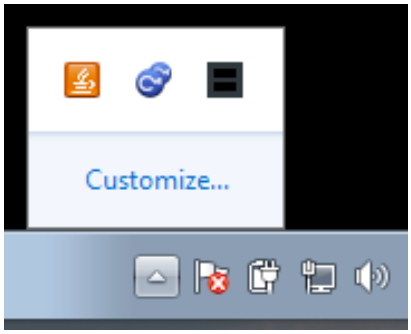
Getting Started with Omnia SST

Launch Omnia SST from the desktop icon that was created. From this point, all control will be done through the web GUI.



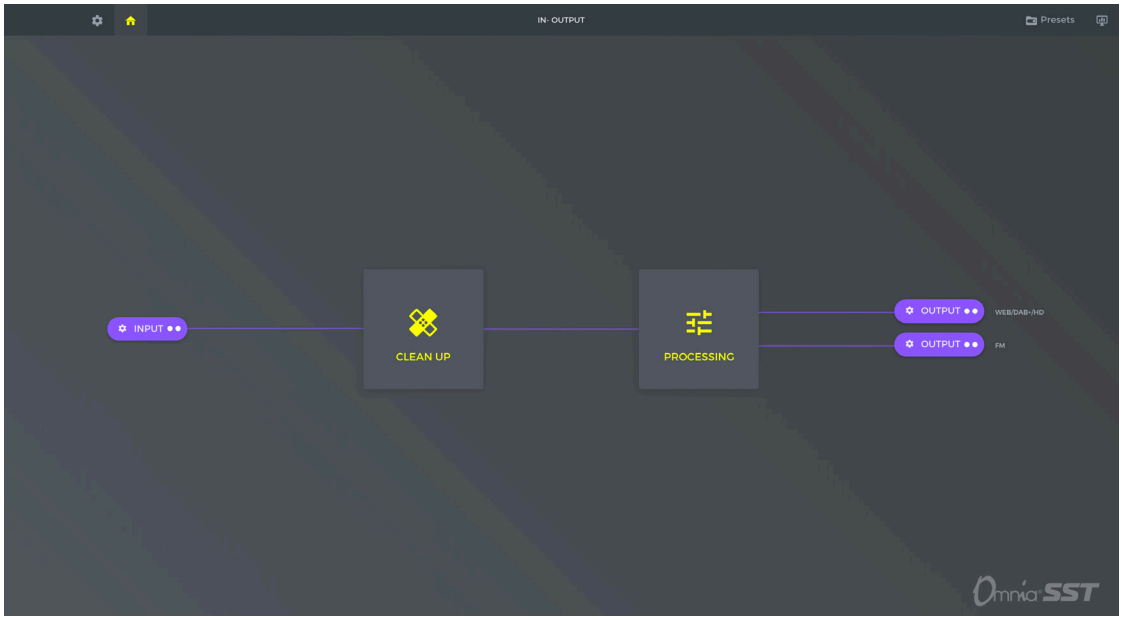
You may receive a prompt requesting that Omnia SST be allowed through the Windows Firewall on the first launch. Click "Allow Access". You may also wish to check the second box if this system is behind an existing firewall. Private network connections can occasionally be mis-categorized by Windows as Public connections.

As Omnia SST launches, a splash screen will appear briefly. The program is minimized to the system tray at launch.



The SST icon is the black box. In some cases, you may need to click the arrow to reveal "hidden" system tray icons. If audio is present at the default input, there will be I/O metering displayed here. Single-click the icon to launch the web GUI or right-click to bring up a menu which will allow you to exit Omnia SST and stop all processing.

Navigating the interface



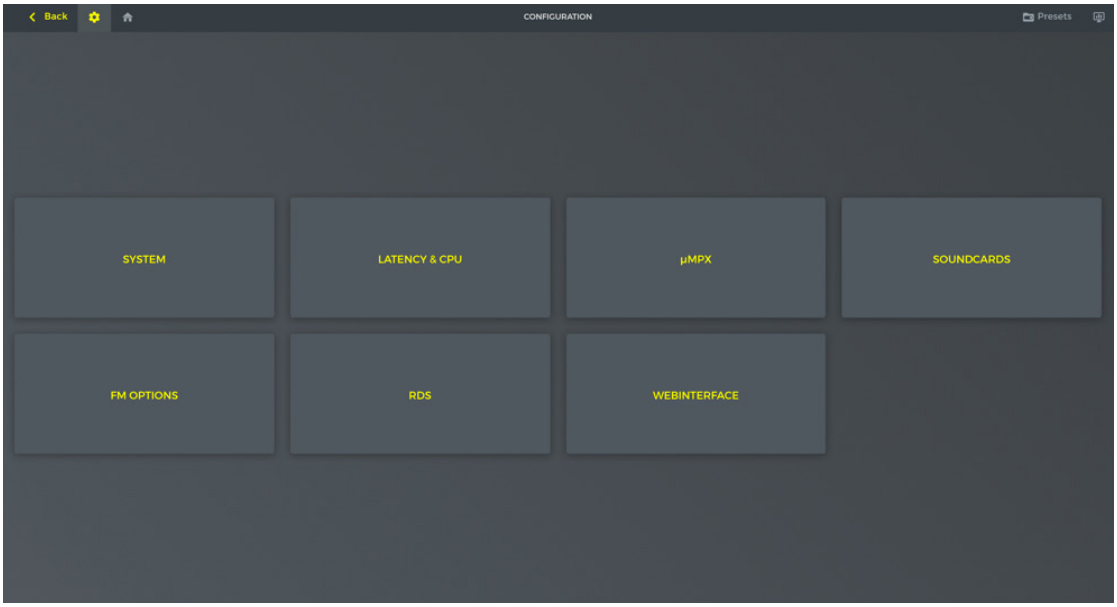
Clicking the SST icon in the system tray will open a browser window to the SST user interface. The "home" screen (above) allows quick access to various sections of configuration and metering. This screen allows direct access to I/O configuration by clicking on any of the purple input or output buttons. "Clean up" and "Processing" allow access to comprehensive parameter sections.

From various screens, use your mouse or pointing device to click, drag or swipe objects between on/off, or to set various values. Note that if you single-click on a "slider" control, you can use the Left/ Right arrows to increase or decrease values in single increments, instead of dragging with a mouse. You can also click on most values to enter a number directly, then press "enter" to accept.

Keep in mind:

- The Home button is at the top of the window. Click to return here at any time.
- The Settings button enters the main configuration screen
- Presets opens the preset management window
- will open the main metering panel.

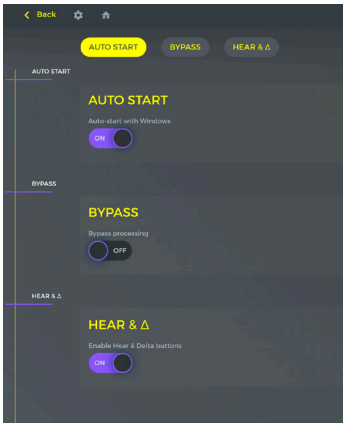
Configuration



Once SST is up and running, you'll need to do some initial setup. This includes starting the software automatically, configuring the audio I/O, updating the HTTP whitelist, and adjusting some MPX settings.

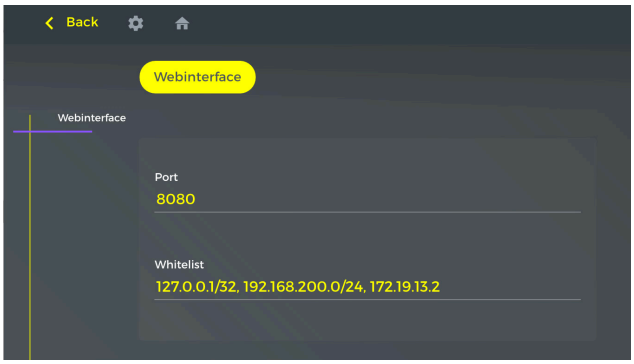
This quick start guide covers the basics. The SST graphic user interface is built to be easy to navigate and explore. We encourage you to click on various buttons and screens to get oriented to this powerful software processor.

System



These settings control a few global parameters such as whether or not the software automatically starts with Windows, allows complete bypass of all processing, and disables "Hear" and "Delta" controls in the software that would otherwise interrupt the processed signal on-air when toggled.

Web Interface



The Web Interface panel configures the port of the internal Omnia SST web server, and the IP addresses which are allowed to access it. By default, only local access is allowed (127.0.0.1) and the port is set to 8080. You may wish to extend this to allow access via your local area network, particularly if you choose to run your Omnia SST system without a keyboard, monitor, and mouse attached. In the above example, in addition to the local system, any host on the 192.168.200.x network as well as a specific external host (172.19.13.2) will be allowed access. Entries take effect immediately and can be separated by a comma or space.

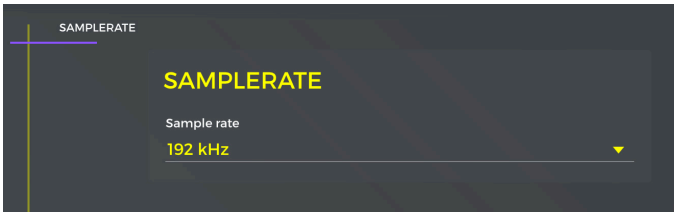
Soundcards

This configuration panel contains all parameters related to sound card I/O selection, level adjustments, and tilt correction. These settings can also be directly accessed by clicking the purple "Input" and "Output" buttons from the "Home" screen. Many of these settings appear in multiple places, but will only be covered here once.

Note:

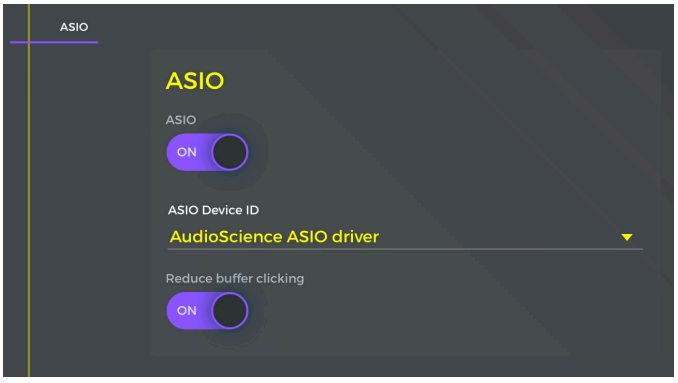
Changing the sample rate, ASIO configuration, buffer sizes, audio devices, or On/Off state in this section WILL cause a brief audio glitch across all outputs as the buffer is cleared and all I/O devices are reset. All changes take effect IMMEDIATELY.

Sample rate



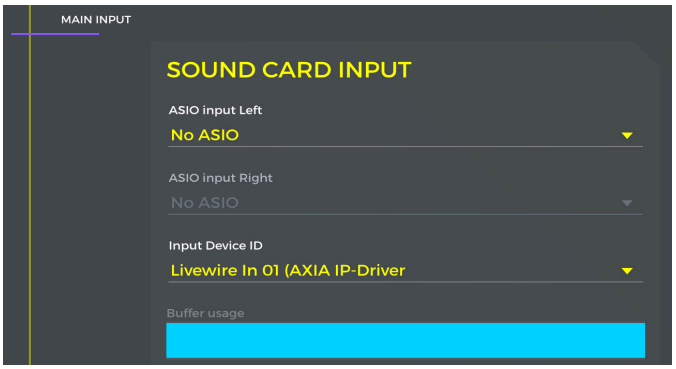
Choose the sample rate you wish to run Omnia SST at. If you plan to generate MPX, this should be set to 192 kHz. If you do not plan to generate MPX with Omnia SST, this can be any valid sample rate supported by your audio hardware.

ASIO



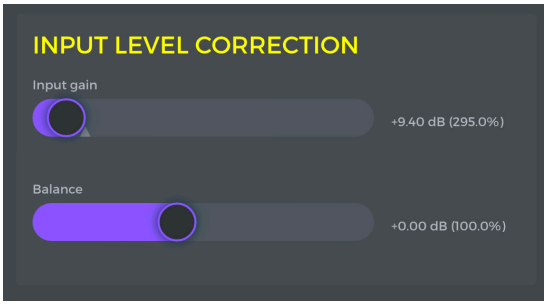
This section will globally enable or disable use of ASIO drivers. It is strongly recommended that you use an ASIO driver with SST if your audio card supports it. This will increase stability, and reduce latency. Only one ASIO device can be selected here. This device will be used in all sections when configuring the ASIO I/O channels in those sections. WDM devices are also supported by choosing "No ASIO" in the appropriate sections, and selecting the desired WDM device ID. Selecting ASIO input or output channels will always override the Input or Output Device ID setting in each section.

Main Input

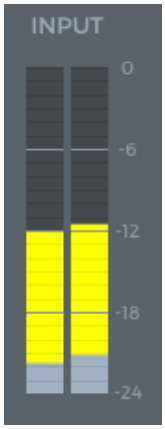


The "Main Input" settings (as you would expect) select what audio device and inputs feed the main program path through SST. If you are using an ASIO device for input, select the appropriate left and right channels. This will automatically disable and override the "Input Device ID" field, which is used for selecting a WDM device. If you wish to use a WDM device, set "ASIO input Left" to "No ASIO" and choose the desired WDM device in the "Input Device ID" menu.

Input Level Correction

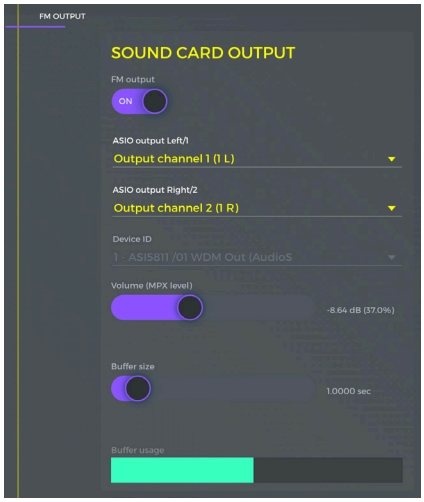


Each audio input has an "Input gain" setting to compensate for low level audio inputs, as well as a "Balance" adjustment to compensate for differences between left and right input levels. Adjust as necessary to achieve sufficient input levels without overdriving the rest of the processing stages. This would typically put the input meter bars between -6 and 0 on the scale. Click the  icon at the top of the window if necessary to show the input metering and scope, along with output and MPX displays.



The "grey" portion of the meter is the actual input level, and the "yellow" portion of the meter reflects any additional gain added with the input level correction control.

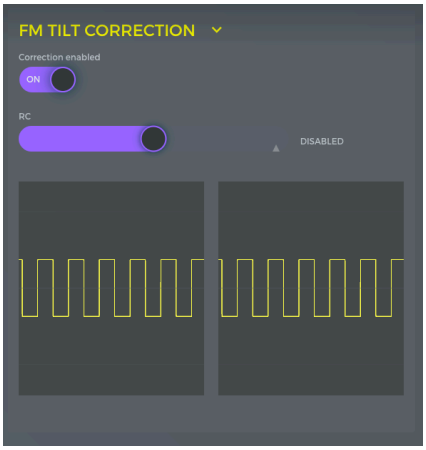
FM Output



The FM output section controls which audio card output (s) will be used for the MPX signal, and the output level of the MPX signal. Tilt correction for the FM output, as well as a test signal generator, and MPX delay for booster or single frequency network use is also available.

The buffer indicator bar below these settings will indicate the status of the output buffer. This bar should stay at least halfway filled, if it doesn't, the buffer is getting starved and audio dropouts can occur. If your system can not maintain adequate buffers, it may not have enough CPU horsepower to operate at the selected sample rate, buffer size, and latency settings.

Tilt Correction



As mentioned earlier, many audio cards are not "DC Coupled". This can result in less than optimum performance when used to generate MPX signals. Tilt on the output can cause overshoots and loss of potential loudness. Tilt on the input can cause loss of bass and slightly reduced de-clipper performance. To compensate for this, SST has built in "Tilt Correction" controls with pre- and post-correction oscilloscope displays.

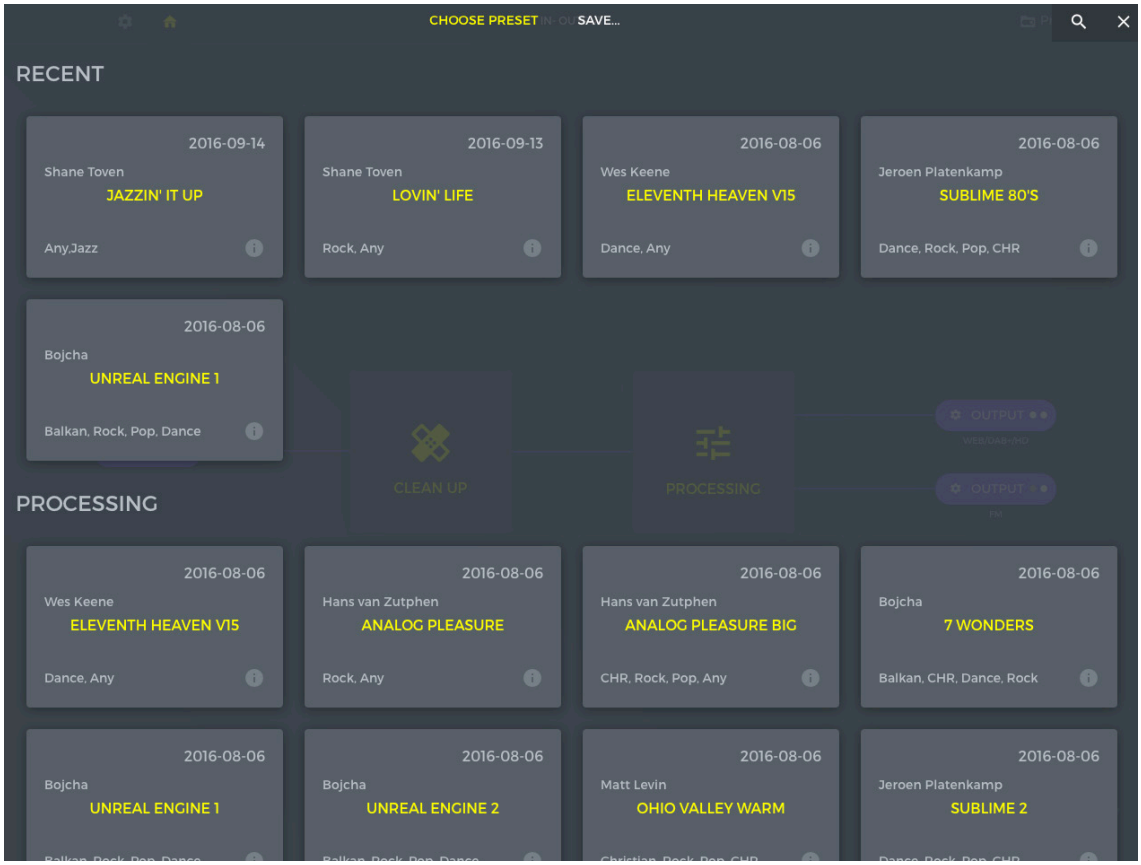
This example shows the FM output tilt correction settings with the internal square wave generator enabled and correction enabled, but no correction value set. While looking at the output of the card on an oscilloscope, adjust the "RC" control until the square wave is flat. The corrected output will be reflected in the right hand waveform, which will begin to tilt in the opposite direction as it compensates for tilt introduced by the card.

Adjusting for tilt on the input is a similar process, but requires that a square wave be fed into the card from an external (DC coupled) source.

Additional I/O

In addition to the main input and FM output, several other I/O paths are provided. These include a secondary audio input for backup audio, SCA audio, or an external RBDS generator and outputs for Streaming/DAB/HD as well as low latency monitoring. Configuring this additional I/O is similar to configuring the main input and FM output, but is not detailed in this quick start guide.

Choosing a Preset

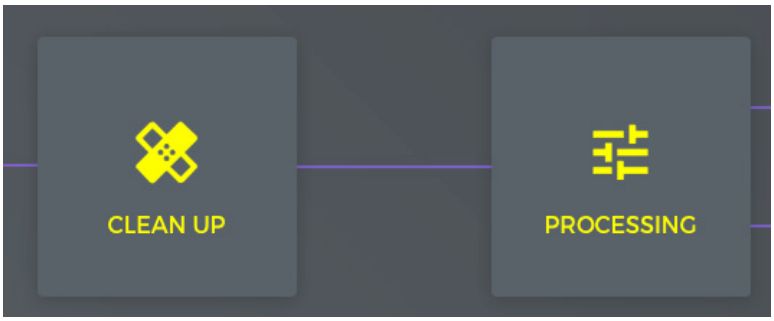


Click the Presets button at the top of the window to open the presets panel. This panel is divided into several sections.

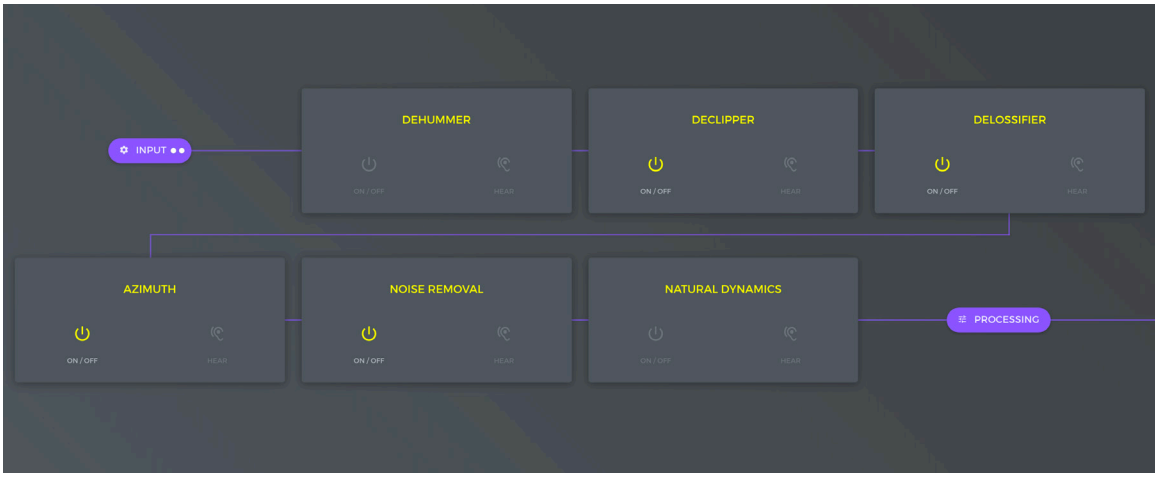
1. The first section displays recently selected presets
2. The second section displays factory "Processing" presets which recall "Processing" parameters (not "Cleanup" or other SST I/O settings)
3. The third section will recall parameters specific to the "Cleanup" section of SST (such as de-clipper, "delossifier", and noise removal)
4. The final section will display any "Custom" presets that have been saved. User saved "Custom" presets in the final section allow all parameters to be recalled; e.g. any combination of settings types (I/O, Cleanup, and Processing).

If you aren't sure where to start, pick a preset from the "Processing" section and apply it. Listen. "Analog Pleasure" is a good place to start. Once you find a factory preset that is "close" to the sound you're looking for, you can adjust it and save it using the "Save…" command at the top of the window. After saving the preset, it will appear in the "Custom" list.

Modifying Presets



From the "Home" screen, click on the "Clean Up" or "Processing" icon to open the corresponding panel of parameter blocks. You can also navigate between them by clicking the purple "Processing" and "Clean Up" icons in each panel.

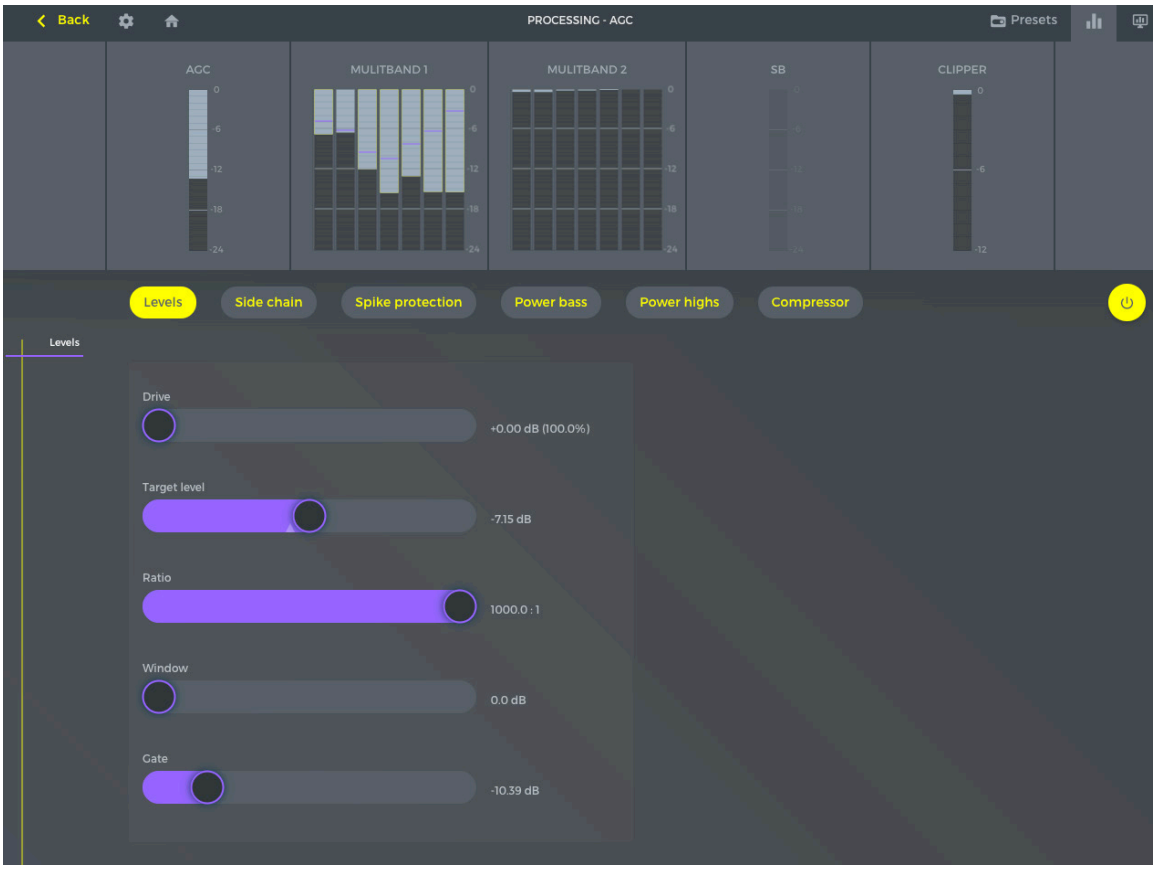


These parameter blocks are laid out in the order of signal flow within the software. Click the title of each block to bring up the controls for that parameter block, click the icon to enable or bypass each block, or click the button to hear all processing up to that point, bypassing subsequent blocks.

Note:

The "Hear" buttons WILL affect your signal on the air. These buttons can be disabled through the system section of the configuration page.

Adjusting Processing Parameters



Each parameter block will open a set of controls for that particular block. Metering information for the selected block and related blocks will be displayed across the top. This metering display can be toggled using the button near the top right corner of the window. To display metering for all blocks simultaneously, click the button. Click Back to select a different block of parameters.

As with any processing, make SMALL and INCREMENTAL changes. Don't try to change too much at once. Change a few things, listen, try again. The professionals know that intense listening and preset tuning for many hours can be fatiguing. A great preset strategy is often to get to a good point, save your settings, sleep on it and come back the next day with "fresh" ears. You can always save multiple versions for comparison during adjustment. Once you've got a sound you like, sit back and enjoy!

Frequently Asked Questions

What exactly is SST?

Omnia SST is a completely software-based audio processor. It can turn a PC into a high-performance FM audio processor when coupled with an appropriate audio interface.

Can I really turn my PC into an FM processor with it?

YES! All it takes is an audio interface capable of 192 kHz operation（preferably with DC coupled outputs）.

Can I use any PC?

You can use a wide variety, but don't waste your time trying to use old, under powered single core computers that are being retired by the front office. A quad core Intel i3 at 2.4gHz is a good start, and 4GB ram is minimum. A clean software environment（not running lots of background programs）is recommended. SST will be doing some important work at your facility; it should be run on a dedicated machine that can be left to do its primary job.

Does SST support multiple audio paths (Studio monitor, HD, SCA, etc)?

Absolutely. In addition to the FM（MPX）output, Omnia SST provides outputs for both digital（Streaming/HD/DAB）and low latency monitoring. It also features dual internal SCA generators to support analog SCA applications.

What about backup audio paths?

SST has full support for external backup audio sources. The secondary input can be either continuously mixed with the main audio path, or switched after a specified period of time when silence is detected.

How about RDS/RBDS?

Omnia SST includes a fully-featured dynamic RDS/RBDS generator, complete with UECP support.

What makes Omnia SST different from other FM processors?

Omnia SST is the FIRST FM processor to incorporate Micro MPX! This technology allows you to transmit a complete MPX baseband in less than 384 kbps!

Do I have to use a 192 kHz audio card?

If you are generating MPX for FM, yes. The MPX baseband can extend out slightly beyond 92 kHz. (Warning: Math alert) Our good friend Nyquist tells us that to faithfully reproduce a given audio frequency when sampled digitally, the sampling rate must be at least twice that frequency…That gives us an audio frequency response out to 96 kHz at a 192 kHz sampling rate, or just enough to cover the MPX baseband.

Is there a list of recommended audio cards?

At this time the only "tested and approved" cards are the ones mentioned earlier (AudioScience 5811 Hardware rev B2 or later, various models from Marian). While any card capable of 192 kHz operation should work, quality varies. We will make additional recommendations available as cards are tested.

1241 Superior Ave. • Cleveland, Ohio, 44114, USA • +1.216.241.7225 • TelosAlliance.com
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