Omnia.7

Goldilocks would approve: It's just right.

Installation & User's Guide

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Omnia®

THE TELOS ALLIANCE®

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Getting the Most From This Manual

If you read nothing else, read this.

Getting the Most From this Manual

Let's be honest about a few things right up front:

- Omnia.7 offers a lot of power and flexibility, characteristics that inherently bring a degree of complexity along for the ride.

- It's menu and control architecture is logical, but also broad and deep, so we've organized the chapters and their contents in a manner that duplicates the menu structure of the front panel from the big picture (the Home Screen) down to every individual control.

- This is not a short manual.

- Your time is valuable and limited.

While we'd love for everyone to read this enthralling literary masterpiece cover-to-cover and fully understand all of what Omnia.7 can do, that's just not practical for the majority of users.

Most of you would like to rack it up, plug it in, find a suitable preset for your taste and market, maybe tweak it up a bit, and then try to eat lunch before the really important stuff lands on your desk. Like the virus-plagued laptop from *that* sales guy (again). Or the wireless mic that the intern backed over with the promotions van (again). Or the urinal that won't stop running. You know, the *real* reasons you got into broadcasting.

With that in mind, here's what we suggest:

- **When you're done here, go to Chapter 2, the Quick Startup Guide.** This is bare bones stuff including physical I/O, routing the audio within Omnia.7, setting levels, and picking a preset.

- **Read Chapter 26, the FAQ section.** Most users have the same or similar questions. We've attempted to answer those here.

- **Read Chapter 3, General Processing Advice,** especially if you don't consider yourself to be a processing expert. It's a short chapter but has non-technical, non-product-specific tips that will serve as a good foundation as you adjust your sound. This is also good reading for your Program Director, General Manager, or anyone else who may have a say in the overall sound of the station. We encourage you to share it with them.

- **Read Chapters 4 and 5** - they'll get you familiar with using the controls and reading the meters.

- **Read Chapter 9, Processing for FM,** and pick which adjustment mode you'd like to start with, then venture on to the chapter for that mode.

- **Glance through Chapter 22, the System menu,** or just poke around the System menu on the front panel just to get an idea of what's there. These tend to be high-level, global, set-and-forget items.

Chapter 1
The Omnia.7 Story

How we got from there to here.

The Omnia.7 Story

How Omnia.7 Came to Be

As of the this writing, Omnia.9 by Leif Claesson - Omnia.7's "big brother" - has been on the air re-defining the sound of FM radio around the world for three years now.

During that time, we've learned that broadcasters really do appreciate the "clean and clear" philosophy that defines Omnia.9 but not everyone has the need (or the budget) for a top-of-the-line audio processor that packs in the amount of features and flexibility Omnia.9 does. This is especially true in mid-sized and smaller radio markets.

We felt it was time to build a processor that brought the most important sonic characteristics of Omnia.9 - including "Undo" (with its de-clipper and multiband expander) and and its psychoacoustic distortion-masking clipper - but in a simplified, more purpose-built processor, and without a few of the premium features offered in Omnia.9.

The result is Omnia.7.

Processing for FM, HD, Streaming, and Studio

Omnia.7 offers completely separate processing cores for FM, HD, and Streaming, and features a dedicated low-latency studio core for talent monitoring.

Each processing core contains and Input AGC, a 4-band fully parametric equalizer, multiband noise reduction, multiband stereo enhancement, an Input AGC, two wideband AGC's (selectable), and up to 5 bands of multiband AGC and peak limiting.

Omnia.7 also introduces the concept of "Basic", "Intermediate", and "Advanced" controls, making it friendlier and less intimidating to use for those who are not audio processing experts while still providing access to all controls for expert users who want to really dig in and fine tune their sound.

The Omnia.7 Toolbox

Omnia.9 introduced the unique concept of a diagnostic "toolbox" and provided a built-in digital oscilloscope, an RTA, and an FFT spectrum analyzer that can monitor dozens of different points within each of its processing cores. Omnia.7 retains all of those same tools including a pink noise generator and a powerful parametric equalizer so that you can calibrate your reference speakers, giving you an accurate monitoring point from which to adjust your processing.

These features allow you to "see what you are hearing" and make informed, intelligent adjustments to your audio that were heretofore difficult if not impossible to make.

There's Still Lots of Power

Despite its mid-level positioning in the Omnia product lineup, Omnia.7 still provides more control and power than you may be accustomed to.

Giving you full access to all of its controls is like giving you the keys to an exotic sports car. If you know what you're doing, you're in for quite a ride! And if you don't, well, let's just say there are lots of ways to get

yourself loose in the corners and end up in the weeds. But for all of its capabilities, Omnia.7 is not difficult to set up and use, especially in "Basic" mode.
We've given you some great presets based on those found in Omnia.9, created and tuned by people who know the product best, that will either satisfy your on-air processing goals right out of the box or will get you close enough to your desired sound so that you can make some tweaks to suit your individual needs and tastes for your format in your market.

That said, we highly recommend that you set aside some time up front to understand the various design philosophies and controls that make Omnia.7 so unique, versatile, and powerful. The time you spend now will pay off exponentially on-air, make your program director smile and sleep better at night, and keep the rest of the stations in the market wondering what kind of freaky magic you're up to.

If you send us cash, expensive gifts, or can make the Cleveland Browns win a Superbowl, we promise not to tell them.

Chapter 2
Quick Startup Guide

Can't wait to get your shiny new Omnia.7 on the air?
We understand.

Here are the down-and-dirty basics to
get you up and running in a jiffy.

Quick Start Setup Guide

We know that you're probably in a hurry to get your new Omnia.7 installed and on the air. If you have technical expertise and previous knowledge of audio processor fundamentals, this Quick-Start Setup Guide will get you up and running as quickly as possible.

It is important to remember that because some features in Omnia.7 are optional, not everything referenced in this guide or in the full product manual may be available in your particular unit. Therefore, some screenshots may differ slightly in appearance.

While Omnia.7 is a svelte 2RU product, we still suggest having an assistant on hand when racking it up to help balance the unit during installation. We don't want to see your new processor accidentally land on the floor nor do we want to live with the guilt of knowing you spent time in the chiropractor's office because of something we built. (If you're going to end up there, make it because of something more fun than racking up gear). We also strongly recommend using all 4 rack screws for the best support. Finally, although the unit is fan cooled, leaving an empty rack space directly above and below the unit is still good practice for both Omnia.7 and the equipment directly above and below it.

Physical Installation and Initial Configuration

Connect AC power to both of the internal power supplies. Don't plug it in while standing in a bathtub (the things our lawyers make us say). There is no power switch.

It is always possible for a supply to fail and so having redundant supplies does help protect you against losing power altogether in that event, but in reality, it is far more likely that the unit will lose power because of an interruption to the circuit feeding the unit. Therefore, good engineering practice dictates that each supply should be fed from a different source. At minimum, we recommend that both sources should be a good quality UPS with adequate surge protection. In an ideal world (where everyone gets along and you got to build the plant of your dreams from scratch with an unlimited budget) each would be fed from a
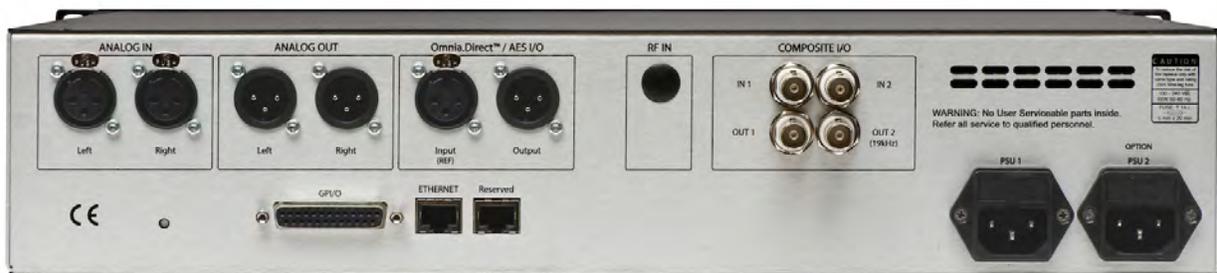
completely different circuit for maximum redundancy.

Next, connect the audio inputs as appropriate for your installation. Omnia.7 accepts balanced professional line-level analog audio via its Left and Right Analog Inputs and AES/EBU digital audio on standard XLR connectors via its AES inputs.

- *Note: A   important   word   about   AES   reference   and   sample   rates!*

  Omnia.7   offers   several   clock   sync/reference   options:

  *The main AES XLR inputs can accept audio with a reference of either 44.1kHz (for HD Radio) or 48kHz (for DAB). To set the sample rate, navigate to the **System > System Configuration > Sample Rate** menu and set the unit's sample rate to match that of the incoming signal and the **Sync Reference**   control   to   "Main   Input".*

  *If the incoming AES audio has a different sample rate between 32kHz and 96kHz, it can be up- or down-sampled to either 44.1 or 48kHz by setting the **Sync Reference** control to "Reference Input." The   unit's   sample   rate   must   be   selected   in   the   **Sample   Rate**   menu.*

  *Finally, a dedicated external reference input is provided on the rear panel via a BNC connector should it be necessary to sync to a clock that is not present on the incoming AES audio (such as an HD exporter at the transmitter site). Set the **Sync Reference** to "Reference Input". The unit's sample rate must be selected in the **Sample Rate** menu. A BNC-to-XLR cable or adapter (Pin 2 hot, Pin 3 shield) may be used for short runs without concern. For longer runs, a transformer should be used as needed.*

Front Panel Controls and Navigation

Unlike other products in the Omnia family, Omnia.7 uses a "joystick" type of rotary encoder for menu navigation and control adjustment. "Rocking" the control left, right, up or down facilitates navigation through the various menus, while turning the knob clockwise or counterclockwise adjusts individual controls.

The factory default password is "1234". Navigate to the "Password" field then move the joystick to the right to bring up the on-screen keyboard. When the keyboard is displayed, turning the control clockwise or counterclockwise moves the cursor around the screen while rocking it to the right enters the highlighted value. Once the password is entered, highlight and enter "OK". Next, highlight and enter "Unlock" to unlock the unit.

The unit will always lock itself when the display times out and goes dark. The length of time before this happens is adjustable in the **System > System Config > Power** menu.

Select the Input Audio Source

Next, navigate to the **System > I/O Options > Input** menu and select the proper source (analog or digital) for the primary and/or backup inputs

Configure Output Routing

Connect the audio outputs as appropriate for your installation. Omnia.7 supports balanced professional line-level analog audio via its Left and Right Analog Outputs and AES/EBU digital output on standard XLR connectors via the AES output. The AES outputs can also be used to provide an Omnia Direct™ (composite over AES) signal. Two composite MPX outputs are provided to feed a main/backup composite STL or transmitter.

If you are using the Analog or AES outputs, navigate to the **System > I/O Options > Main Outputs** menu, select the appropriate output source for your particular installation, and adjust the output levels as needed.

- *Note: FM De-emphasized L/R is the least-recommended output option, especially for analog. Although is it possible in theory to have excellent peak modulation control even with external pre-emphasis, in practice not every stereo generator does pre-emphasis correctly. Certain stereo*

generators use phase-linear pre-emphasis in DSP, which is incorrect and causes roughly 20% overshoot (2dB loudness loss) when used with any audio processor.

If you using the composite outputs, navigate to the **System > I/O Options > FM Options** menu to set the pre-emphasis, pilot injection, audio bandwidth, and single/dual sideband preference. Select the proper output source for each composite output and adjust the output level to achieve the desired modulation level.

Omnia.7 is set up by default to provide a pre-emphasized MPX signal from the FM processing core. If you must use an external stereo generator, some additional configuration is required.

- ***Note:*** *Feeding the transmitter with L/R pre-emphasized output instead of the MPX output has several inherent performance disadvantages, including the loss of peaks beyond 91% (leaving room for the 19kHz pilot tone, as we will not know its phase) - a capability unique to the MPX clipper. The (optional) internal RDS encoder also become unavailable, though the L/R clipper does employ psychoacoustic distortion masking.*

Adjust FM Diversity Delay (If equipped with HD option)

The FM diversity delay can be set by going to the **System > I/O Options > Diversity Delay** menu.

Adjust Input Audio

From the Home menu, navigate to the **System > I/O Options > Source Adjustment** menu. Use the **Input Gain** sliders to set the input levels. When driving the input with typical program material at normal operating levels, adjust the input gain while watching the Input meters in the Processing display window so that average levels keep the meters in the green. If the meters flash red, the input is being overdriven and levels to the Omnia.7 must be reduced. If necessary, it is also possible to invert the polarity of either or both channels with the Invert control. The Mode control allows several different channel configuration options. A static left/right channel balance offset can also be dialed in.

Choose a Preset

Return to the Home Menu, then navigate to the **FM > Processing > Processing** menu. Select **Load Preset** to choose one of the factory presets. "Rustonium 5B" is the default preset and provides a well-balanced sound with competitive loudness, suitable for nearly any format. However, we suggest you audition all of the factory presets to get a feel for each of them.

- ***Note:*** *Omnia.7 contains a relay-bypass feature that allows unprocessed audio to pass directly through the unit to prevent complete loss of audio (dead air) any time the software is not active. This includes when the unit loses power, is in the start-up process, or must re-initialize its software after applying certain user-initiated configuration changes.*

  *Normally this is not an issue. However, in certain situations - for example, if you have a CD player connected to the analog inputs and an amplifier or speakers connected to the analog outputs - this means the input and output will be directly connected **with no attenuation whatsoever,** resulting in fried speakers (or eardrums) or an eviction notice following complaints from irritable neighbors.*

  When engaged, the bypass relays hard wire the the analog inputs to the analog outputs, and the AES digital inputs to the AES digital outputs.

Chapter 3
General Processing Advice

Setting your goals and avoiding common pitfalls.

General Processing Advice

Know Your Goals

The first step to successful processing – and this applies to ANY processor, not just Omnia.7 - is defining your goals. Whatever those goals are, Omnia.7 is capable of getting you there.

You may wish to maintain as much quality as possible while increasing loudness somewhat over your existing processor. You might want to create very consistent source-to-source spectral balance and develop a "signature sound" for your station. You may find yourself in a situation where you need to stay competitively loud on the dial at the expense of the best possible sound. Or you may have the luxury of aiming for a more open, cleaner sound that will draw and keep listeners for longer periods of time without having to worry about all-out loudness.

In any case, it is best to start with a goal in mind and work toward it carefully and deliberately.

Don't Touch That Dial! (too much)

One big temptation when installing a new processor is to play with every available control, and there's really no better way to find out what each control does. But that sort of experimentation and exploration is probably best done "on the bench" before you put your new acquisition on the air. That way, you're free to tweak away without having to worry about jeopardizing your on-air sound or being unnecessarily timid about making adjustments because you don't know what affect they will have.

Another suggestion for getting to know your way around Omnia.7 is to find a factory preset that you like and then go exploring in the various menus to see how that sound was achieved. For example, let's say you find a preset with a smooth, open sound which matches your general processing goal. As you explore, you might find some controls set as you would expect to deliver that sound, but you may also find some unexpected settings that make more creative use of Omnia.7's controls. There is much to be learned by studying.

By default, each preset loads up in "Basic" mode to keep things simple. Despite the name, this mode is still very powerful and may provide all the controls you need to achieve your desired sound and loudness. It is always possible to go back and forth freely between "Basic," "Intermediate", and "Advanced" modes even after making changes in one mode or another.

Once you are comfortable with navigating through Omnia.7's various menus and have a good understanding of how its controls operate, you're ready to take it for a test drive on the air.

Choosing a Preset

Regardless of whether you end up using a supplied preset "as-is" or make adjustments to customize your sound, you must start with one of the factory presets. We recommend you find one that most closely matches your goals and then make any modifications from there as needed.

Most processors use radio format names to try and define their sound but then go on to explain there's no reason a rock station shouldn't try out the "Country" preset – which is very true. As befitting its lineage to our Omnia.9 processor, Omnia.7 takes a deliberately different approach and most of its presets don't give you any hint as to who should use them (or how) in the hopes that you'll "step out of your box" a bit and explore.

If your Country station sounds great on the air with settings that might mimic an "Urban" preset - with a slamming low end and a nice open mid-range – the last thing we want to do is make you second guess yourself because the preset name doesn't match.

You may find some of your favorite Omnia.9 factory presets here, but specially tweaked to give you as close a sound as possible on your Omnia.7.

Making and Saving Changes

Human nature is fickle; the human ear adapts and tires quickly; and Omnia.7 gives you lots of control. With those things in mind, here are some recommended "Do's" and "Don'ts" when making and saving changes to presets:

- DO resist the temptation to constantly fiddle with every control right after you put Omnia.7 on the air.

- DON'T make hasty, radical changes.

- DON'T make adjustments to too many parameters at once – that makes it difficult to determine which of the adjustments is actually responsible for the changes (for better or worse) you're hearing on the air.

- DO look to the Band Mix and Parametric EQ sections first to achieve the spectral balance (aka "signature sound") that you're looking for. These are powerful adjustments, and a little EQ can go a long way. This is generally "safer" than making adjustments to the target, attack, and release rate controls as it is sometimes difficult to know how the different compression stages interact with one another on all material.

- DO take breaks when adjusting your processing. Ears tire quickly, and if you stay at it too long, you're almost sure to make changes influenced by fatigue.

- DON'T turn your monitor speakers up too loud when making adjustments. High listening levels cause ears to tire even more quickly and mask both gain riding artifacts and distortion. Most listeners play the radio in the background, and problems tend to be more audible at comfortable listening levels.

- DO make small adjustments, particularly to critical controls like Clipper and Limiter thresholds.

- DO take the time to calibrate a set of high-quality reference monitors (a process described in detail in this manual) so that any changes you make aren't skewed by colorations of the speakers or room.

- DON'T rush the process. Use the "sleep-on-it" method when you've reached a point where you are mostly satisfied with the sound, and then re-evaluate it the next day. If it still sounds good, STOP. If it doesn't, make a few adjustments and walk away for another day.

- DO use the "Save As" method of naming and saving your custom presets rather than over-writing them. This will allow you to return to any point in your adjustments if you get too far "off track" and keep you from having to remember (or guess) what changes you've made along the way.

Customers sometimes ask if they can make their own custom presets "from scratch." All custom presets start life as a factory preset, but the most straightforward, neutral-sounding factory preset is "Reference Settings," and as such, it provides the closest thing to a "blank canvas" possible for building your own preset from the ground up.

Chapter 4
Home Screen & User Interface

Getting the lay of the land on the Home Screen.

Front Panel Home Screen & User Interface

Home Screen

Omnia.7's home screen is divided into two primary sections: Displays and meters on the left side, and menus and controls on the right. By default, the Undo meters are displayed in the top section, while input, output, and processing meters are shown at the bottom. The displays can be customized, a subject covered in detail in Chapter 13.

- **Note:** *To make this manual as comprehensive as possible, all available options are shown, and what you see on your Omnia.7 may vary slightly; for instance, units that do not have the HD or*

Streaming option will lack all menus and controls related to HD and Streaming processing.

Navigation is accomplished using a multi-function rotary encoder, hereafter referred to as "The Control" because saying "multi-function rotary encoder" more than once a) Sounds really stuffy and elitist, and b) Will annoy us both.

Generally speaking:

- Moving the control to the left takes back through the menu hierarchy and eventually lead back to the Home screen.

- Moving it to the right takes you to the next branch of the current menu or will enable/disable the highlighted control.

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- Moving it up or down scrolls vertically through all available options in the current menu. If you see a scroll bar on the right side of the menu, this indicates there are additional items out of view which can be seen by continuing to scroll up or down.

- Turning the control clockwise or counterclockwise typically scrolls through available choices in cyclical "list" type controls and makes adjustments when a specific control is highlighted as indicated by a yellow outline.

Menu Hierarchy

The basic Omnia.7 menu hierarchy is organized as a series of menus and sub-menus. with each sub-menu getting more and more specific in nature and finally ending in individual controls.

Throughout this manual, navigation paths will be expressed as **Menu > Sub Menu > Submenu > Control** with color images showing what the controls look like on the front panel display.

The path **Home > FM > Processing > Enhance > Deep Bass**, for example, would step through the menus like this:

Chapter 5
Reading the Processing Meters

Connecting what you see to what you hear.

Reading the Processing Meters

The Processing Meters display provides a tremendous amount of information about what's going on
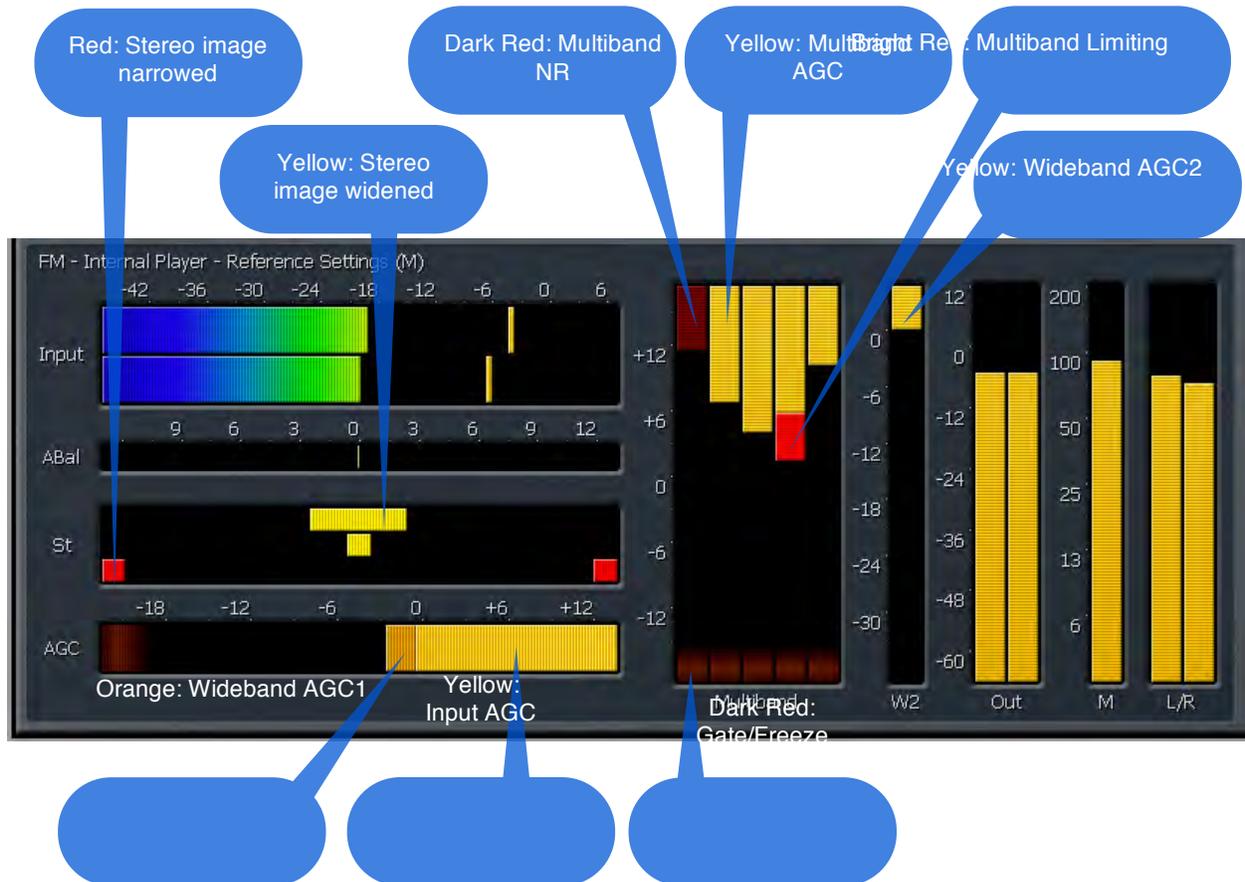
inside each of Omnia.7's processing cores but are very easy to understand at a glance.

Meters are provided for monitoring input levels, Input AGC, Wideband AGC1, Multiband AGC and Limiters, Multiband Noise Reduction, Multiband Stereo Enhancement, Wideband AGC2 post-multiband output, MPX output, and individual left and right outputs. In the HD section, meters for the final look-ahead peak limiters and the final output of the processing core are added while the MPX output and left and AGC output meters are eliminated.

- The **ITU BS.1770 Input** meters indicate the level of the unprocessed source audio coming into Omnia.7 with floating peak indicators above each bar.

- The **Auto Balance** window indicates any corrective left-to-right channel balancing being performed.

- The **AGC** meter window shows the levels and action of the Input AGC and the Wideband AGC1 compressors.

  Depending upon the settings of the various Input AGC and Wideband AGC1 controls, the scale to the left of the meter can display levels below threshold (positive numbers) as well as levels above threshold   (negative   numbers). When the meters dip down below "0" the compressors are above threshold and therefore in a state of gain reduction. When they rise above "0" they are below threshold and in a state of gain increase. The combination of Input AGC and Wideband AGC1 gain is added together to determine the total amount of AGC gain in place.

- The **Input AGC** levels are indicated by a bright yellow bar. The Wideband AGC1 levels are shown as a dark orange bar extending below the Input AGC meter.

- The **Multiband** meter window shows the levels and action of the AGC, limiter, and noise reduction sections for each band (ranging from 2 to 5 depending upon the preset employed). As is the case with the AGC metering section, the scale will change based upon the settings of various multiband controls.

- The **AGC** level in each band is indicated by a bright yellow bar. The multiband limiter for each band is represented by a bright red bar that flashes beneath the AGC level. The multiband noise reduction for each band is shown by a dark red bar that appears to drop down from the very top of the meter. Gating - the condition in which release is significantly slowed down - is indicated by a dark red ribbon at the bottom of the multiband AGC meters. Freezing - the condition in which release stops completely - is indicated by the same red ribbon, but slightly brighter.

- If the **Wideband AGC2** compressor is enabled its meter will be displayed separately to the right of the multiband display.

- The **Multiband Output** meters show the levels after the multiband processing section, but before the Bass Clipper and Final Clipper.

- The **MPX** meter shows the final output of Omnia.7's FM processing core, including L+R, L-R, and pilot, plus RDS when enabled.

- The **L/R** meters show the output of the L/R clipper, which is useful only if you are using the Analog or Digital FM L/R outputs.

- The **Multiband Stereo Enhancer** meters will be displayed if the current preset employs this feature. Yellow bars extending from the middle outward toward the left and right of the display indicate a widening of the stereo image. Red bars extending from the left and right edges toward the middle indicate a narrowing of the stereo image.

Chapter 6
Home Menu

"Home is where one starts from." - T. S. Eliot

Home Menu

Omnia.7's **Home Menu** is the highest level menu available in the user interface. If you ever lose your way

in the menu system, going back to the Home Menu will get you quickly back on familiar ground.
Available sub-menus include:

- **Input -** Includes **Source Audio** and **Undo** menus, as these are common to all processing cores.

- **FM -** Includes all FM processing controls, meter options, and RDS configuration.

- **Studio Processing** - Includes all controls for low-latency studio processing.

- **HD -** Includes all controls for HD processing.

- **Monitor Outputs -** Includes calibration adjustments and monitor patch points for both the Speaker and Headphone monitor outputs.

- **System -** Includes all "global" controls such as input source selection, analog, digital, and composite output routing and adjustments, FM diversity delay, time/date settings, event scheduling (such as preset changes at a specific time), system sample rate, password protection, IP configuration, SNMP, and more. If you are having trouble finding a particular infrequently-used setting, it is probably lurking somewhere in the System menu.

- **Display Options -** Contains settings that allow you to customize what meters and analytical tools are displayed on the front panel. As a convenience, this sub-menu appears on many different menus throughout Omnia.7, and details are provided in Chapter 13.

- **Shortcuts -** Contains shortcuts to Full Screen mode (all displays, no controls) as well as volume sliders for Monitor Outputs. Like Display Options, this sub-menu appears on many different menus throughout Omnia.7 as a convenience, and details are provided in Chapter 13.

- **Lock Front Panel -** Includes controls for locking/unlocking the front panel when the unit is password protected.

Chapter 7
Input > Source Audio Menu

*"The secret to creativity is knowing
how to hide your sources" - Mark Twain*

Input > Source Audio Menu

Source Audio Menu

The **Source Audio** menu contains the **Auto Balance** menu.

Auto Balance Menu

When **Auto Balance** is enabled, Omnia.7 will automatically balance the left and right channels of the incoming audio, compensating for any level discrepancies that may be present in an audio stage preceding the processor (such as the output of a console or an STL). Ideally, such out-of-balance issues should be addressed and corrected at the source, but it is not always practical or possible to do so.
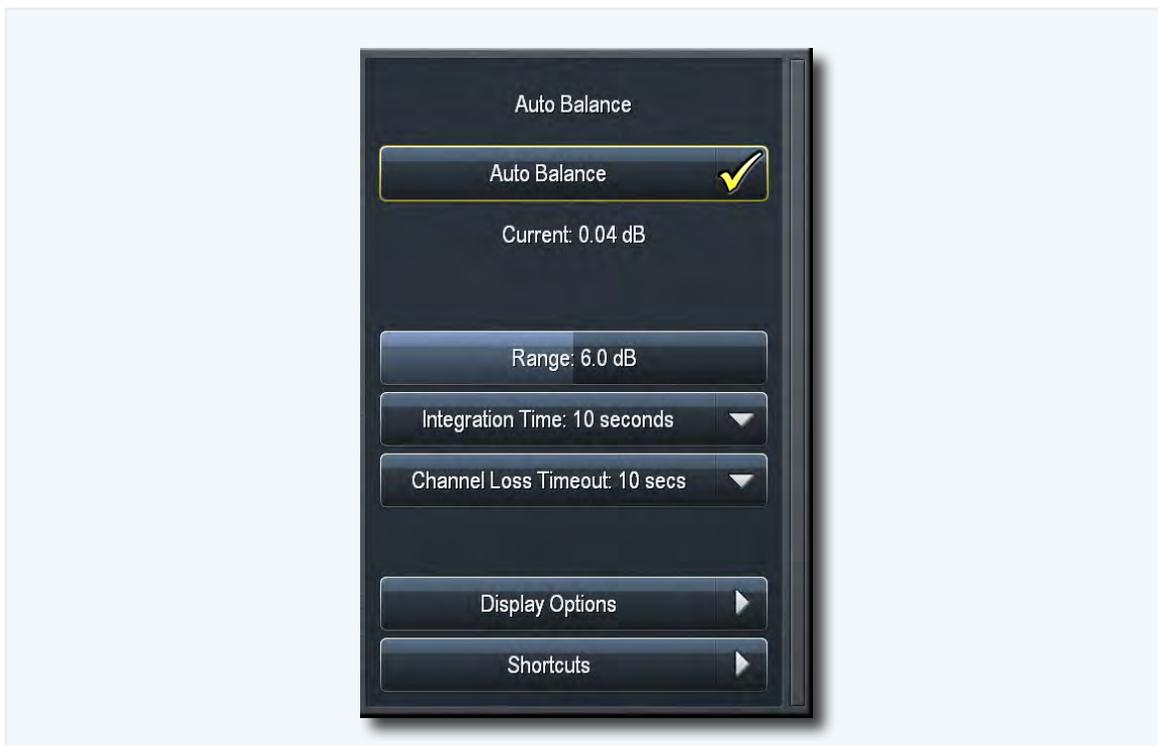
- **Note:** To monitor input audio before Auto Balance, be sure to monitor at the Program Input or A/B Loudness Matched patch point. To monitor audio immediately after Auto Balance, choose the Pre-Declipper patch point.

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- Enabling **Auto Balance** (as indicated by the yellow checkmark) turns the feature on and off. The current amount of correction is displayed just below this control. Positive values indicate that the right channel gain is being increased, while negative values indicate an increase in left channel gain.

- The **Range** slider sets the maximum total amount of gain that can be increased or decreased in each channel. For example, with the Range control set at 6.0dB, the gain in each channel can be boosted by up to 3dB and attenuated by up to 3dB. Each channel contains an ITU BS-1770 loudness monitor which measures and compares the frequency-shaped RMS level in each channel.

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- The **Integration Time** control determines how quickly Auto Balance corrects any discrepancies between the left and right channel. Shorter integration times correct channel-to-channel imbalances more quickly and provide more consistent levels between the left and right channels. Reducing the integration time too much may cause an undesirable or unnatural effect as the channels re-balance, and therefore the default setting of 10 seconds is recommended for most situations.

- The **Channel Loss Timeout** option automatically fades to mono if one input channel is missing. The length of time Omnia.7 waits before fading to mono can be set to 3, 10, 30, or 60 seconds. 10 seconds is the default. This feature can be disabled altogether by selecting "Off".

Chapter 8
Input > Undo Menu

*We can't change the past,
but we can make the future better.*

# Input > Undo Menu

What Exactly Is Undo?

In order to understand how to best use Undo, it is helpful to understand exactly what it is and how it works.

Undo is actually two separate processes - a de-clipper and a multiband expander – which work together to "undo" the poorly mastered, hyper-compressed and clipped audio found on so many modern CD's.

- ***Note:*** *The de-clipper works most effectively when using Omnia.7's digital inputs. Regardless of whether your use the analog or digital input, the incoming audio must not be equalized or pre-processed in any way. This means NO leveler, neither wideband nor multiband. If the possibility of clipping the STL at the studio is a concern, simply turn down the input level to the STL and use Omnia.7's Input Gain control to compensate. Omnia.7 will also happily boost low input levels automatically.*

Take a look at the two waveforms below, captured using Omnia.7's built-in oscilloscope. The top window shows the damaged source audio. The bottom window shows the same audio after it has passed through the de-clipper. Notice how the peaks that were clipped during mastering have been restored by the de-clipper.

- ***Note:*** *The oscilloscope gain was kept at the same level for comparison purposes, but Omnia.7 has sufficient internal headroom, and the illustrations that follow do not suggest that the audio is being clipped again by any portion of "Undo").*
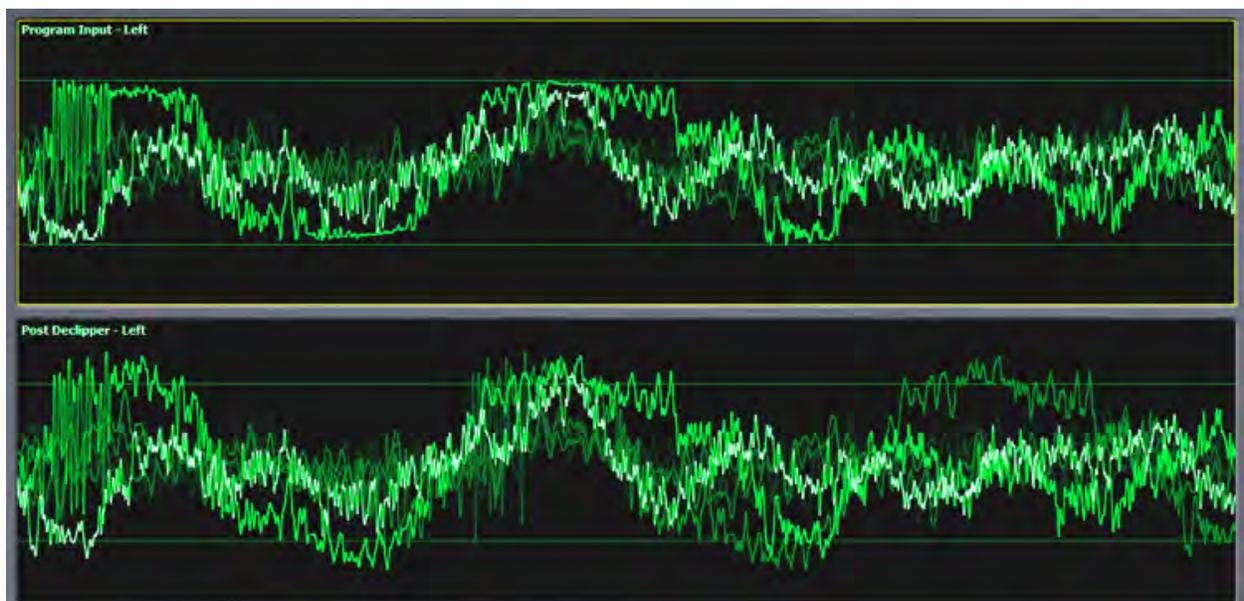
The second stage of Undo is a multi-band expander that is designed to restore dynamic range to audio that has been excessively compressed.

Each of the five bands of the expander has a corresponding psychoacoustic dynamics detector and a peak detector that examine the peak levels of the incoming audio, and based upon that information plus the settings of the various controls, tells the expander how much dynamic range to restore to the audio.

The illustrations that follow show the damaged audio before de-clipping or expansion. The bottom window
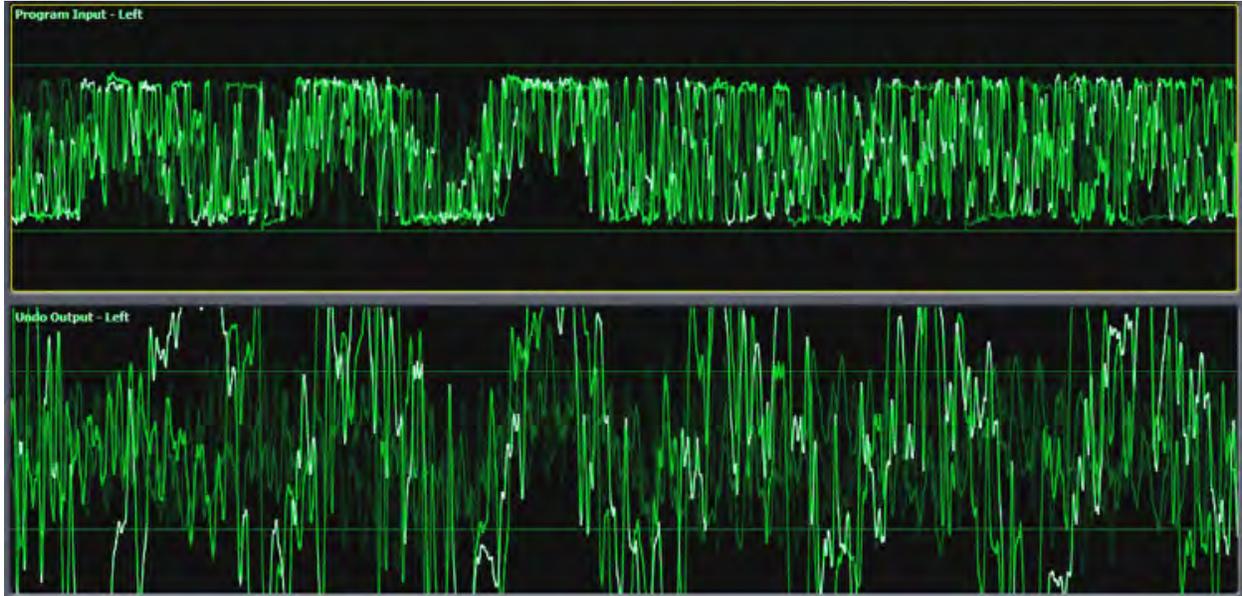
shows the same audio after it has been de-clipped and expanded.

Undo Menu

The **Undo** menu contains seven sub-menus: **Load Preset, Save Preset, Preset Protection, About Preset, Undo Main, Undo Metering,** and **Declipper.**

Load Preset, Save Preset, and Preset Protection Menus

The **Load Preset** menus allows you view the Undo preset currently on the air, toggle back and forth between the current and backup presets, load a new preset, compare the settings of two presets, and delete user presets. The **Save Preset** menu allows you to edit the name of or save over a user preset. The **Preset Protection** Menu allows you to password protect a preset so that it cannot be modified or copied for use in another Omnia.7.

A complete explanation of how to use the **Load Preset**, **Save Preset**, and **Preset Protection** functions is found in the section of this manual devoted to FM processing. *Keep in mind, however, that while the process for loading and saving presets is identical, Undo and FM processing are completely independent operations within Omnia.7, each with unique presets.*

About Preset Menu

The **About Preset** menu contains information about the preset itself, including its author and a
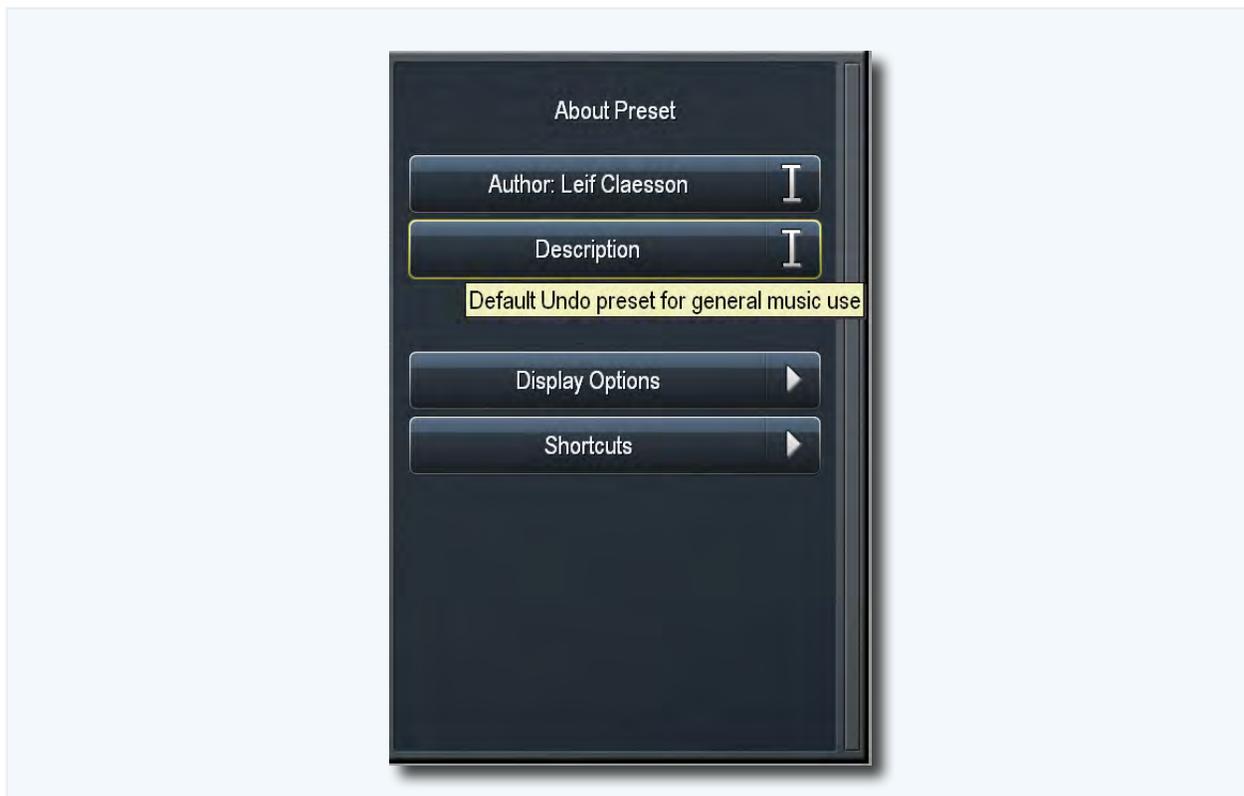
description which appears in a pop-up window when this button is selected.

Undo Main Menu

Controls for bypassing undo as well as independently enabling the declipper and multiband expander are contained in the **Undo Main** menu.
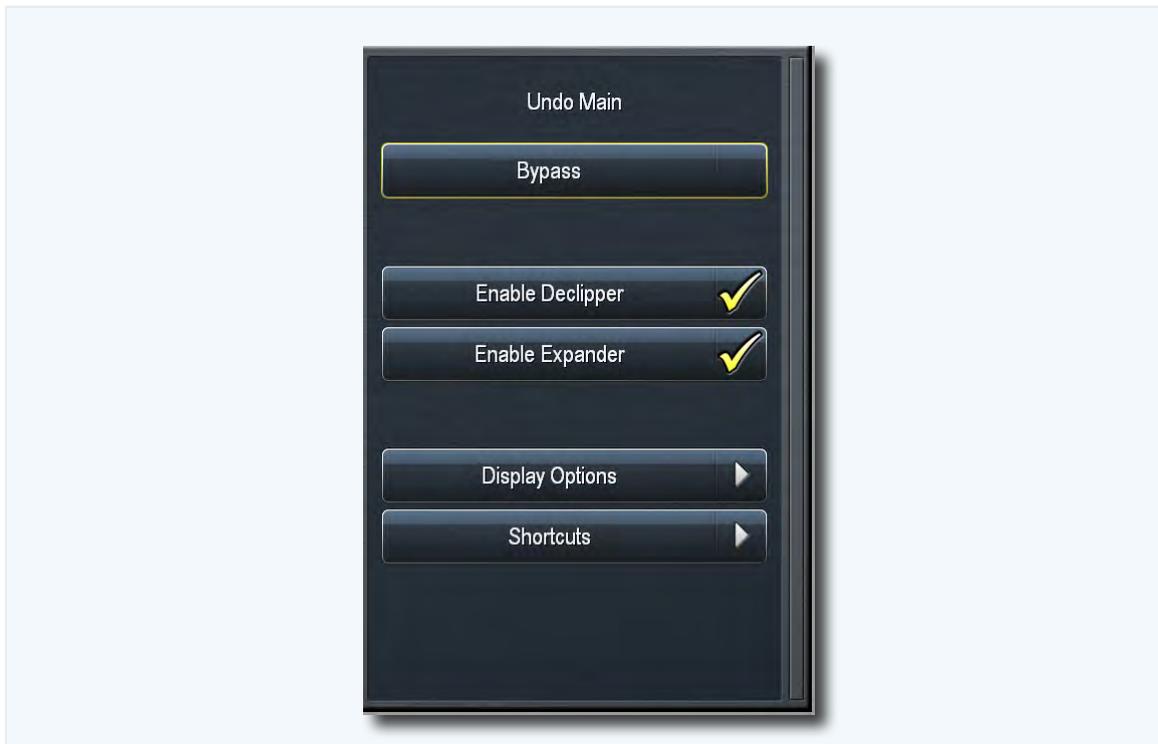
- When selected, the **Bypass** control turns off both the de-clipper and the expander portions of Undo.

- The **Enable De-clipper** and **Enable Expanders** buttons turn the de-clipper and expander portions of Undo on and off independently and respectively.

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Undo Metering Menu

The **Undo Metering** menu determines which of Undo's four metering functions are displayed in the Undo Meters window.

When enabled, the **Show Dynamics Detector** Meters, **Show Expander Ratio** Meters, **Show Speed Governor** Meters, and **Show Expander Threshold** Meters allow the associated meters for each respective section to be displayed in the Undo Meters window.
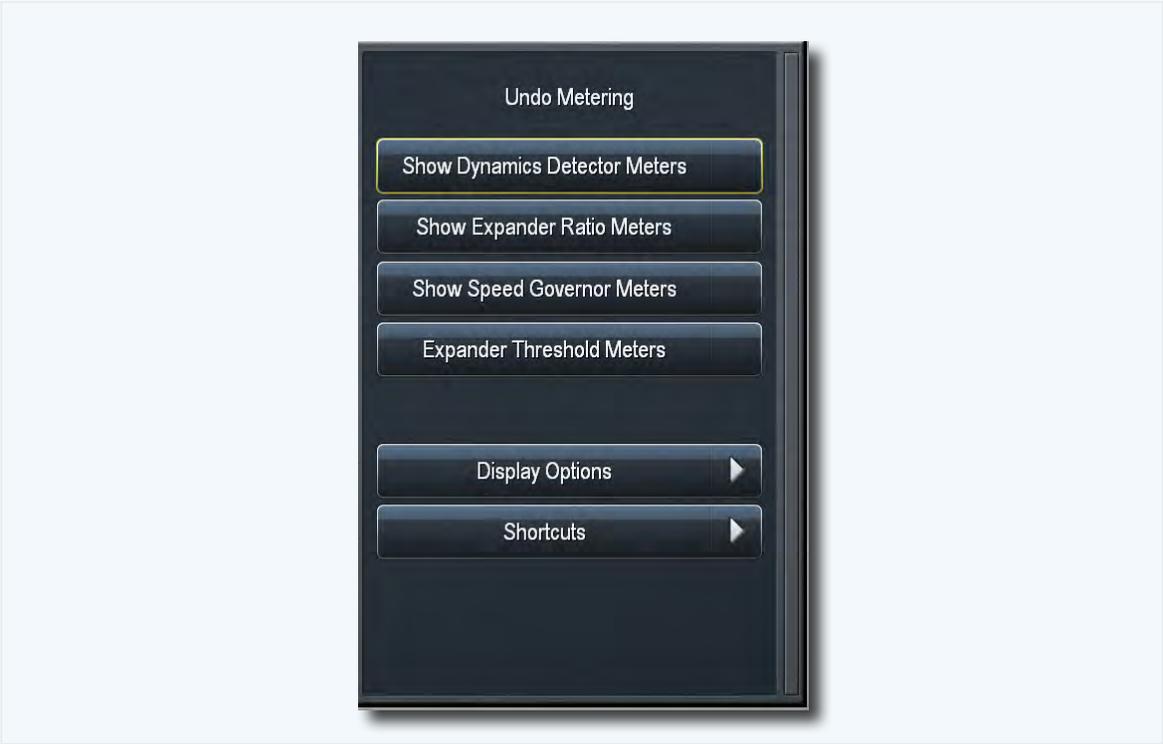
- The level of each band in the expander is always indicated in the **Multiband Expander** display. The meters on the right side of the display show average (yellow), peak (orange), and peak hold (yellow
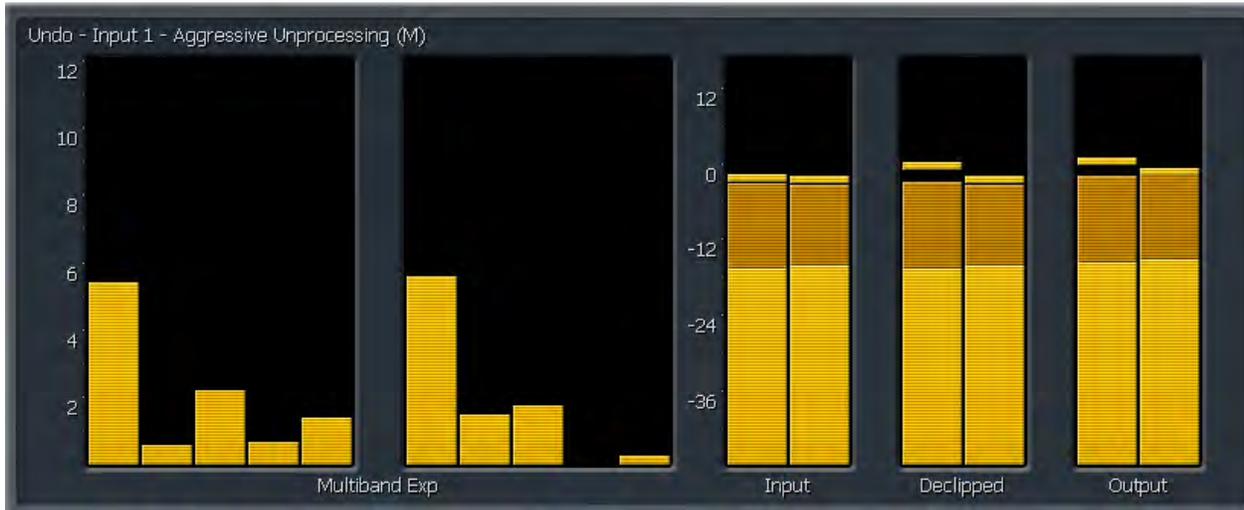

   "blips") for the input audio, audio after the declipper, and after the multiband expanders (Output).
- The **Dynamics Detectors** meters indicate the amount of dynamics detected in each band. Taller bars indicate more inherent dynamics in the source music while shorter bars indicate less dynamics. These meters are generally the inverse of the **Expander Ratio** meters
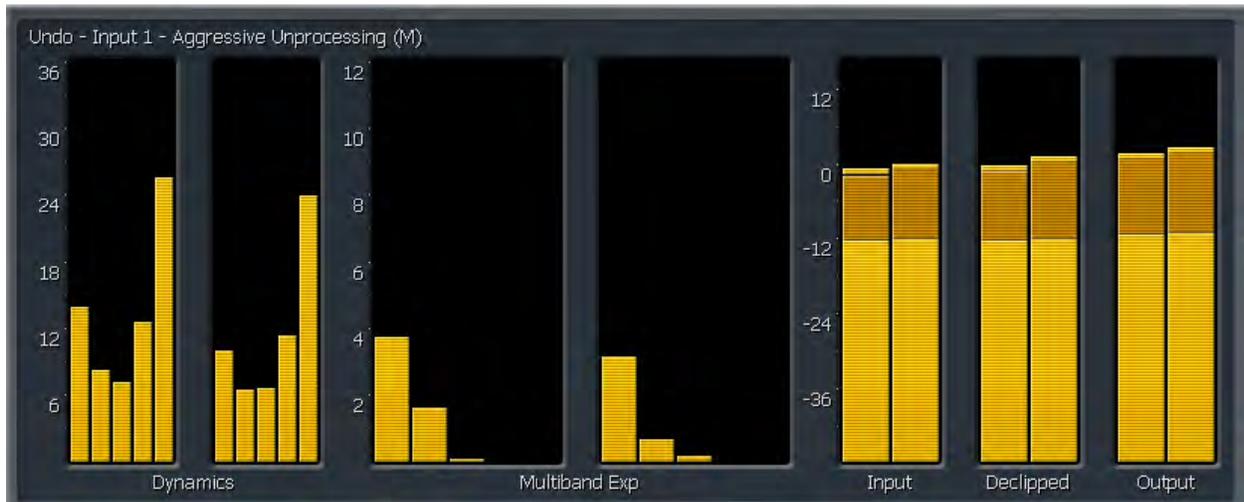

- The **Expander Ratio** meters indicate the current ratio of expansion relative to the detected incoming dynamics. Less dynamic source material will have a higher expander ratio compared to content that is more dynamic.
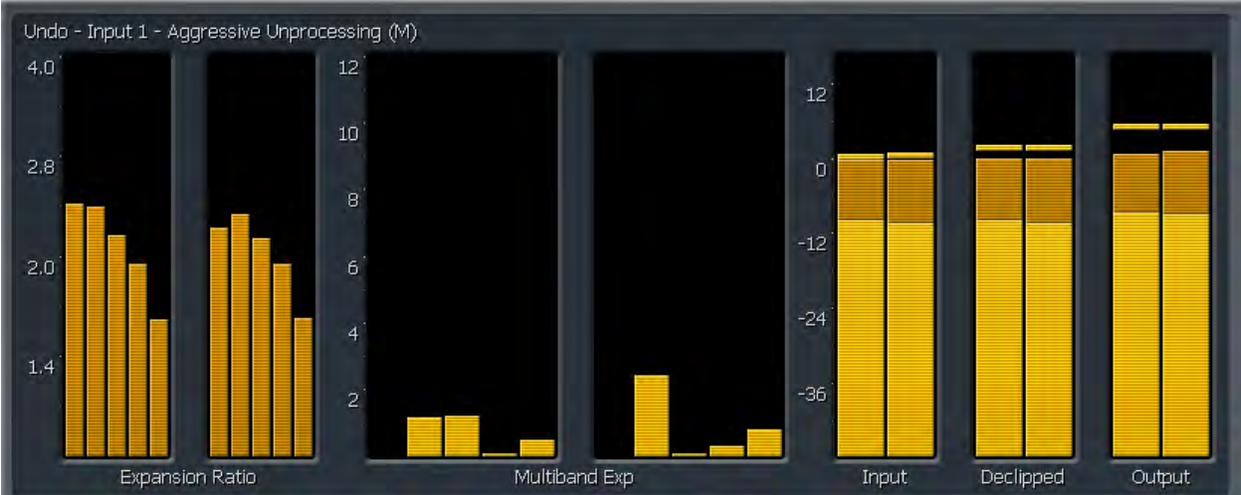
- Undo utilizes a second set of parallel expanders which look at the same input and automatically scale the attack and release characteristics of the main expanders. The **Speed Governor** meters show the activity of these expanders.

- The **Expander Threshold** meters simultaneously show four different measurements about expander activity. The bright yellow bars indicate the average levels; the orange bars indicate the peak levels; the dark red bars indicate the distance limit (the greatest distance by which an individual band's peak detector can fall relative to the wideband level to prevent any one band from being expanded if there are insufficient levels to begin with); the yellow "blips" indicate peaks.

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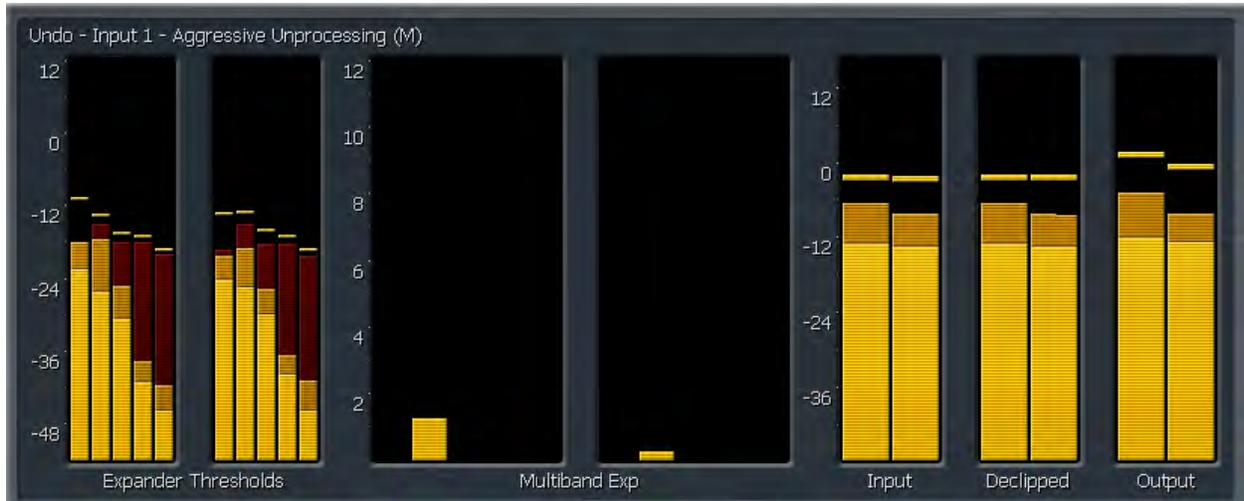
De-clipper Menu

The **De-clipper** menu contains a single control to set the level of de-clipping in 5 stages. Lower settings offer more conservative de-clipping action, while higher settings offer more de-clipping.

A setting of Level 5 the "normal" setting and recommended for most modern material which have been mastered with high levels of compression and clipping. If your station primarily plays source material that has been cleanly mastered, you may find lower settings are sufficient.

The most effective way to monitor exactly what the de-clipper is doing is to view the pre-de-clipper and post-de-clipper waveforms side-by-side using Omnia.7's built-in oscilloscopes. Details of how to configure the display windows and set up the oscilloscopes are provided in Chapter 13 of this manual.

Declipper

Perfect Declip by Hans van Zutphen

Version: 2.02

Declip Level: 5

Normal declipping

Display Options ▶

Shortcuts ▶

Chapter 9
FM Menu
Adjustment Modes

"I never look back, darling!
It distracts from the now." - Edna "E" Mode

FM Menu - Adjustment Modes

The **FM Menu** contains three sub-menus for **Processing, RDS,** and **Meter Options.**

While Omnia.7 offers completely independent processing cores for FM, HD, and the low-latency Studio feed, the majority of the controls are the same for each. There will be some differences for settings that are peculiar to a particular medium; for instance, HD uses look-ahead limiters instead of a clipper for final peak control). But once you have familiarized yourself with the FM section, you will have also learned 99% of the HD and studio sections as well.

Basic, Intermediate, and Expert Modes

Omnia.7 offers three levels of control - **Basic, Intermediate,** and **Expert**.

- By default, each preset loads in **Basic** mode. This mode drastically reduces the number of visible menu items and individual controls and presents a much simpler and easy-to-use interface. Adjustments to general processing characteristics (such as Multiband Speed, Deep Bass, and Clipper Drive, for instance) can be made with a single control though multiple adjustments are actually being made simultaneously in the background.

  This Basic mode is ideal for anyone who does not care to dig deeply into the hundreds of controls exposed in the Expert mode, but it is also useful even for processing experts who just want the convenience of quickly tweaking a preset without having to manually make multiple adjustments.

- Switching to **Intermediate** mode makes a significantly larger number of controls available and is much more akin to Expert mode than Basic. For instance, the three simple controls for multiband adjustments in Basic mode are replaced by three entire menus that allow complete control over parameters like attack rate, release rate, targets, and thresholds for each band of the multiband AGC's   and   multiband   limiters.

  Intermediate mode is best suited for anyone who knows the art of processing well, understands how these controls work and interact with one another, and wants to fine tune their sound with tools that are not available in Basic mode.

- **Expert** mode makes visible every available control in Omnia.7, including some that are admittedly rarely used by anyone except factory preset authors. While there are some very powerful controls available in this mode, our experience with Omnia.9 over the past several years (the product upon which Omnia.7 is based) is that they are best left alone unless you are intimately familiar with the intricacies of these products and have a very specific need to make changes to these settings.

  But as we sometimes say, "We just build the Ferrari - we don't issue driver's licenses", so all of the tools are here regardless of whether they get used to set a record lap time or crash before the green flag finishes dropping!

Switching Between Modes

The current mode is part of the **About Preset** menu (more about that control later). The important thing to remember is that you can freely switch back and forth between Basic, Intermediate, and Expert modes without losing any settings.

This is an important ability and not one widely offered in other FM processors that feature multiple levels of user adjustment, and it affords you the flexibility to do something like this to hone your sound: Pick a preset that's close to the sound you are after, do some fundamental adjustments to the bass in Basic mode, switch to Intermediate for some bass fine tuning, go back to Basic mode to open up the dynamics a bit, go back into Intermediate to adjust the attack time of a single band, then go back to Basic to set the final clipper to achieve the desired loudness.

In other words, you are never locked into the Intermediate or Advanced modes once you've left the Basic mode.

Chapter 10
FM Menu
Processing in Basic Mode

"A child of five could understand this.
Send someone to fetch a child of five." - Groucho Marx

FM Menu - Processing in Basic Mode

Switching to and from Basic mode is done in the **FM > Processing > About Preset** menu.

The **Processing** menu in Basic mode contains ten sub-menus, including **Load Preset, Save Preset, Preset Protection, About Preset, Input Conditioning, Enhance, Gain Riding, Multiband, Final,** and **Bypass.**

Load Preset Menu

The **Load Preset** menu displays the current and backup presets. It also contains controls for loading and deleting presets and for sorting available presets by tags.

Which specific presets are available is dependent upon the list selected in the **Tags** menu. Tags are metadata key words that are included in the **About Preset** menu (described in detail later) for each preset. These can include groups like "All", "Factory", and "User", or can describe the sonic characteristics of the preset by using terms like "Open", "Loud", or "Obnoxious" (yes, that's a real category).

Highlighting a preset and then selecting it (by moving the controller to the right) puts that preset on the air and moves it up to the Current Preset position. The preset that was previously on the air will become the Backup Preset.

After changing any parameter of a preset, an (M) appears next to the Current Preset name and the text turns yellow to indicate the preset has been modified but not yet saved. The Backup Preset also becomes the former (and unmodified) Current Preset.

Changes to each parameter you adjusted to create the modified preset are also displayed in yellow on the specific control button in each section of the processing core, providing an instant visual comparison between the modified preset and the original preset upon which it is based.

Selecting the Delete Preset button allows you to permanently delete user-created presets. Factory presets cannot be deleted.

Save Preset Menu

The **Save Preset** menu allows you to edit the preset name of or save over an existing user preset.
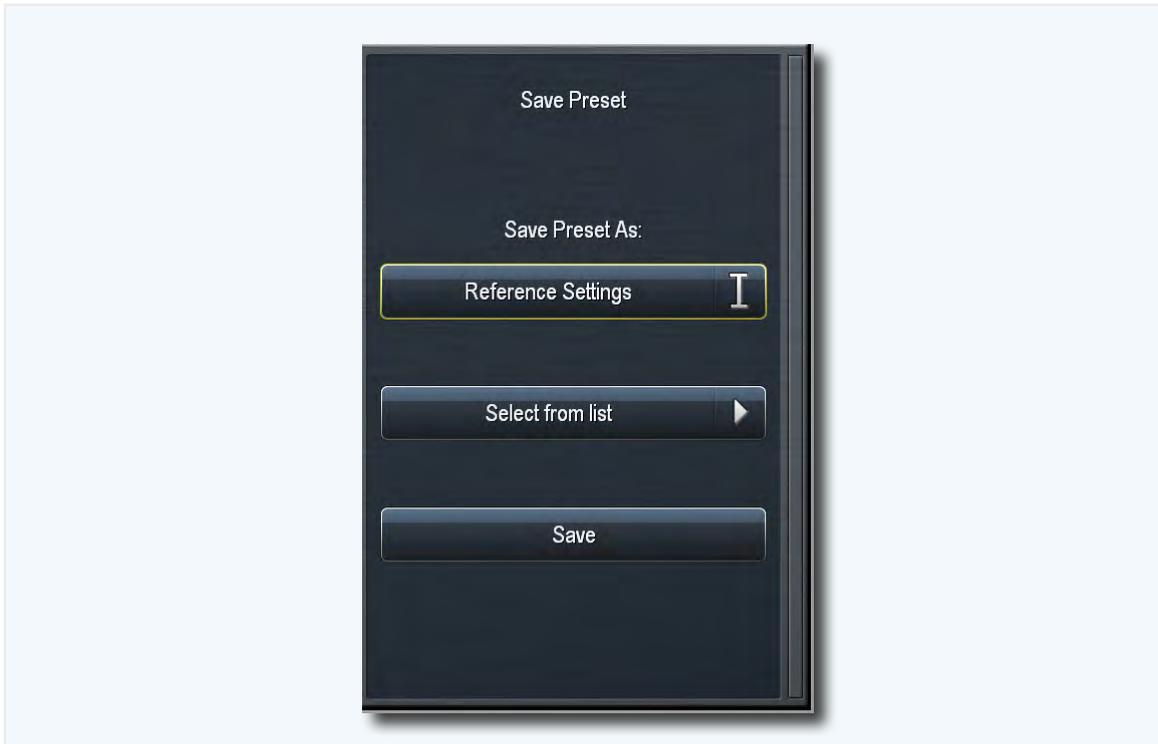
The current preset, regardless of whether or not it has been modified, can be renamed by highlighting and selecting the **Save Preset As** control which will bring up the on-screen keyboard. Rotating the controller clockwise and counter-clockwise provides navigation through the keyboard; moving it to the right selects the highlighted character. Select "OK" and then **Save** to save the preset with the new name.

If your Current Preset has been modified but not renamed, you can write over it by selecting the **Save** button.

If the name you wish to use already exists, you may select **Select From List** and choose it rather than retyping it.

We strongly recommend that after you've made some adjustments and are ready to save those changes to a Custom Preset that you give it a unique name instead of saving directly over your current version. That way, should there come a time when you want to revert back to a previous incarnation of a preset, you can do so, something you cannot do if you continually save over the same preset throughout your adjustment process.

Keep in mind that you cannot give a Custom Preset the same name as an existing Factory Preset.

Preset Protection Menu

The **Preset Protection** Menu allows you to password protect a preset so that it cannot be modified or copied for use in another Omnia.7. In addition, the settings for this preset will be hidden from view as long as the preset is locked.
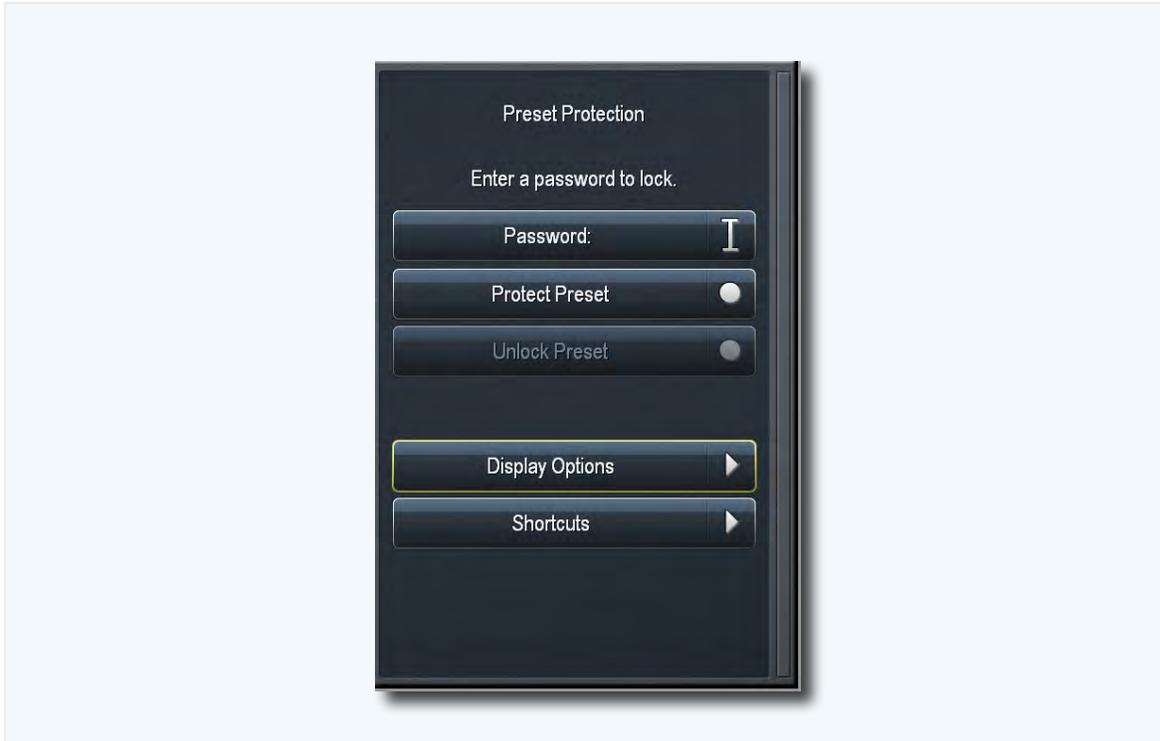
To password protect a preset, enter a password in the **Password** menu, select "OK," and then "Protect Preset." A warning dialogue box will appear. If your intention really is to protect the preset, select "Yes."

The final step is saving the new, protected preset with a unique name in the Save Preset menu. Protected presets appear in green in the Load Preset menu. Remember not to accidentally leave an unencrypted version your preset in the Backup Preset slot!

To un-protect a preset, return to the Preset Protection menu, enter your password, select "OK," and then "Unlock Preset."

About Preset Menu

The **About Preset** menu contains information about the current preset, including its current adjustment level (Basic, Intermediate, Expert), its author, any associated tags, and a description of its characteristics.

Input Conditioning Menu

The **Input Conditioning** menu contains the controls for multiband noise reduction, the phase scrambler and the phase rotator.

Input Conditioning

Noise Reduction Amount: 5 dB

Noise Reduction Threshold: -50 dB

Phase Scrambler ✓

Phase Rotation

Display Options ▶

Shortcuts ▶
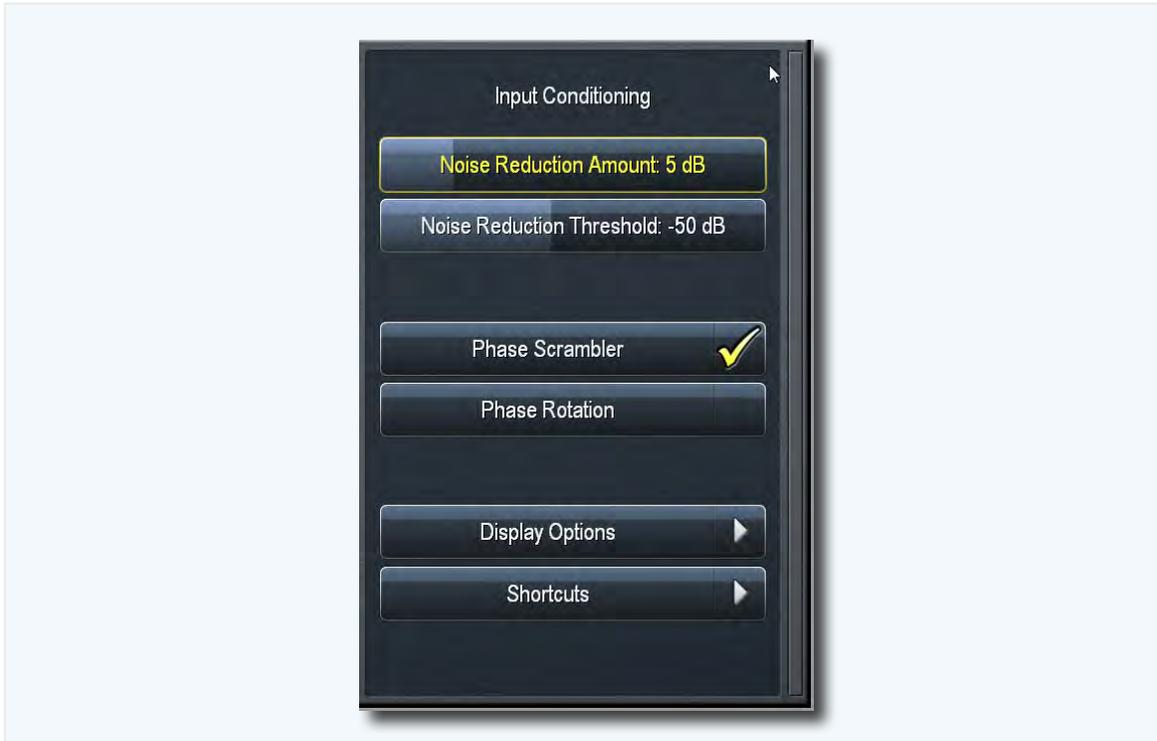
- Omnia.7 features downward expanders in its multiband AGC stage to help control noise in the content itself (for example, tape hiss present on an old recording) or environmental noise (such as HVAC noise in the studio). The maximum amount of downward expansion is determined by the **Noise Reduction Amount** control. The setting of the **Noise Reduction Threshold** control determines the point at which the expanders begin to react.

- The **Phase Scrambler** button enables or disables the phase scrambler. Certain sharp sounds with high harmonic content (such as trumpets or some synthesized sounds) are low in energy but contain high peaks. Since peaks must be limited to prevent over-deviation of the FM carrier, and the majority of those peaks will be removed by clipping, the sound may become dull and distorted.

  The Phase Scrambler, without employing limiting or clipping of its own, slightly offsets the various harmonics present in the audio to drastically lower the peak level, thereby allowing much more of the audio to pass through the final clipper. The result is a dramatically improved high end and less distortion.

- The **Phase Rotator** button enables or disables the phase rotator. Phase rotation is recommended primarily for stations airing talk programming who are also trying to achieve high levels of loudness as it can adversely affect transient "punch" desirable on music formats.

Enhance Menu
The **Enhance** menu contains controls that affect the spectral balance of processed audio as well as enhancements to the stereo image.

- In presets with 4 or 5 bands, the **Deep Bass** control simultaneously adjusts the lowest band of the parametric equalizer, the target level of Band 1 in the multiband AGC, and the setting of Band 1 in the Band Mix Output control. In presets with only 2 or 3 bands, only the parametric EQ is adjusted. Advancing the control increases the amount of deep bass.

- The **Warmth** control works in the same manner as Deep Bass but operates on the mid-bass and low-mid range of frequencies by adjusting the parametric equalizer. Additionally in presets with 4 or 5 bands, it adjusts the target setting of Band 2 in the multiband AGC and output level of Band 2 in the Band Mix Output.

- The **Presence** control adjusts high-mid frequencies. Like the other Enhance controls, it adjusts the parametric equalizer. In presets with 5 bands, it also adjusts the multiband AGC target setting of Band 4 and the output of Band 4 in the Band Mix Output.

- The **Brilliance** control adjusts high frequencies with the parametric equalizer. In 4 and 5 band presets, it also adjusts the target setting of the highest band of the multiband AGC along with the output level of the highest band in the Band Mix Output.

- Omnia.7 features a unique multiband stereo enhancer which widens the stereo field. The total number of bands employed depends upon the current preset, but in all cases, it does not operate on the lowest band(s).This approach significantly reduces the chance that quieter, hard-panned stereo sounds in a recording with a strong centered mono sound will be shifted out of phase and offers much greater control over the stereo enhancement available in various portions of the spectrum. It is enabled with the **Stereo Enhancer** button and adjusted with the **Stereo Amount** control. When enabled, the activity of the enhancer is show in the processing meters display.

Gain Riding Menu

Multiple individual settings of Omnia.7's various wideband AGC sections are simultaneously controlled by

the settings in the **Gain Riding** menu.

- The setting of the **Gain Riding Range** control affects the Input AGC only and determines the amount of available gain. Setting this control too high may provide too much room for low level audio to be raised up while not providing enough room to adequately attenuate higher input levels. Conversely, setting it too low may not provide enough gain to increase low incoming levels.

  It is worth noting that traditional processors only act upon audio above a particular threshold. They are driven into various amounts of gain reduction, but once the audio falls below the threshold, they "run out of room" or "top out" and are incapable of increasing the audio any further. This necessitates some sort of make-up gain control later in the audio chain.

  The AGC's in Omnia.7 operate both above AND below threshold (as you can see by observing the scale on the Input AGC meter) thereby controlling the dynamics over a much wider range without the need for makeup gain.

- The **Gain Riding Power** control simultaneously adjusts the ratio of the Input AGC and Wideband AGC 1 sections. Advancing the control tightens the ratio and provides more consistency, while sliding the control to the left loosens the ratio and yields a more open sound.

- **Gain Riding Speed** simultaneously adjusts the attack and release rates of the Input AGC and Wideband AGC 1 sections. Higher settings translate to faster attack and release rates. Since the actual attack and release speeds are program dependent, the numeric value on the control simply represents the relative position of the slider (0 = control completely to the left, 100 = control completely to the right).

Multiband Menu

The controls of the **Multiband** menu work in a similar fashion to their counterparts in the **Gain Riding** menu but (as the sharper students in the class may have already surmised) work on Omnia.7's multiband AGC

section.

- The **Multiband Range** control sets the total amount of available multiband gain. Setting this control too high may provide too much room for low level audio to be raised up. Setting it too low may not provide enough gain to increase low incoming levels. It may also cause individual bands to run out of gain before others which in turn can cause inconsistencies in the overall spectral balance.

- The **Gain Riding Power** control adjusts the ratio of the multiband AGC's. Advancing the control tightens the ratio and provides more consistency, while sliding the control to the left loosens the ratio and yields a more open sound.

- **Gain Riding Speed** simultaneously adjusts the attack and release rates of all bands of the multiband AGC's. Higher settings translate to faster attack and release rates, though actual attack and release speeds are program dependent.

Final Menu

The **Final** menu is home to the controls that are most influential in setting overall loudness and determining the tradeoff between loudness and quality.

- The **Bass Compression Threshold** control sets the threshold of the Wideband AGC 1 compressor when it is used in "Bass Only" mode. Lower settings will allow more bass compression to be handled in this section rather than by the bass clipper further along in the chain.

- The **Bass Clip Threshold** control sets the threshold of the Bass Clipper. Lowering the threshold (moving the slider to the left) increases the amount of bass clipping and protects against intermodulation distortion at the expense of bass punch.

  Conversely, raising the threshold (moving the slider to the right) will yield less bass clipping which in turn moves more of the work load to the final clipper. This will result in a punchier bass sound but at the risk of creating increased intermodulation distortion.

- The **Final Clip Drive** control sets the drive of the final clipper. Decreasing the drive (moving the slider to the left) reduces the amount of clipping. Conversely, increasing the drive (moving the slider to the right) will result in more clipping.

  Less clipping will result in a more open, less-processed, cleaner sound, but at the expense of overall loudness. More clipping can result in a louder on-air sound – but only up to a point. *Even if total dial domination and loudness are your processing goals, there comes a point when the final wave-form is completely full and increasing the amount of clipping will no longer yield additional loudness – only more distortion.*

We strongly recommend using Omnia.7's oscilloscope as well as your ears to monitor the MPX Output signal while adjusting the final clip drive. The fact that this control is calibrated in one-quarter dB increments should give you the (correct) impression that small changes make a big difference in the sound. Keep in mind that a setting of +0.00 simply means that the control is at the middle of its range and does not necessarily mean that no clipping is taking place.

Bypass Menu

Enabling the **Bypass Processing** button bypasses all dynamics processing except for Undo, which has its own dedicated controls in the **Undo** menu. The **Bypass Gain** control should be set to that the level of unprocessed (bypassed) audio matches the level of processed audio as closely as possible.

Chapter 11
FM Menu
Processing in
Intermediate Mode

Ready to move on from the simple to the mildly complex?
Read on.

FM Menu - Processing in Intermediate Mode

Intermediate mode brings out nearly all of the available controls to the front panel except for those rarely used outside of creating factory presets. Switching to and from Intermediate mode is done in the **FM > Processing > About Preset** menu.

Even though there is an Expert mode that opens up even more controls, there is no shortage of them at the Intermediate level. There is rarely a good case for moving beyond Intermediate mode as it provides a very high level of customization and power. Used skillfully, that power can let you really fine tune the sound of Omnia.7. Used incorrectly, however, it can produce some unexpected or undesirable results. We strongly encourage you to read and understand this chapter to prevent such a fate!

The **Processing** menu in Intermediate mode include eighteen sub-menus: **Load Preset, Save Preset, Preset Protection, About Preset, Phase Processing, Downward Expanders, Input AGC, Wideband AGC 1, Parametric Equalizer, Stereo Enhancer, Multiband Setup, Multiband AGC, Multiband Thresholds, Speech Detection, Wideband AGC 2, Band Mix, Clipper,** and **Bypass.**

The **Load Preset, Save Preset, Preset Protection, About Preset,** and **Bypass** menus are all identical to their counterparts in the Basic mode and as such their functions will not be addressed again here.

Phase Processing Menu

The **Phase Processing** menu in Intermediate mode is similar to its counterpart in the Basic mode except
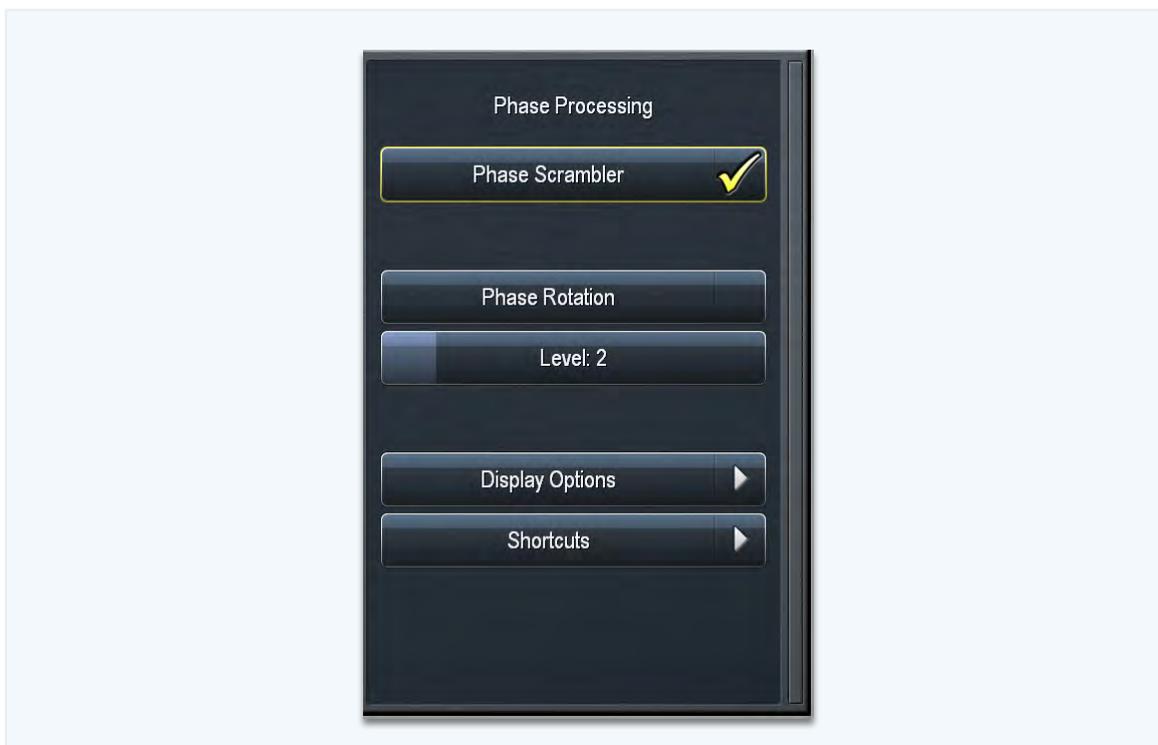
that the amount of phase rotation is now adjustable by using the **Level** control.

Downward Expanders Menu

The controls in the **Downward Expanders** menu allow you to control the maximum gain reduction (downward expansion) for all bands as well as the threshold of each individual band. The total number of bands available in the Downward Expanders section is determined by the number of bands of processing used in the Current Preset.

The Downward Expanders operate in a manner similar to a traditional "noise gate" and provide a useful means for reducing unwanted background noise from less-than-perfect program material or from a noisy

studio environment. The ratio of the expanders is 2:1.

- The **Maximum Gain Reduction** control determines the greatest amount of gain reduction for all available bands.

- The **Target (coupled)** control adjusts the target of all of the bands simultaneously by an equal amount.

- The **Threshold** control for each band sets the point at which downward expansion begins. The range of this control is from -90 to 0dB.

Input AGC Menu

The **Input AGC** Menu is used to set the ratio, maximum gain, attack rate, release rate, target, gate threshold, and freeze threshold.

The Input AGC is the first gain control stage in Omnia.7 following Undo and is designed to be used as a slower-acting leveler ahead of the Wideband AGC1 and multiband compressor sections that follow it.

It is worth noting that traditional processors only act upon audio above a particular threshold. They are driven into various amounts of gain reduction, but once the audio falls below the threshold, they "run out of room" or "top out" and are incapable of increasing the audio any further. This necessitates some sort of make-up gain control later in the audio chain.

The AGC's in Omnia.7 operate both above AND below threshold (as you can see by observing the scale on the Input AGC meter) thereby controlling the dynamics over a much wider range without the need for makeup gain.

- The **Ratio** control determines how much the output audio will be increased or decreased in relationship to the input audio of the Input AGC section. For example, a ratio of 3:1 means that for every 3dB of change in the level of the input audio, the output will be changed by 1dB. Lower (looser) settings provide less control of the dynamics in this section but provide a more open sound, while higher (tighter) settings provide more control at the expense of openness.

- The **Maximum Gain** control works in conjunction with the Ratio control to determine how much gain is available below target. If the Input AGC Ratio is set at Infinity:1 and the Input AGC Maximum Gain is set to 36dB, the Input AGC has 36dB of range below target. At a ratio of 2.0:1 and the same Maximum gain setting, the range is reduced by half to 18dB. The scale to the left of the Input AGC meter automatically adjusts as needed when changes are made to the Input AGC Maximum Gain or the Input AGC Ratio to accurately reflect how much range is available below target.

- The **Attack** control determines the speed with which the Input AGC acts to reduce audio above target. Lower settings represent slower attack speeds and allow more audio to pass unprocessed by the Input AGC into subsequent processing stages. Higher settings result in faster attack speeds and allow less unprocessed audio to enter subsequent sections.

Because all of Omnia.7's processing stages are program-dependent, putting actual measures of time on these controls would be pointless, and so the numbers on the various Attack and Release controls throughout simply indicate to what degree the slider is advanced.

- The **Release** control determines the speed with which the Input AGC increases gain when the output is below target. Lower settings provide slower release speeds, while higher settings result in faster release speeds.

- The **Target** control sets the target output level of the Input AGC. A lower setting results in a lower output level, while higher settings provide a higher output level. This is similar to a traditional "threshold" control except that gain may also be increased to reach the target, up to the maximum gain setting.

- The **Gate Threshold** and **Freeze Threshold** controls work together to determine the points at which the release rate of the Input AGC slows by a factor of 3 (gate threshold) or freezes altogether (freeze threshold). Lower settings means the audio must drop to a lower level before the release speed slows or freezes. Higher settings means the audio doesn't have to drop as much in level before the input AGC gain slows down or stops. Using higher settings when employing faster Input AGC release speeds can keep the audio from being increased too quickly or too much during quieter passages or pauses. A Gate condition will be indicated by a dim, dark red bar at the end of the meter. A Freeze condition will be indicated by a brighter dark red bar.

Wideband AGC1 Menu

The **Wideband AGC1** menu provides access to the sidechain delay, maximum gain, maximum gain


reduction, ratio, attack, release, progressive release, target, gate threshold, and freeze threshold controls.

- The **Wideband AGC1 Enable** button enables this compressor, which follows the Input AGC section and provides additional wideband compression as determined by its various controls. Disabling the Wideband AGC1 also makes this patch point unavailable in an oscilloscope or RTA display window.

- In contrast to the **Enable** button, the **Bypass** button removes the Wideband AGC1 compressor from the audio path but its patch point remains an available option for viewing on the oscilloscope or RTA via the Display Settings menu. Its meters will remain visible, but dimmed.

- The **Sidechain Delay** feature is useful for both adding punch and managing the amount of low frequency power (while increasing bass punch). This is an especially useful "trick" for maintaining apparent loudness when operating under MPX Power regulations.

- The **Maximum Gain**, **Ratio**, **Attack** rate **Release** rate, **Target**, **Gate Threshold**, and **Freeze Threshold** controls work in the same manner as their counterparts in the other sections of the Omnia.7 as explained earlier in this manual. However, the Maximum Gain control in the Wideband AGC1 section has more range.

- The **Maximum Gain Reduction** control sets the maximum amount of gain reduction possible in the Wideband AGC1 compressor, and is adjustable from 0 to 24dB in one-quarter dB increments.

- The **Progressive Release** control determines the degree to which the Wideband AGC1 compressor releases its gain at a faster rate as the audio is driven further toward or into gain reduction. At a setting of 0, the control has no effect and the Release speed control fully determines the rate of release. Increasing the setting progressively makes the release speed of the audio faster as gain decreases.

Parametric Equalizer Menu

The **Parametric Equalizer** menu provides 4 bands of phase-linear parametric equalization located just ahead of the multiband section of the processing core. In addition, an assortment of adjustable filters are available including a Low Pass Filter, a High Pass Filter, a Band Pass Filter, a Notch Filter, a Low Shelf EQ, and a High Shelf EQ.
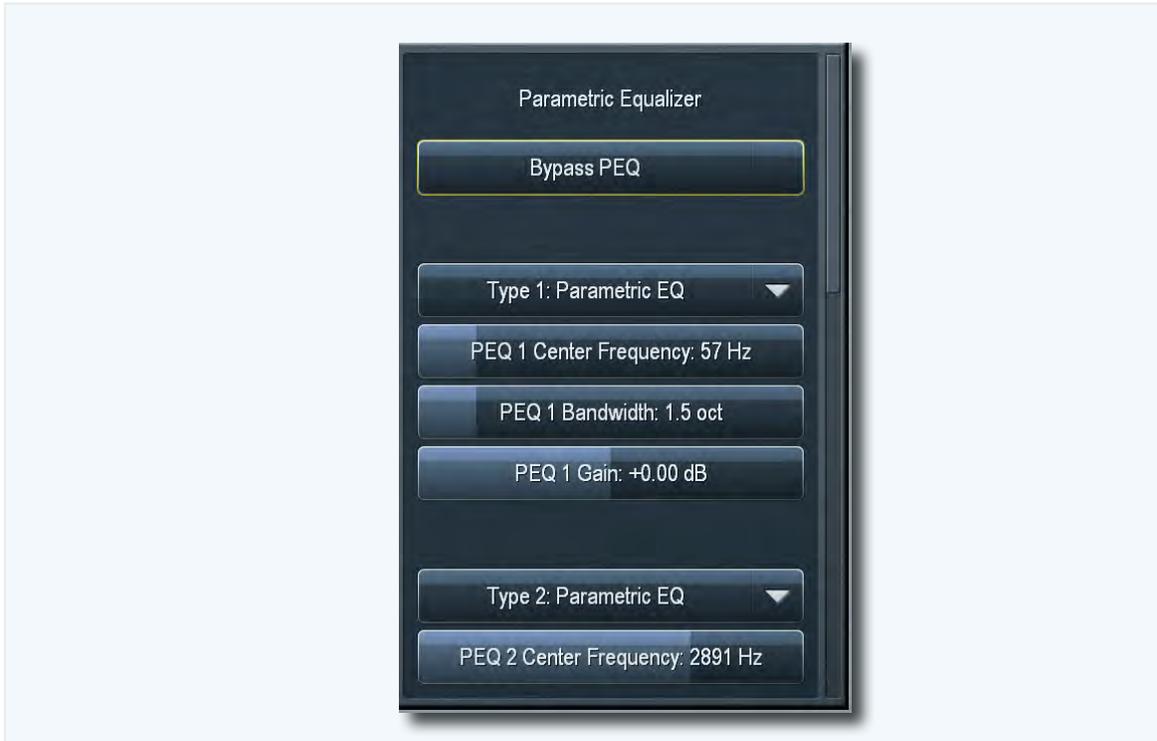
- The **Bypass** button removes the equalizer from the audio path.

- The **Type** drop down menu determines what type of EQ or filter is employed.

- The **Center Frequency** slider is used to set the center frequency for each band.

- The **Width** slider determines how much audio above and below the center frequency will also be affected by any boosts or cuts in gain. The range of this control is 0.0 to 10.0 octaves in one-tenth octave increments. Lower values provide a narrower (sharper) boost or cut, while higher values provide a wider (gentler) boost or cut.

- The **Gain** slider determines how much the audio selected with a combination of the Frequency and Width sliders is boosted or cut. Each band can be boosted or cut by 12dB in one-quarter dB increments.

Although changes made in the parametric equalizer section are offset somewhat by the action of the multiband compressors that follow, this does not occur to the degree you might expect based upon your experience with other processors. The parametric equalizer in Omnia.7 is a very versatile and powerful tool for creating your on-air sound. A visual representation of the effects of the PEQ using the built-in real time analyzer can be seen in the RTA portion of the Display Settings section of this manual.

Stereo Enhancer Menu
Several additional controls are made available to the stereo enhancer in the Intermediate mode and are controlled from the **Stereo Enhancer** menu.

- The **Enable** control turns the Stereo Enhancer on or off.

- The **Target Width** control determines the ratio of L+R to L-R. Higher settings provide more stereo enhancement. Adjust this control carefully to avoid turning the stereo image "inside out" by allowing L-R to overpower L+R which ruins mono compatibility and increases multipath distortion.

- The **Maximum Gain** controls determines how much the Stereo Enhancer can increase L/R separation in an effort to achieve the Target Width in program material that has a narrow stereo image.

- The **Maximum Gain Reduction** controls determines how much the Stereo Enhancer can reduce L/R separation in an effort to achieve the Target Width in program material that already has a wide stereo image.

- The **Target Width** (coupled), **Maximum Gain** (coupled), and **Maximum Gain Reduction** (coupled), controls allow you to adjust all bands simultaneously by an equal amount in their corresponding sections.

Multiband Setup Menu

The **Multiband Setup** menu provides control over the number of processing bands employed, gate threshold, freeze threshold, and gate delay.
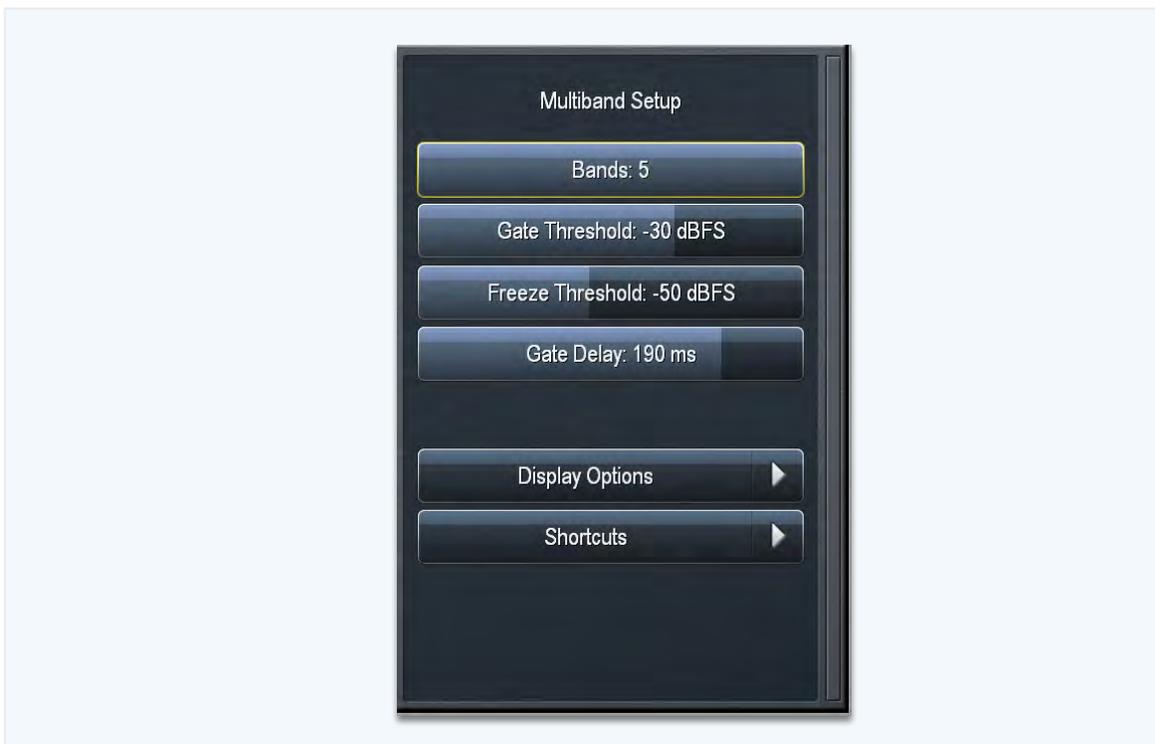
- The **Band** slider determines the number of bands in the multiband processing section and ranges from 2 to 5.

- The **Gate Delay** control determines how long the Gate Threshold and Freeze Threshold controls wait before they begin working. The default settings for most presets is 190ms. Setting the control to "0" means that as soon as audio falls below the threshold as determined by the settings of the Gate and Freeze controls, it immediately slows or stops, respectively. Higher settings mean it will take longer for the release of the audio to slow or stop.

  - *Note: Setting the Gate Delay much lower than 79ms will cause the gate to take effect during the brief pauses in dry speech, resulting in a much lower volume level from an announcer mic, for instance, as compared to music. Used creatively, this is actually a very useful tool for controlling announcer/music level balance.*

- The **Gate Threshold** and **Freeze Threshold** controls work in the same manner as their counterparts in the other sections of the Omnia.7 as explained earlier in this manual.

Multiband AGC Menu

The **Multiband AGC** menu hosts the controls for setting maximum gain, ratio, progressive release, AGC levels, and AGC speed.

- The **Maximum Gain, Ratio,** and **Progressive Release** controls work in the same manner as their counterparts in the other sections of the Omnia.7 as explained earlier in this manual.

- The **MB AGC Levels** menu has a sub-menu of its own with the following controls:

  - The **AGC Target (coupled), Band Mix (coupled),** and **Drive (coupled)** controls work in the same manner as their counterparts in the other sections of the Omnia.7 as explained earlier in this manual.

  - **The AGC Target** controls set the target output level of each band of the Multiband AGC. A lower setting provides a lower output level, while a higher setting provides a higher output level. These are duplicates of the AGC Target controls located in the **Multiband Thresholds** menu.

  - The **Band Mix** controls allow you to adjust the final output of each band after all Wideband and Multiband processing has been applied and are duplicates of those found in the separate **Band Mix** menu. Please see the section on the **Band Mix** menu below which contains additional important information about these controls.

  - When raising the target of a particular band (to increase gain and consequently raise its output) it was normally necessary to reduce the output of the same band in the band mix control to compensate. Likewise, lowering the target of a band (to decrease gain and therefore lower its output) it was necessary to increase the output of that band in the band mix menu.

    The **Drive** controls provide simultaneous and opposite adjustment to both the **AGC Target** and **Band Mix** controls. This allows the overall spectral balance to remain consistent.

- The **MB AGC Speed** menu has a sub-menu of its own with the following controls:

- The **Attack (coupled)** control allows you to adjust the attack speed of all of the bands simultaneously by an equal amount.

- The **Release (coupled)** control allows you to adjust the release speed of all the bands simultaneously by and equal amount.

- The **Speed (coupled)** control allows you to adjust both the Attack speed and Release speed of all the bands simultaneously by an equal amount.

- The **Peak Sense (Coupled)** control simultaneously adjusts the attack and release rates but in opposition to one another. Sliding the control to the right increases the attack rate and slows the release rate, making it more peak sensitive. Sliding the control to the left decreases the attack rate and speeds up the release rate, making it less peak sensitive.

- Individual per-band **Attack** and **Release** controls work in the same manner as their counterparts in the other sections of the Omnia.7 as explained earlier in this manual.

- **Note:** *The attack and release speeds of the multiband limiters are program-dependent and not adjustable.*

Multiband Thresholds Menu

The **Multiband Thresholds** menu allows you to set the target for each of the Multiband AGC bands as well as the threshold for each band of the Multiband Limiters. The number of available bands is determined by the number of bands of processing used in the current preset.
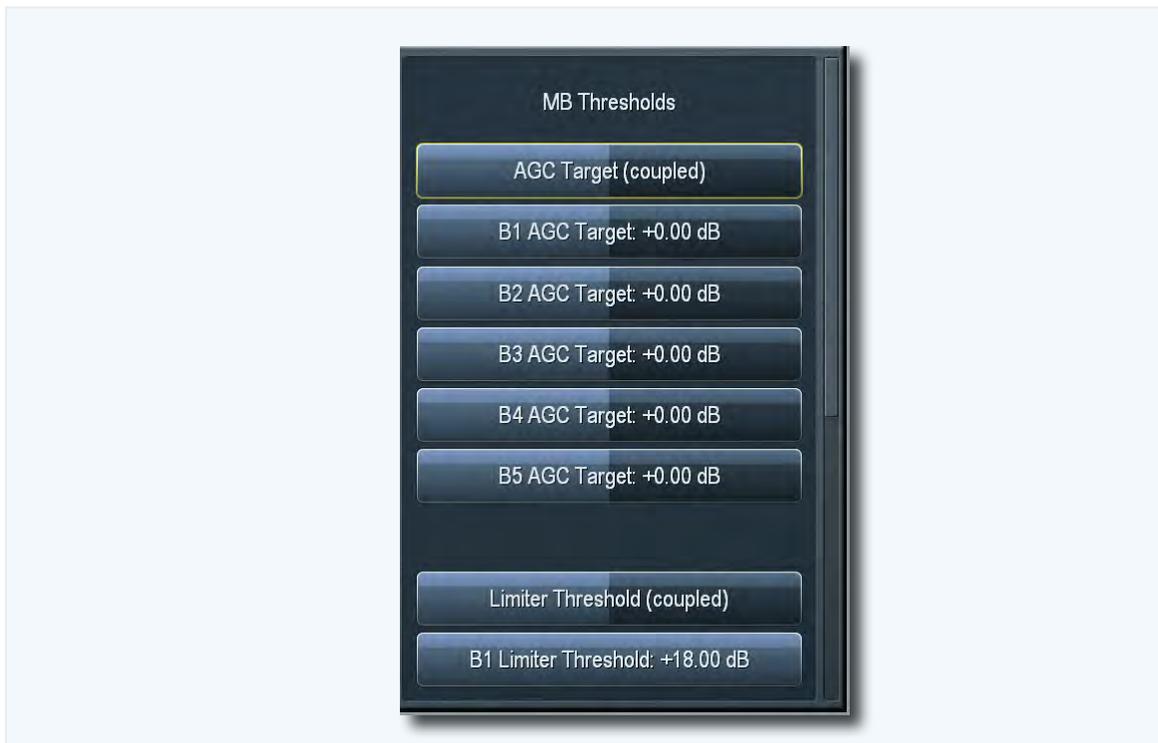

- The **AGC Target (coupled)** and **Limited Threshold Target** (coupled) controls work in the same manner as their counterparts in the other sections of the Omnia.7 as explained earlier in this manual.

- **The AGC Target** controls set the target output level of each band of the Multiband AGC. A lower setting provides a lower output level, while a higher setting provides a higher output level.

- The **Limiter Threshold** controls determine at which point the Multiband Limiter acts upon the incoming audio for its particular band relative to its corresponding AGC Target. For example, a setting of +6dB means that any peaks of less 6dB above the AGC Target level will not be processed by the limiter.

Dry Voice Detection Menu

Speech is one of the most difficult waveforms to process cleanly, as the human voice is complex in nature and is typically asymmetrical in form. Stations that choose to process aggressively in an effort to maximize loudness may find that bare vocals come through with unacceptably high levels of audible distortion.

The **Dry Voice Detection** menu houses the controls that allows Omnia.7 to overcome this by automatically detecting (in the Auto mode) when the input audio is speech and using a separate set of multiband targets, attack rates, and release rates. This allows the dynamics section to do more of the "heavy lifting" and
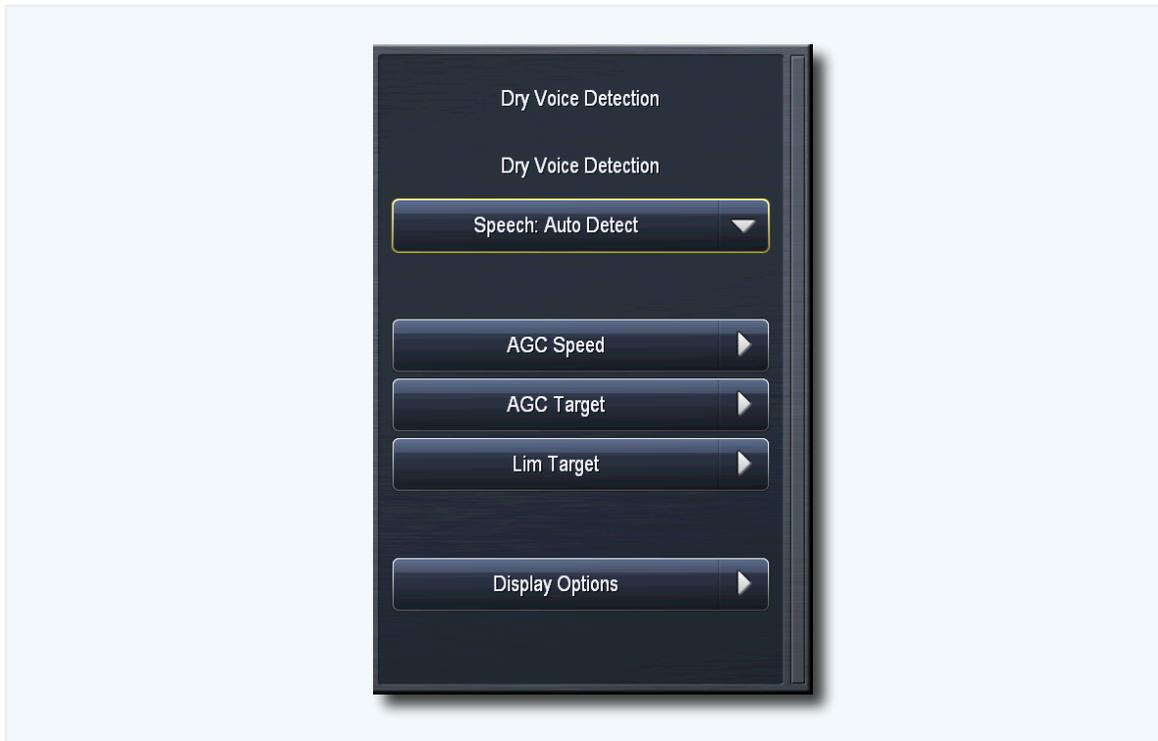
reduces the amount of clipping necessary to maintain the same level of loudness.

- Setting the **Speech** control to "Off" completely disables the speech detection circuit. "Auto" allows the processor to automatically detect the presence of speech. "Force" overrides the main multiband settings and uses the Speech Detection settings (as determined in the current preset) at all times. The default setting depends upon preset chosen; most presets have this featured set to "Off" by default, while the default setting for more aggressive, loudness-driven presets is "Auto."

Wideband AGC 2 Menu

Omnia.7 allows you to insert an additional (and rather versatile) AGC into the processing chain after the

Multiband AGC's. This can be used as an additional wideband AGC or as a bass compressor.

The **Wideband AGC 2** menu provides the controls to determine the location and type of compressor as well as all of the expected gain and speed controls.

- The **Bypass** button removes the Wideband AGC1 compressor from the audio path, but its patch point remains an available option for viewing on the oscilloscope or RTA via the Display Settings menu.

- The **Sidechain Delay**, **Maximum Gain**, **Ratio**, **Attack** speed, **Release** speed, **Target**, and **Progressive Release** controls work in the same manner as their counterparts in the other sections of the Omnia.7 as explained earlier in this manual.

- The **Wideband AGC2** dropdown control enables or disables the Wideband AGC2 section and allows you to choose whether is used as a dedicated Bass Compressor. If you use the AGC2 as a **Bass Compressor**, it will affect only the lower bands, allowing you to push the bass a bit harder without over-driving the final clipper or using excessively fast attack and release speeds in the lower bands of the Multiband AGC.

  - In **Bass Onl**y mode, only the lowest frequencies are processed by the Wideband AGC2 compressor. The **Sidechain Delay** control takes on additional importance in this mode. I

    Properly set, it can delay low-frequency audio headed into the bass clipper just long enough so as to allow the peak of the waveform to be clipped (providing bass "punch" or "slam") but then

handle the rest of the waveform in the Wideband AGC 2 compressor to avoid keeping the audio in the clipper too long and risking audible distortion.

Band Mix Menu

The **Band Mix** Menu allows you to adjust the final output of each band after all Wideband and Multiband processing has been applied. It can be used very effectively to tailor the overall spectral balance of your sound, but keep in mind that this is the final point of adjustment before the audio reaches the Final Clipper (FM core) or Final Limiter (HD Core). In other words, levels increased in the Band Mix section can only be controlled by final clipping or final limiting which may result in unexpected or unwanted density on some material, so care is required when making adjustments here.

- The **Band Mix (coupled)** control works in the same manner as its counterparts in the other sections of the Omnia.7 as explained earlier in this manual.

Clipper Menu

The **Clipper Menu** provides control of the final clip drive, bass clipper slope, and bass clipper threshold.

- The **Final Clip Drive** control sets the drive of the final clipper. Decreasing the drive (moving the slider to the left) reduces the amount of clipping. Conversely, increasing the drive (moving the slider to the right) will result in more clipping.

  Less clipping will result in a more open, less-processed, cleaner sound, but at the expense of overall loudness. More clipping can result in a louder on-air sound – but only up to a point. *Even if total dial domination and loudness are your processing goals, there comes a point when the final wave-form is completely full, and increasing the amount of clipping will no longer yield additional loudness – only more distortion.*

  We strongly recommend using Omnia.7's oscilloscope as well as your ears to monitor the MPX Output signal while adjusting the final clip drive. This control ranges from -6.0 to +6.0 in one-quarter dB increments, which should give you the (correct) impression that small changes make a big difference in the sound. Keep in mind that a setting of +0.00 means the control is at the middle of its range, but does not necessarily mean that no clipping is taking place.

- The **Bass Clipper Slope** control determines the slope characteristics of the bass clipper.

  - **Slope 1** is filtered at a very low frequency so that the low bass stays "clean" even when clipped hard. However, some of the mid-bass will pass through the clipper, which may result in more of the final waveform being taken up by the bass. For lighter processing settings, Slope 1 offers the cleanest and punchiest bass sound.

  - **Slope 2** has a higher cutoff frequency than Slope 1, offering more control over the mid-bass while creating a "dirtier" bass sound with more harmonics. On certain formats, or when listening on a smaller radio, this may be a desirable effect.

- **Slope 1+2** is simply Slope 1 followed by Slope 2. Most of the low bass will be controlled by Slope 1 and stay nice and clean, while the remaining bass will be taken care of by Slope 2 without affecting the low bass. If you are using heavier overall processing, this option will give you the cleanest sound.

- The **Bass Clipper Threshold** control sets the threshold of the Bass Clipper. Lowering the threshold (moving the slider to the left) increases the amount of bass clipping and protects against intermodulation distortion at the expense of bass punch. Conversely, raising the threshold (moving the slider to the right) will yield less bass clipping which in turn moves more of the work load to the final clipper. This will result in a punchier bass sound but at the risk of creating increased intermodulation distortion.

Bypass Menu

Enabling the **Bypass Processing** button bypasses all dynamics processing except for Undo, which has its own dedicated controls in the **Undo** menu. The **Bypass Gain** control should be set to that the level of unprocessed (bypassed) audio matches the level of processed audio as closely as possible. Note that the final clipper is still active even in bypass mode as modulation must still be properly controlled.
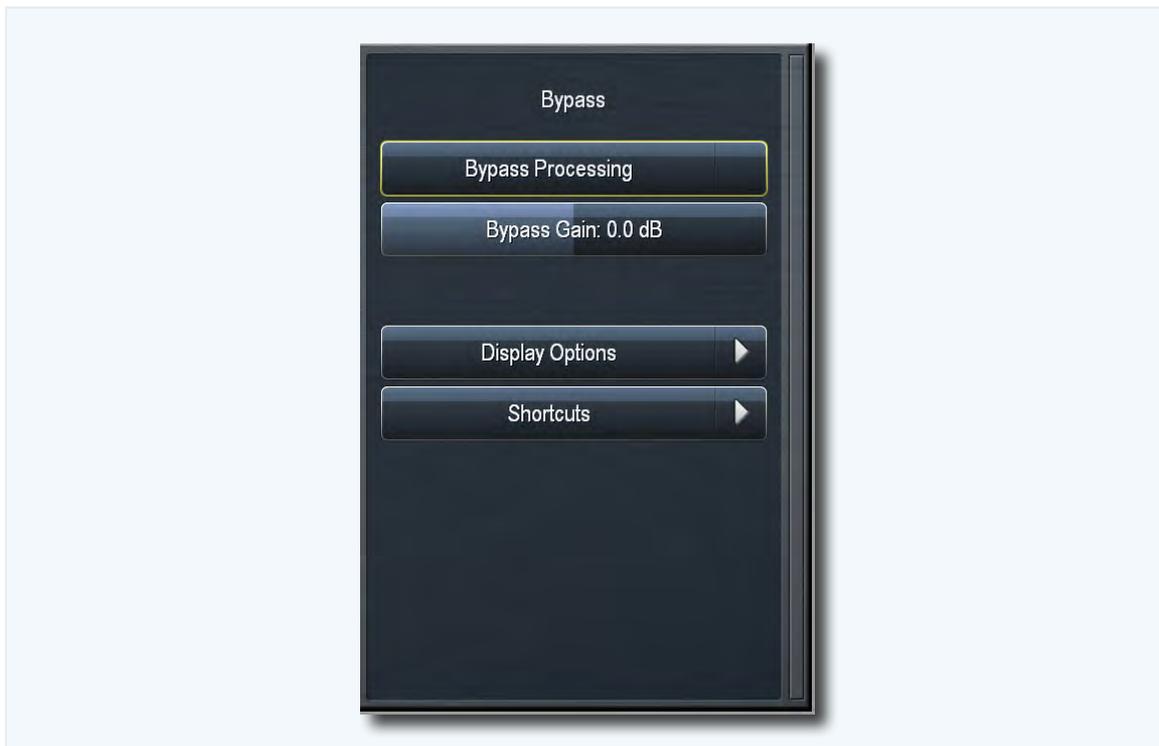
Chapter 12
FM Menu
Processing in Expert Mode

"Danger, Will Robinson!" - The Robot

FM Menu - Processing in Expert Mode

The Intermediate mode should provide more than enough tools to create the precise sound you want and we recommend that the majority of advanced users stop there.

But for the brave, Expert mode brings out every available control to the front panel. There are no hidden "back door" controls in this mode. For better or worse, they're all out there and we're leaving it up to you to judge whether using them is in your best interest. (The home improvement store will rent a floor sander to you without asking if you know how to use one; if you end up sanding your way into the basement, well...)

The additional controls found only in Expert mode fall into several different categories.

Some are more "niche" controls useful mainly when creating factory presets which don't have widespread application for the majority of end users.

Others may appear to have no obvious effect when casually adjusted but can actually create interactions between different sections of Omnia.7 that may only reveal themselves on some program material (thus the reason why authors of factory presets listen to countless of various program material before declaring a preset suitable for release).

Some require an especially intimate knowledge of how Omnia.7 works "under the hood" and are risky to adjust without a very deep understanding of the product.

So, with all of the disclaimers we can muster out of the way, here's a complete rundown of life in Expert mode.

Switching to and from Expert mode is done in the **FM > Processing > About Preset** menu.

The **Processing** menu in Expert mode includes the same eighteen sub-menus found in the Intermediate mode: **Load Preset, Save Preset, Preset Protection, About Preset, Phase Processing, Downward Expanders, Input AGC, Wideband AGC 1, Parametric Equalizer, Stereo Enhancer, Multiband Setup, Multiband AGC, Multiband Thresholds, Speech Detection, Wideband AGC 2, Band Mix, Clipper,** and **Bypass.**

The **Load Preset, Save Preset, Preset Protection, About Preset, Phase Processing, Parametric Equalizer, Multiband Setup, Multiband AGC, Multiband Thresholds,** and **Bypass** menus are all identical to their counterparts in the Basic and Intermediate modes and as such their functions will not be addressed again here.

As the majority of the controls in Expert mode are also present in Intermediate mode, this chapter will address and explain only those controls unique to Expert mode. For a full explanation of the other controls, please reference Chapter 11, "FM Menu - Processing in Intermediate Mode".

Downward Expanders Menu

The **Downward Expanders** menu in Expert mode offers an additional sub-menu labeled **Expander Speed.**
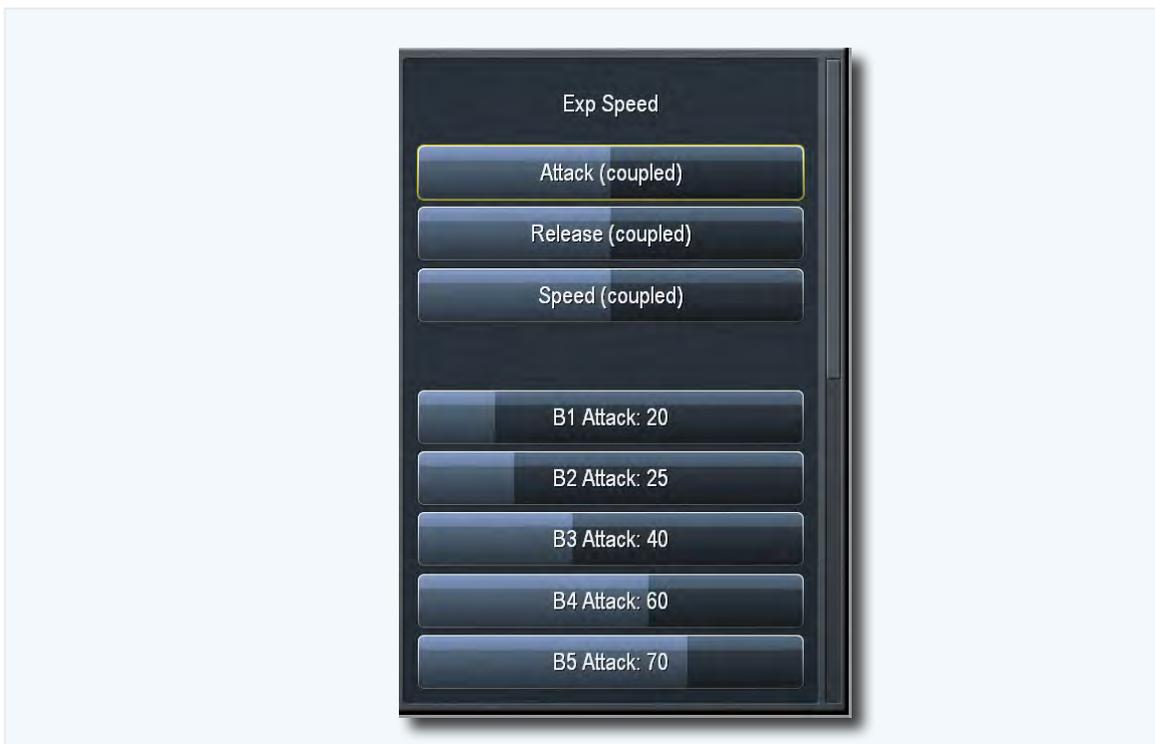
- The **Attack** control determines the speed with which the Downward Expanders act to reduce gain in each band when the program audio falls below the threshold. Lower settings provide slower attack speeds, while higher settings result in faster attack speeds.

- The **Release** control determines the speed with which the Downward Expanders act to return gain to each band when the program audio rises above threshold. Lower settings provide slower release speeds, while higher settings result in faster release speeds.

- The **Attack (coupled)** control allows you to adjust the attack speed of all of the bands simultaneously by an equal amount.

- The **Release (coupled)** control allows you to adjust the release speed of all the bands simultaneously by and equal amount.

- The **Speed (coupled)** control allows you to adjust both the Attack speed and Release speed of all the bands simultaneously by an equal amount.

Input AGC, Wideband AGC 1, and Wideband AGC 2 Menus

The **Input AGC, Wideband AGC 1,** and **Wideband AGC 2** menus in Expert mode each add a 3-band **Sidechain Equalizer** which allows you to make it more or less sensitive to particular frequencies. When the controls are not set to cut or boost any frequency, the Input AGC behaves like a traditional wideband processor and reacts to the full audio spectrum. When set to cut or boost a particular range of frequencies, the Input AGC becomes less sensitive (cut) or more sensitive (boost).

Additionally, an assortment of pre-configured filters are available including a Low Pass Filter, a High Pass Filter, a Band Pass Filter, a Notch Filter, a Low Shelf EQ, and a High Shelf EQ.

> • **Note:** *It is important to remember that this equalizer has no direct effect on shaping the spectral balance of the audio and operates in the sidechain control circuit only.*

The settings for the Wideband AGC1 should, in most cases, mirror those of the Input AGC sidechain equalizer since Wideband AGC 1 is used as an additional full-spectrum AGC.

For Wideband AGC2 used in the Bass Only mode, however, you may want to make the compressor more sensitive to very low frequencies by setting a 2dB boost at 23Hz with a 3 Octave width. This will yield more gain reduction and thus slightly less sustained deep bass in order to protect against the possibility of causing intermodulation distortion which is more audible with a combination of sub-bass plus "ess" sounds than mid-bass plus "ess" sounds.
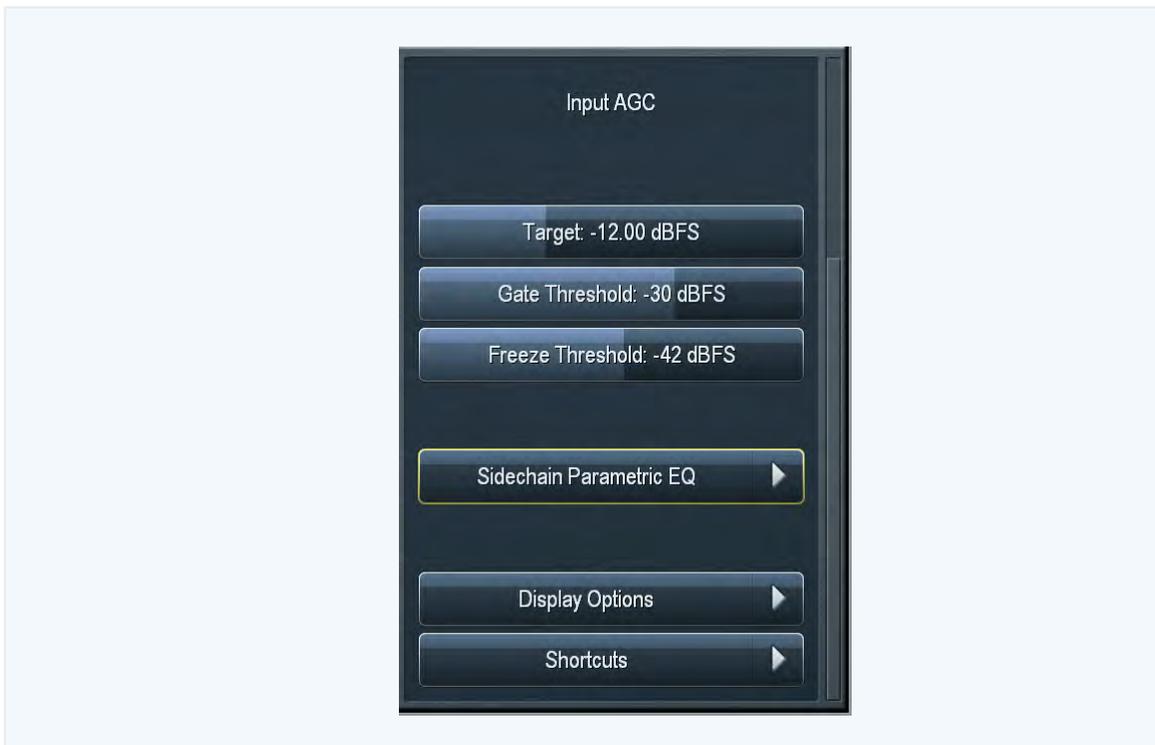
The controls of the equalizer itself work in the same manner as their counterparts in the other sections of the Omnia.7 as explained earlier in this manual.

> • **Note**: *You can see a visual representation of the sidechain EQ curve in a display window using Omnia.7's built-in RTA by navigating to **FM > Processing > Display Settings** and choosing the specific patch point for each sidechain. A full explanation of Display Settings is provided in Chapter 13.*

Stereo Enhancer Menu

The **Stereo Enhancer** menu adds an additional sub-menu in Expert mode that allows attack and release rates to be individually adjusted per band.
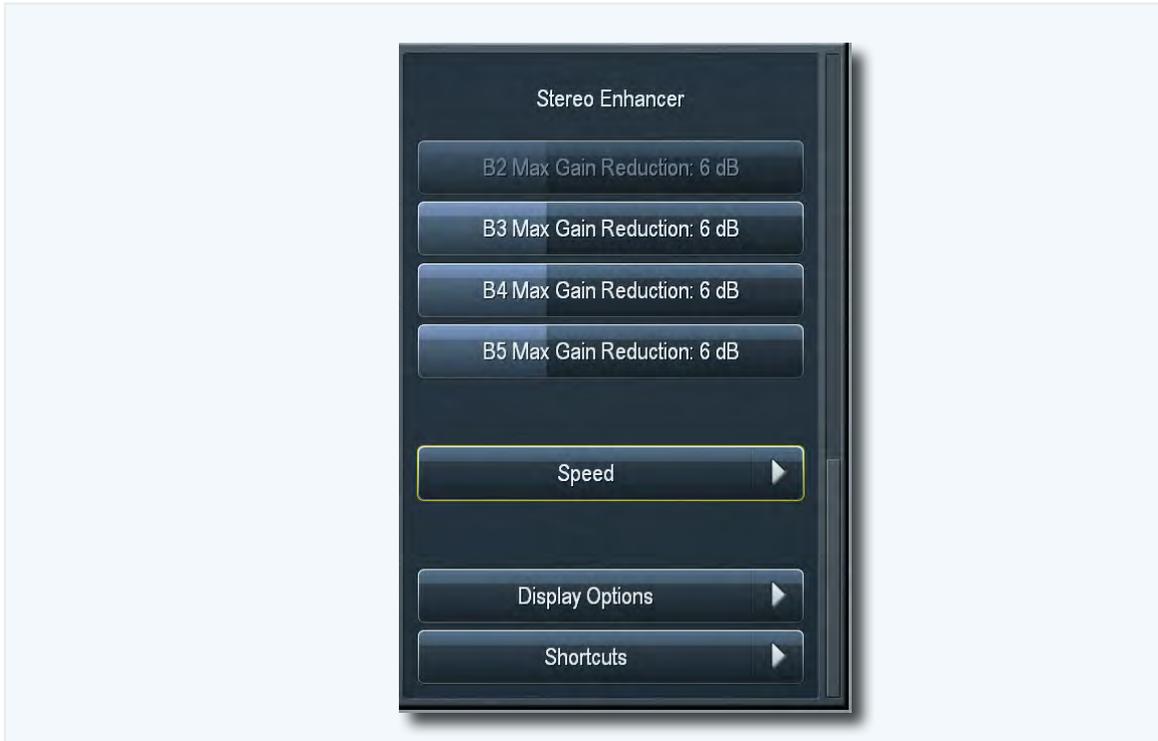
- The **Attack** control determines the speed at which the stereo image is narrowed.

- The **Release** control determines the speed at which the stereo image is widened.

Speech Detection Menu

In Expert mode, the **Speech Detection** menu has three additional sub-menus: **AGC Speed, AGC Target,** and **Limiter Target.**
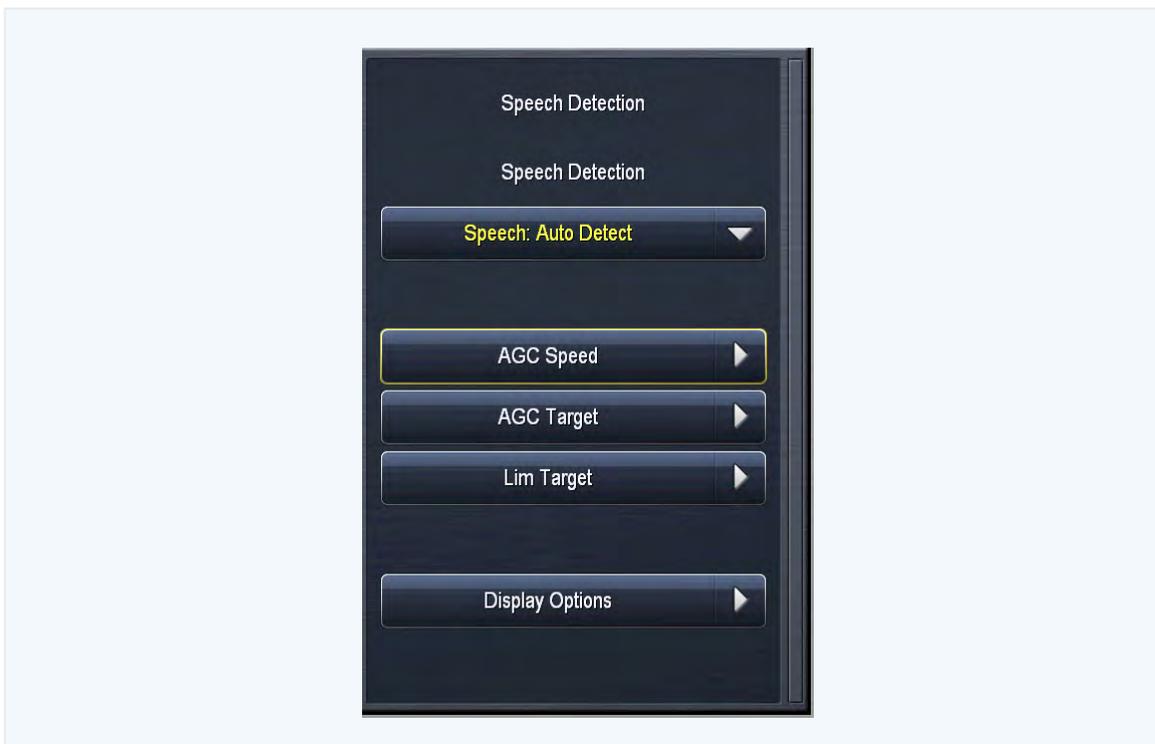
- The **Attack, Release, Target, Limiter Threshold, Attack (coupled), Release (coupled),** and **Speed (coupled)** controls found throughout these sub-menus are work in conjunction with and are relative to the controls of the same names found in the main multiband AGC menu. These settings come into play only when Speech Detection is set to "Forced" or when it is set to "Auto" and speech is detected.

- The **Peak Sense (Coupled)** control in the **AGC Speed** sub-menu simultaneously adjusts the attack and release rates but in opposition to one another. Sliding the control to the right increases the attack rate and slows the release rate, making it more peak sensitive. Sliding the control to the left decreases the attack rate and speeds up the release rate, making it less peak sensitive.

Clipper Menu

The **Clipper Menu** in Expert mode reveals three additional controls entitled **LF Protection Threshold**, **HF Protection Threshold**, and **A15 Protection Threshold**.

These controls adjust the respective clip levels of the three protection clippers situated ahead of the final clipper and help protect low frequencies from influencing high frequencies and vice versa.

The various frequencies in the final wave form will always be vying for space in the final clipper. Advancing these controls ensures their corresponding frequencies will always have at least some room reserved in the final clipper. However, setting the thresholds too high by advancing these controls too much will cause the sound to become dull and dense.

These are very critical controls (as evidenced by the fact that they are adjustable in increments of one-tenth of a dB) and allow you to determine exactly what goes into the final clipper. We strongly recommend listening very carefully to the sound with your ears and watching the waveform on the oscilloscope very carefully when setting these controls.
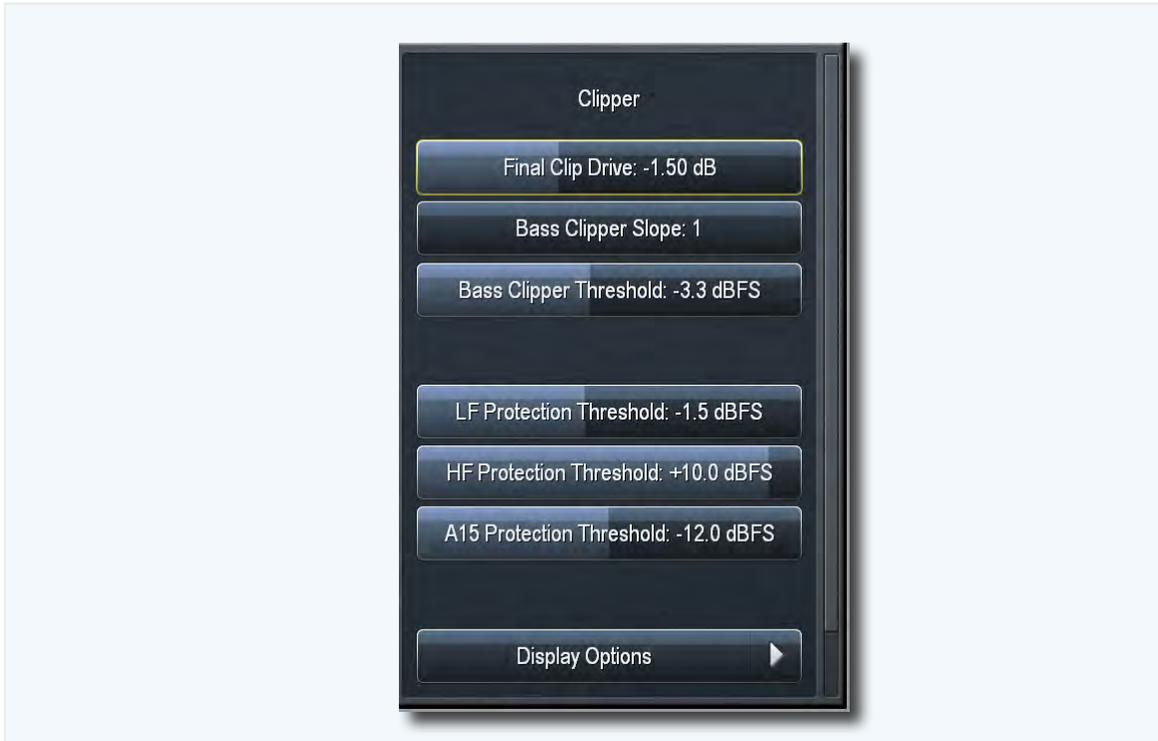
- The **LF Protection Threshold** controls frequencies between 0 and 1,500Hz, though audio in some of these frequencies will already have been dealt with by the bass clippers.

- The **HF Protection Threshold** controls frequencies between 1,500 and 17,500Hz.

- The **A15 Protection Threshold** controls frequencies between 15,000 and 16,500Hz. Omnia.7 is quite capable of passing audio in excess of the traditional 15kHz cutoff found in other FM processors because of its superior pilot protection. A low threshold setting of, say, -12dB allows these additional high frequencies to pass through while making sure the pilot is well protected.

Chapter 13
FM Menu
Display Options Menu

"A picture is worth a thousand words"
and we have lots to say.

FM Menu - Display Options

As mentioned earlier in this manual (and as you may have noticed as you wind your way through the various menus), there are two sub-menus that appear frequently at the bottom of many menu pages: **Display Options** and **Shortcut Menus.** These also appear in the main Processing menu and the Home menu.

Display Options Menu

As mentioned in Chapter 4, the front panel of Omnia.7 can simultaneously display a variety of meters and tools in up to six windows at once.

Since the amount of screen "real estate" available for each display decreases as additional windows are added, six available **Memory Slots** can be set up in different display configurations allowing you to choose which processing parameters or visualizations from one of Omnia.7's valuable built-in diagnostic tools are viewable in each window.

For example, you may wish to devote one preset to nothing but the Undo and Processing Meters to display these parameters in greater detail. Or, you could devote an entire preset to the oscilloscope and monitor the program input, the output of Undo, the MPX before the clipper, and the MPX output to see what the various stages within Omnia.7 are doing to the audio signal. The combinations are endless and yours to customize to suit your particular needs and preferences.

You can also turn off any or all of Omnia.7's displays here – a handy feature for keeping your processing meters and settings from curious eyes!
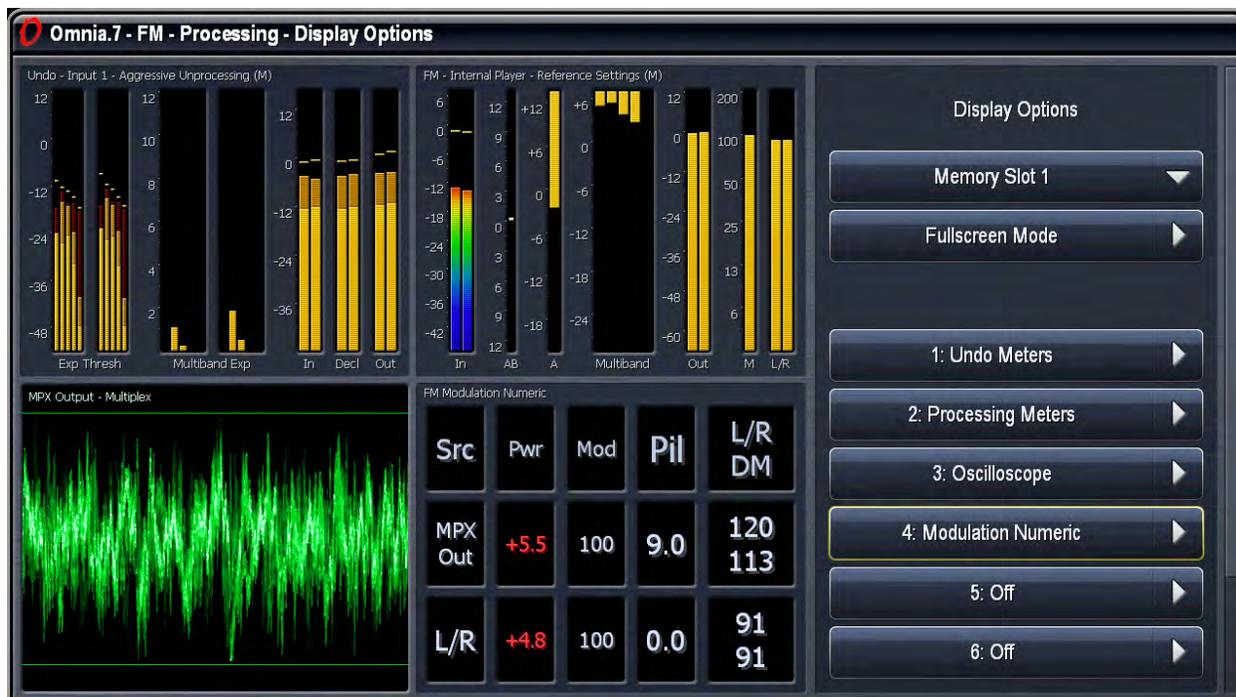

- The **Memory Slot** dropdown menu selects which set of displays is currently shown.

- Selecting **Fullscreen Mode** temporarily removes the controls from the screen and shows only the selected displays.

- The **Delay** slider lets you synchronize Omnia.7's meters with the audio to which you are listening. For example, if you are listening to a stream with a 10 second delay, it would be impossible to properly adjust the processing if that much time passed before you actually heard what you were seeing on the meters! By advancing the Delay control to 10,000ms, what your eyes see on the meters will coincide with what your ears are hearing. Keep in mind, however, that any changes you make to the processing will still take 10 seconds to be audible.

- Which information is displayed is determined by **Display Options** sub-menu in each of the six individual **Window Display** controls.
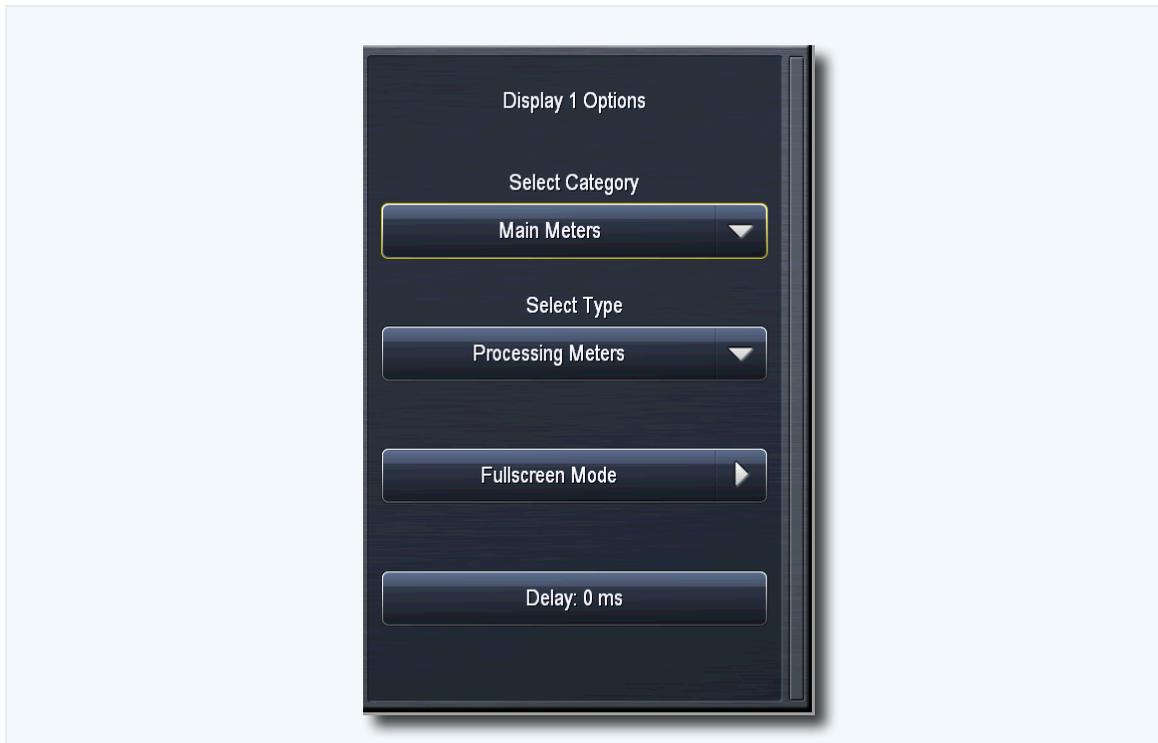
- The **Category** sub-menu broadly divides things into four groups: **Main Meters, Loudness Meters, Modulation Monitor,** and **Instrumentation.** Options in the **Type** sub-menu change depending upon the category. In some cases (particularly with the instrumentation) additional controls and options are provided to select the specific patch point being monitored.

  - **Main Meters** includes **Undo Meters, Processing Meters,** and **Input Meters**

  - **Loudness Meters** includes real-time **Loudness Meters, Short Term Loudness Graphs,** and **Momentary Loudness Graphs.**

  - **Modulation Monitor** offers **Modulation Numeric, MPX Power Graph,** and **Modulation Meters.**

- **Instrumentation** accesses the **Oscilloscope, RTA,** and **FFT Spectrum Analyzer.**

Main Meters Menu

- Selecting **Undo Meters** allows you to display the activity of the entire Undo section. Which specific Undo meters are displayed within this window is determined by settings in the Undo Metering portion of the main Undo menu as described in Chapter 8.

- The **Processing Meters** menu allows you to display the levels and activity of Omnia.7's various gain stages and processing sections. A complete explanation of these meters is provided in Chapter 5.

- The **Input Meters** menu allows you to monitor the audio levels entering Omnia.7 with ITU-R BS.1770 bargraph meters.
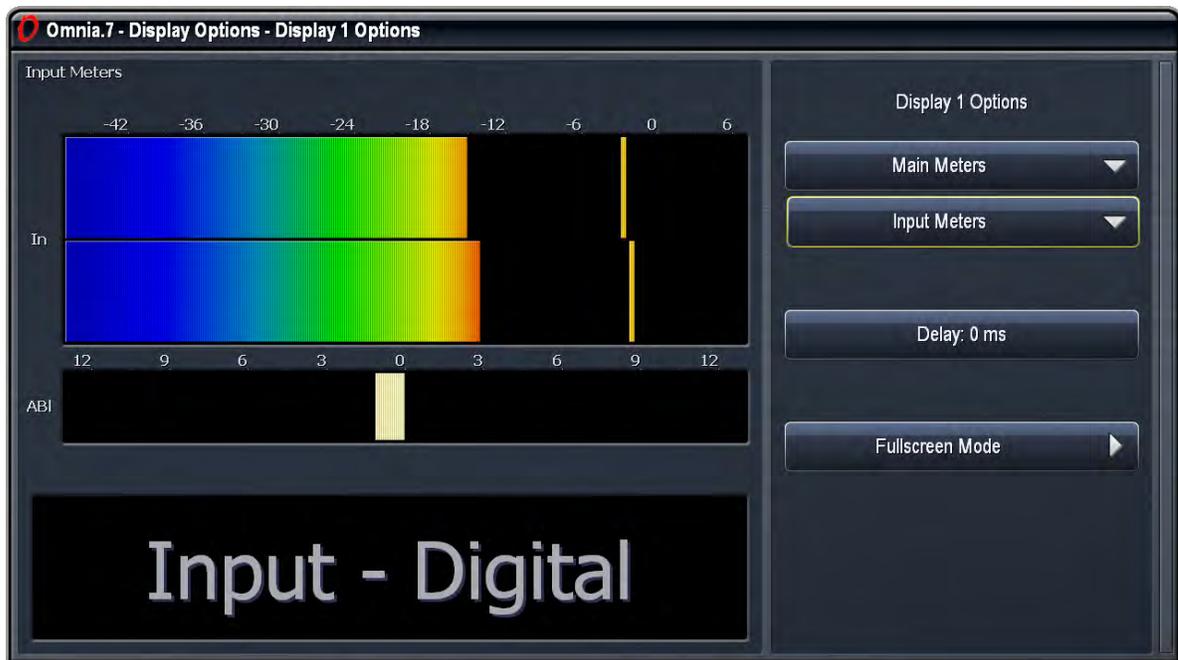
Loudness Meters Menu

- Choosing **Loudness Meters** provides separate loudness meters for Program Input, MPX Output, and L/R Output. The orange bars indicate peak hold levels. A numeric LKFS loudness value is also

provided   for   each   meter.

- Selecting the **Short Term Loudness Graph** provides a graphical representation of loudness over time. Because it does take addition CPU resources to create the graphs, graphic is turned "off" by default and must be enabled for each processing core (FM and HD) in the **Meter Options > Meter**

Options   menu.

- The **Source** dropdown menu determines the audio source feeding the graph. Available sources are determined selections made in the **Meter Options > Meter Options** menu.

- By default, the graphs display data in **Relative Time**, that is, since the graph was first enabled. Checking the **Local** control changes the display to the actual time as set in the **System > Time/Date** menu. Choosing the **UTC** option reflects Coordinated Universal Time (no local time offset). When remotely connected to Omnia.7 via the NfRemote software, an additional option called **Remote** is available which reflects system time of the host PC.

- The **X Range** control determines how long a period of time is shown in a particular display window. The most recent information will always be at the far right of the graph, but advancing this control will show more historical data at once though in less detail.

  The exact length of visible time - that is, how much historical data can be displayed - will be dependent upon how much screen real estate is devoted to the graph. On smaller displays, or if multiple displays are enabled at once, each display will get less screen space and as a result, less past data will be visible.

- The **History** control determines allows you to "travel back in time" anywhere from the present to 24 hours in the past. With the slider set to 0%, the most recent information is displayed. Advancing the control looks further back in time.

- The **Y Zoom** control determines the visible range of loudness measurements on the LKFS/LUFS scale on the left side of the graph. At its default setting of 1.0 X, levels from approximately -30dB to +6dB are displayed. A wider range of levels can be seen by sliding this control to the left, while sliding the control to the right narrows the range.

- The **Y Center** control determines which LKFS/LUFS value on the left scale appears centered on the display. The default setting of 50% places the middle of the graph at -12dB.

- Selecting the **Momentary Loudness Graph** displays measured loudness over a shorter period of
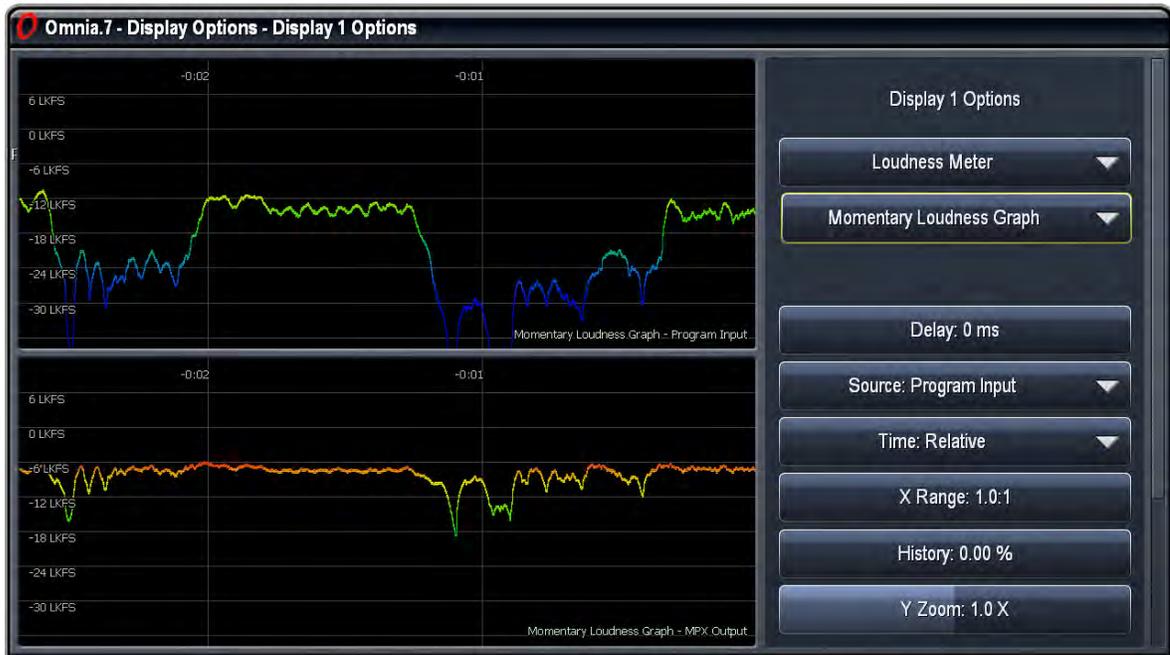
time compared to the Short Term Loudness option

- Modulation Meters Menu

- Selecting **Modulation Numeric** provides the L/R and MPX (composite) output levels, MPX Power levels, pilot level, and the L/R demodulated levels as determined by selections made in the **Meter Options**   menu.
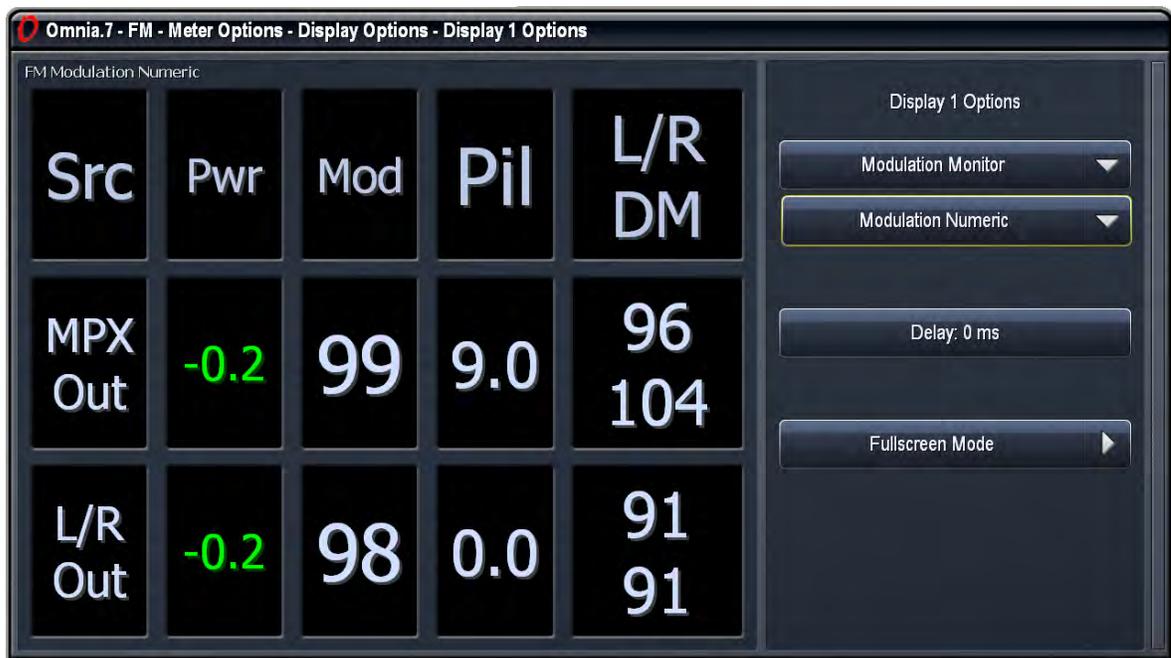
- The **MPX Power Graph** selection displays measured MPX power over time in a graphical format.

- Selecting **Modulation Meters** displays MPX and L/R modulation levels, pilot levels and MPX Power levels as determined by selections made in the Meter Options > Meter Options menu

Instrumentation Menu > Oscilloscope

Choosing the **Oscilloscope** menu allows you to monitor a wide variety of patch points from various
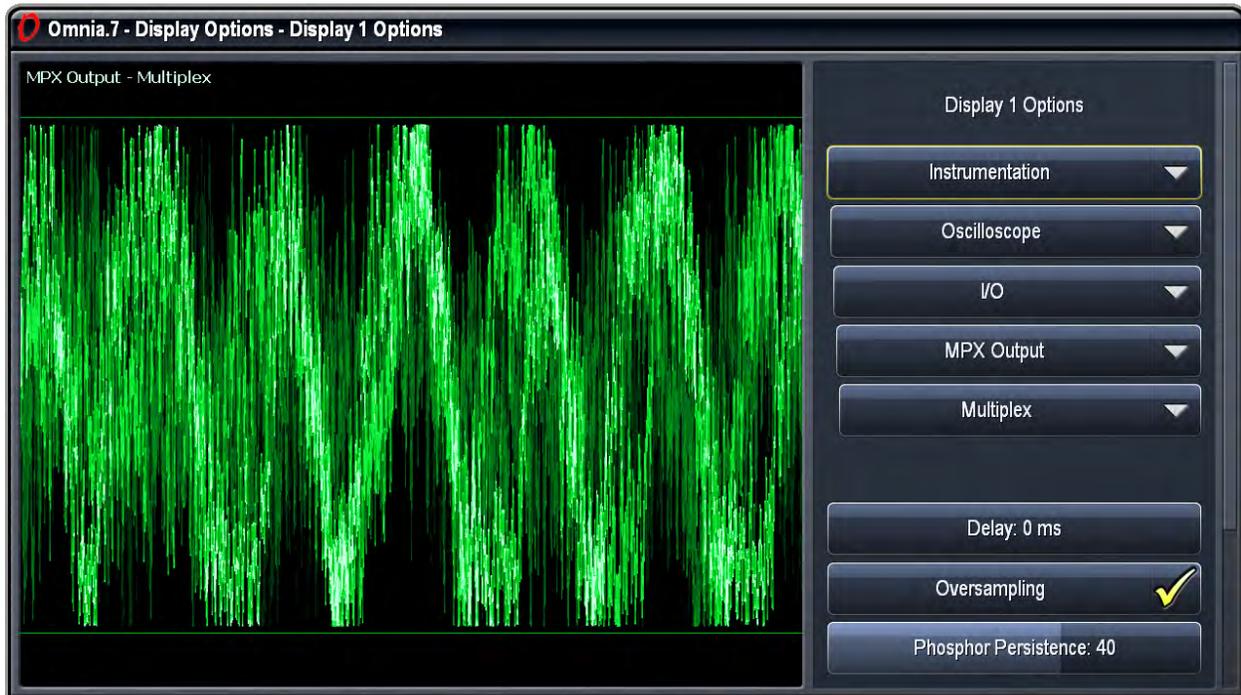
patchpoints with Omnia.7's built-in digital oscilloscope.

The **Category, Patch Point,** and **Audio Channel** sub-menus are used to select the specific source audio. The specific patch points will change depending upon the category. Categories include **I/O, Undo, Miscellaneous, MPX Decoded, Physical Inputs, Sidechains, Multiband,** and **Monitor Out.**

- The **I/O** category offers the following patch points:

  - **Program Input** is the unprocessed audio as it comes into Omnia.7's inputs.

  - **Loudness Matched A/B** is also unprocessed input audio, but level matched to make A/B comparisons easier.

  - From the **MPX Output** patch point, you can view the Multiplex, left de-modulated, right de-modulated, left de-emphasized, or right de-emphasized audio signal as well as the pilot tone (obtained through a brick wall phase-linear band pass filter from 18,950 – 19,050Hz), the multiplexed signal minus the pilot, and the MPX signal minus SCA carriers (obtained through a brick wall phase-linear low pass filter at 54,000Hz).

  - From the **L/R Output** patch points, you can view the original pre-emphasized left/right audio signal, the de-emphasized left/right audio signal, as well as the MPX Encoded signal, a stereo coded version of the pre-emphasized left/right audio signals.

- The **Undo** category includes patch points for **Pre-Declipper, Post-Declipper,** and **Undo Output.** The left or right channel can be selected for each patch point.

- The **Miscellaneous** category offers patch points for **Post Input Filtering, Pre Final, Post Bass Clipper,** and **MPX Output with Noise.**

    - **Post Input Filter** monitors the signal after immediately before the Input AGC.

    - **Pre Final** monitors the signal after the multiband section but before and final limiters or clippers.

    - **Post Bass Clipper** is located immediately after the bass clipper but before the final clipper.

    - **MPX Output with Noise** is an complete composite signal with noise injection to simulate real-world FM conditions. The amount of noise injected is set in the **FM > Meter Options > Test Options** menu.

- The **MPX Decoded** patch point provides patch points for **MPX Decoded Output** and **L/R De-emphasized Output** in both the left and right channels.

    - **MPX Decoded Output** is the complete composite signal after it has been decoded.

    - **L/R De-emphasized Output** is the de-emphasized output of the L/R clipper.

- The **Physical Inputs** category allows the signal present at Omnia.7's rear panel inputs to be monitored. The left and right channels of both the **Analog** and **Digital** inputs are available. The patch points are especially valuable when using the NfRemote client software to stream audio back from Omnia.7 in situations where there is insufficient bandwidth to stream their un-decoded counterparts.

- The **Sidechains** category includes patch points for the **AGC Sidechain, WB AGC 1 Sidechain, WB AGC 2 Sidechain, AGC Output Audio, WB AGC 1 Audio,** and **WB AGC 2 Audio.**

    - The **Input AGC Sidechain, Wideband AGC 1 Sidechain, Wideband AGC 2 Sidechain Audio** patch points allow you to see the effect of the corresponding side chain parametric equalizers. This can be useful when trying to filter out (or include) certain frequencies.

    - The **Input AGC, Wideband AGC 1, and Wideband AGC 2 Output** patch points display the signal at their respective outputs and after any sidechain equalization.

- The **Multiband** category allows the oscilloscope to display the outputs of each of Omnia.7's multiband AGC's. The total number of available bands is dependent upon the number of bands used in the current preset.

    - The output of each individual band of the multiband AGC can be selected by choosing one of the **Solo Band** patch points.

    - The **Post Multiband** patch point is the summed output of all bands including all processing preceding the multiband AGC's.

- The **Monitor Output** category allows the **Speaker Source** and **Headphone Source** audio to be displayed along with the **Speaker Output** and **Headphone Output** audio.

When the oscilloscope is selected as the current type of instrumentation, controls for adjusting its display

are provided in the Display Options menu. It may be necessary to scroll down to view these controls.

- The **Delay** control works the same here as it does in other display sections.

- The **Oversampling** control enables or disables the oscilloscope's 4x oversampling function. Without oversampling, some peaks may pass through without being displayed, giving an inaccurate view of the signal. This is most critical when monitoring the MPX Output or the L/R Pre-emphasis Output. However, since oversampling consumes more CPU resources, it is turned off by default.

- The **Phosphor Persistence** control adjusts how long latent images remain on the screen. A setting of 0 provides no image delay at all and offers the greatest amount of visual detail for the current information   on   the   scope.

  Higher settings allow images of signal that has already passed through the scope to remain on the screen for progressively longer periods of time. Setting this control all the way to the right keeps the image from fading at all, useful for catching peaks.

- The **Gain** control adjusts the Y scale of the oscilloscope and moves the grid relative to the signal.

- The **Lines** control adjusts the offset of the reference lines as measured in dB.

- The **Zoom** control allows you to choose between a 1x, 2x, and 4x view of the X scale, similar to setting the sweep time of a traditional oscilloscope.

Below are some examples of how to use the oscilloscope:

- As a High Frequency Headroom Monitor:
  - Display the Left or Right Demod signal from the MPX Output menu
  - Set Oversampling to "On"
  - Set Phosphor Persistence to 50
  - Set Gain to -3
  - Set Lines to -1
  - Set Zoom to 4x

Below is a comparison of this signal to the pre-emphasized output so you can see just how much additional HF headroom Omnia.7's composite clipper provides!
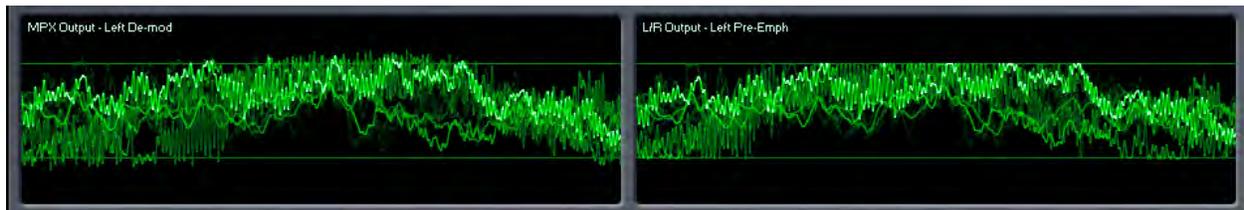

- As a Pilot Protection Monitor:
  - Display the MPX Output
  - Set Oversampling to "Off"
  - Set Phosphor Persistence to 40
  - Set Gain to 0
  - Set Lines to 0
  - Set Zoom to 1x

Note that what you are seeing here is the actual pilot extracted from the entire MPX signal. To see just how tightly the composite signal is packed, compare the complete MPX signal to one with no pilot and note that the peak level actually increases when the pilot is removed! This is exactly the opposite of what you will observe with any other processor (except for Omnia.9).

Instrumentation Menu > RTA

Choosing the **RTA** menu provides spectral analysis from various patch points within Omnia.7. The horizontal scale along the bottom of the RTA screen shows frequencies from 20 to 20,000Hz. The vertical
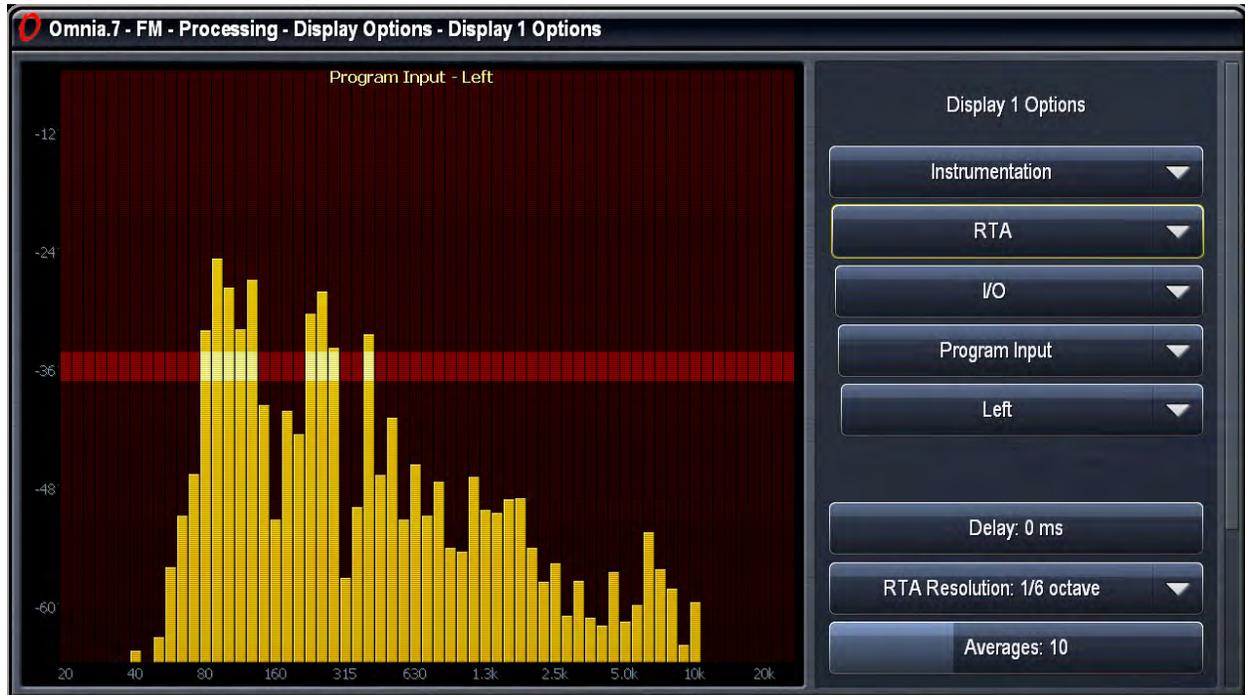
scale along the left side shows the amplitude of the audio in decibels.

The **Category, Patch Point,** and **Audio Channel** sub-menus are used to select the specific source audio. The specific patch points will change depending upon the category. Categories include **I/O, Undo,**

Miscellaneous, MPX Decoded, Physical Inputs, Parametric EQ Preview, Sidechains, Multiband, and
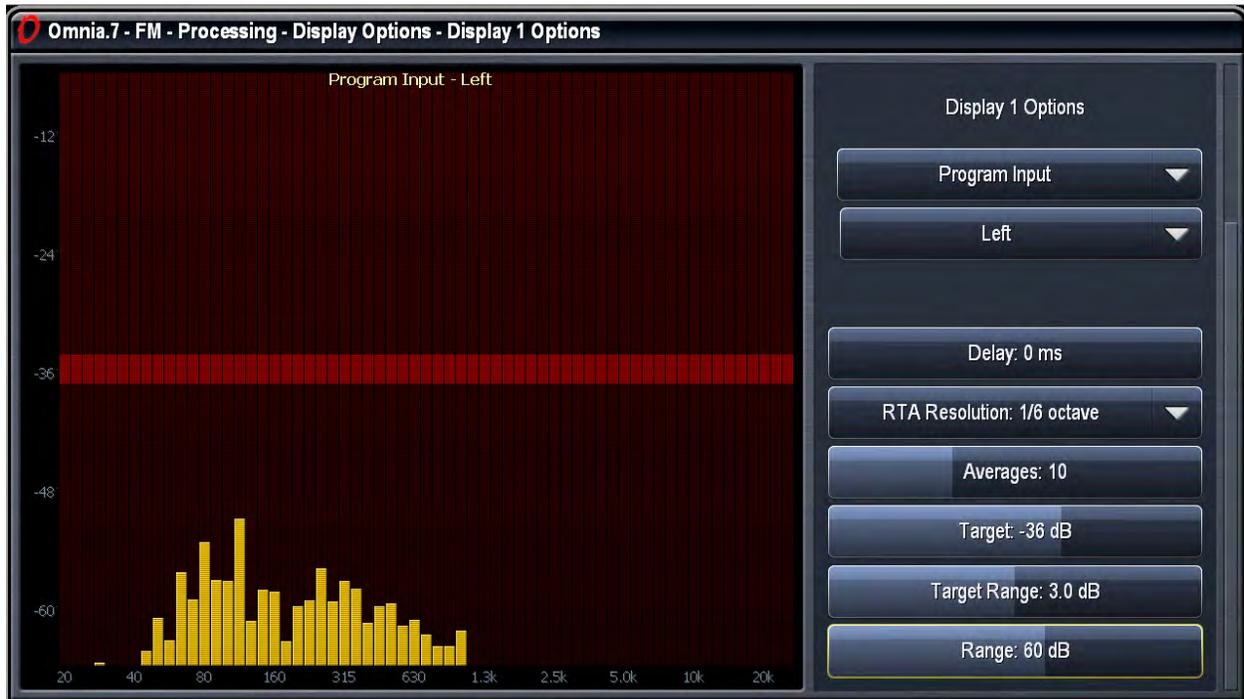

Monitor Out.
When the RTA is selected as the current type of instrumentation, controls for adjusting its display are provided in the Display Options menu. It may be necessary to scroll down to view these controls.

- The **Delay** control works the same here as it does previous and subsequent display sections.

- The **RTA Resolution** control lets you choose between a 1/3 and 1/6 octave display.

- The **Averages** control can be used to slow down or speed up the RTA's display response. A lower average setting (faster meter response) might be more useful for peak monitoring; while a higher average setting (slower meter response) might be more useful for calibrating speakers. Higher averages are also useful for adjusting lower frequencies. The recommended setting for speaker calibration is 100. Regardless of how the Averages control is set, the RTA maintains a history "buffer" of 1,000 frames. Advancing the control to 1,000 will immediately display the average of the last 1,000 frames.

- The **Target** control moves the dark red target window and/or the amplitude scale up and down within the display, a useful tool for establishing a target when performing speaker calibration.

- The **Range** control allows you to view a broader or narrower range of audio, indicated by the range scale along the left side of the display.

- The **Target Range** adjusts the height of the target window within a 6dB range in half-decibel increments. Lower settings are better suited to more precise measurements. Moving the Target Range slider all the way to the left hides the target window.

Below is an example of how to use the RTA menu:

To see a visual representation of a parametric EQ (PEQ) setting:
- Display the MB DRC Solo menu and select PEQ Preview
- Set Resolution to 1/6 octave
- Set Averages to 100 to "freeze" the display
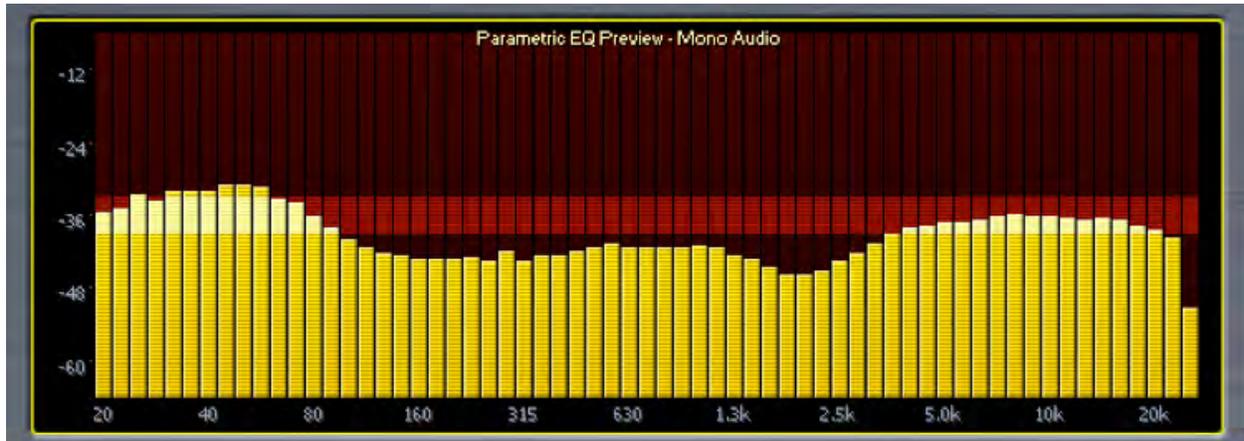
You will now be able to see the curve of the PEQ in the RTA display window. You can also view the curves of each band of the multiband compressor by selecting one of the Solo band buttons. Since the Solo bands relate to a dynamic section of the processing core, lowering the Averages slider will yield more of a "real time" view.

Instrumentation Menu > FFT Spectrum Analyzer Menu

The **FFT** menu allows you to monitor the same sources as those mentioned in the Oscilloscope menu section.
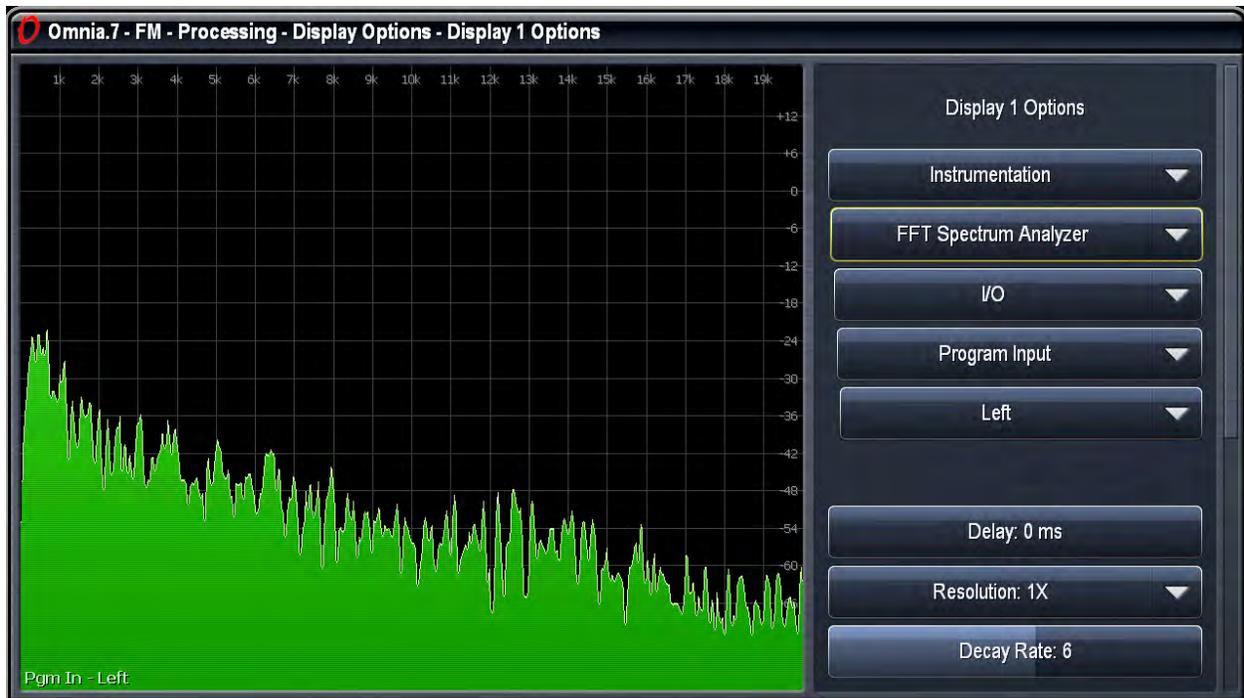
- The **Delay** control works the same here as it does previous and subsequent display sections.

- The **Resolution** control selects the number of frequency bands into which the audio is divided. 1x resolution gives you a refresh rate of approximately 48 frames per second and a frequency resolution sufficient for viewing the entire audio spectrum. 8x resolutions gives you a refresh rate of approximately 6 frames per second, but a much finer frequency resolution.

- The **Decay Rate** control adjusts how quickly the display will fall after a peak is displayed. Lower settings are the slowest, while the highest setting is instantaneous.

- The **Peak Hold** control enables or disables the ability to indicate and hold the highest peak achieved. Peak Hold is displayed in the dark green background layer.

- The **X-Center** control centers the display at the selected frequency.

- The **X-Width** control sets the displayed frequency range in kHz.

- The **Y-Center** control centers the display vertically around the selected level in dB.

- The **Y-Range** control sets the displayed level range in dB.

- The **dB Scale Position** control allows you to move the dB scale horizontally to a different place in the display. Advancing the control completely to the right places it in front of the graph at all times.

Below are some examples of how to use the FFT menu:

As a pilot protection monitor:
- Display the MPX Output
- Set Resolution to 8x
- Set Decay Rate to 6

94

- Set Peak Hold to "On"
- Set X-Center to 19kHz
- Set X-Width to 4kHz
- Set Y-Center to -90dB
- Set Y-Range to 100dB,
- Set dB Scale Position to 36
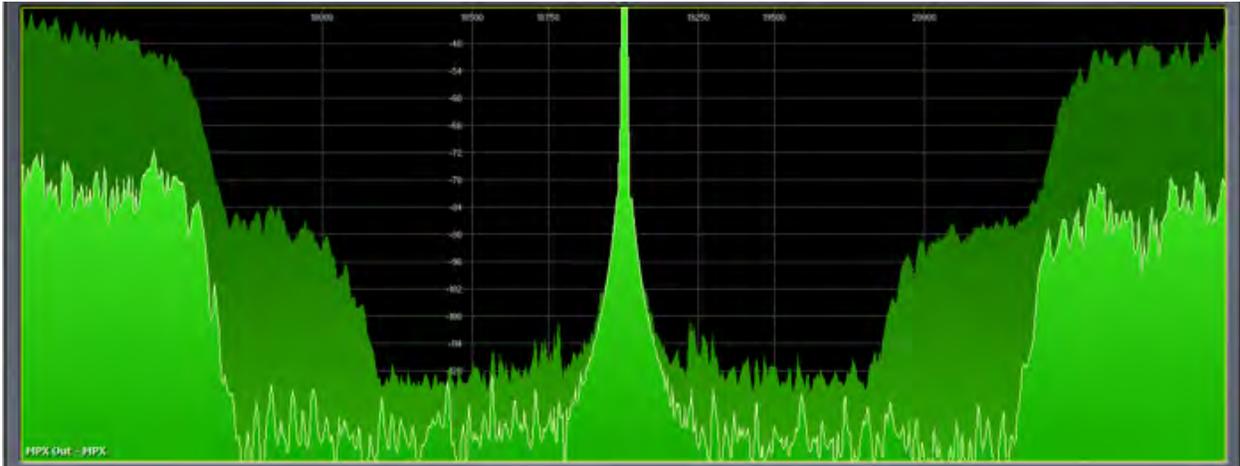
To display the RDS subcarrier:
- Display the MPX Output
- Set the Resolution and Decay rate to any setting
- Set Peak Hold to "Off"
- Set X-Center to 57kHz
- Set X-Width 10kHz
- Set Y-Center to -80dB
- Set Y-Range to 100dB
- Set dB Scale Position to 100
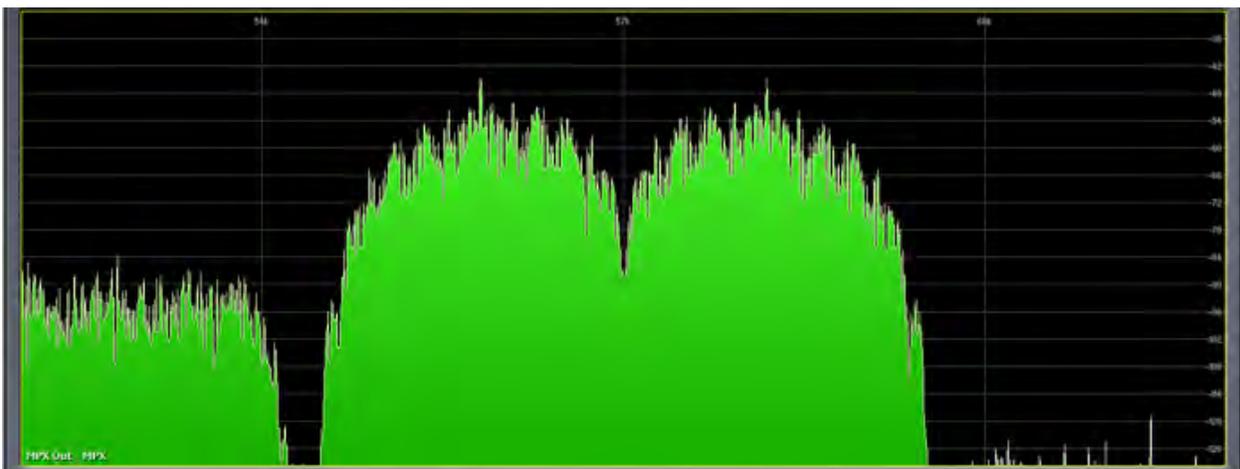
Chapter 14
FM Menu
ITU-R BS.412 Processing /
MPX Power Limiting

*"The measure of a man is
what he does with power." - Aristotle*

FM Menu -

Processing for ITU-R BS.412 / MPX Power Limiting

ITU-R BS.412 requires that the average MPX power be limited to a particular standard and measured with a rolling 60-second integration time. However, since it is impossible to know what lies ahead in terms of content, loudness must be practically be controlled within a much shorter period of time "just in case."

The factory "412" presets included with Omnia.7 are tuned in such a way that significantly less power limiting is needed to deliver a compliant output compared to other processors. In fact, it is not at all unusual to see no gain reduction on the Power Limiter meter at all during normal programming and only 2dB - 3dB with very bass-heavy material.

Speaking of bass, managing bass-heavy content presents a special challenge because of the amount of energy typically present in the lower frequencies. Most of Omnia.7's "412" presets make use of the WB AGC 2 compressor in "Bass Only" mode. This allows the initial portion of the bass waveform to be managed by downstream processing stages while the remainder is processed by the compressor, resulting in much higher perceived levels of bass than would otherwise be possible under the limitations imposed by the regulations.

To prepare Omnia.7 to operate in compliance with ITU-R BS.412, MPX Power Control must first be enabled in the **System > System Config > Processing Cores** menu. Be sure to "Apply Config" after enabling this

mode and remember that doing so will take the unit off-air temporarily.

You will notice in the **FM > Processing > Load Prese**t Menu that the preset list has been updated to include only those specifically designed for BS.412 use. There is also an additional Power Limit menu option.

In addition, the Processing Meters display window now includes a meter for the Power Limiter and three meters showing output levels over 10 second, 30 second, and 60 second integration times.

Controls for adjusting the Power Limiter are found in the FM> Processing> Power Limit menu.

- The **Peak Limiter Drive** control sets the amount of limiting performed by the final peak limiters and has a 12dB range and is adjustable in one-quarter dB increments. These limiters are the same type used in the HD and Streaming cores and are situated *before* pre-emphasis.

- The **Power Limiter Drive** control determines the amount of limiting performed by the MPX Power Limiter with a range of 12dB adjustable in one-quarter dB increments.

- Advancing the **Punch (coupled)** slider (moving it to the right) increases the Power Limiter Drive while simultaneously reducing the Peak Limiter Drive by a corresponding amount which results in a more open sound. Sliding the control to the left decreases the Power Limiter Drive and increases the Peak Limiter Drive by a corresponding amount which results in a more dense sound.

- The **Limiter Style** drop-down menu provides a choice between Standard and Aggressive settings. "Standard" is more gentle and less audible. "Aggressive" is more audible but allows you maintain levels that are closer to the designated power limit.

Chapter 15
FM Menu
RDS

"I will always be puzzled by the human predilection for piloting vehicles at unsafe velocities." - Lt. Cmdr. Data

FM Menu - RDS

Main RDS Menu

The main **RDS** menu contains the controls necessary for using an external RDS encoder with Omnia.7 by means of its two rear-panel MPX inputs or by utilizing the optional built-in RDS encoder.


- The **RDS Mode** drop-down menu allows you to choose from several different RDS options.

  - When set to **Off 54.5kHz**, RDS is turned completely off but the audio extends all the way out to 54.5kHz. It is not recommended to use an external RDS encoder in this mode, even one installed after Omnia.7, as the audio extends partially into the portion of the spectrum normally reserved for RDS.

  - When set to **Off 54kHz**, the audio extends only to 54kHz to allow room for RDS data provided by an external RDS encoder. Note that using this mode does mean losing 3dB of stereo separation between 16,000 and 16,500Hz.

  - In the **Internal** mode, Omnia.7's (optional) built-in RDS encoder is active. Because RDS is taken into consideration by the composite clipper, there is no loss of loudness in this mode. Therefore, we highly recommend using the internal mode whenever possible.

  - The **External Input 1, External Input 2,** and **External Input 1+2** modes determine which of Omnia.7's rear panel MPX inputs are active.

- The **Injection Level** slider sets the amount of RDS injection from 0 – 15%. The default setting is 4%.

Some common scenarios for using external RDS generators are outlined below, with details about how to set Omnia.7's various RDS controls for each situation.

Using Omnia.7's Built-In RDS Encoder

Using the built-in RDS encoder is the simplest and most straightforward means of getting RDS data on the air since everything is handled within Omnia.7 itself.
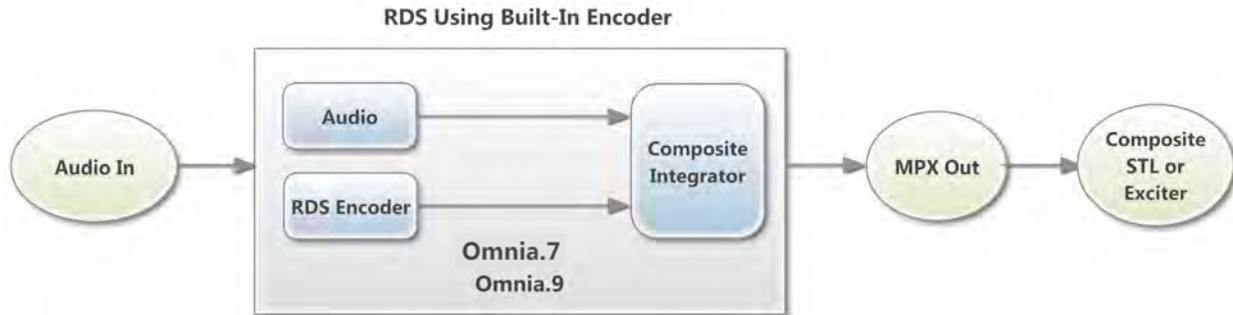
Using an RDS Encoder with Omnia.7's Final Clipper

It is possible to utilize an external RDS encoder without losing any loudness by integrating it with Omnia.7's final clipper. To do so, you must feed both the encoder's MPX and Pilot inputs with an independently-generated 19kHz signal and in turn feed the output of the encoder (with RDS and Pilot) to one of Omnia.7's MPX inputs. Omnia.7's MPX 1 Output will feed the exciter directly.
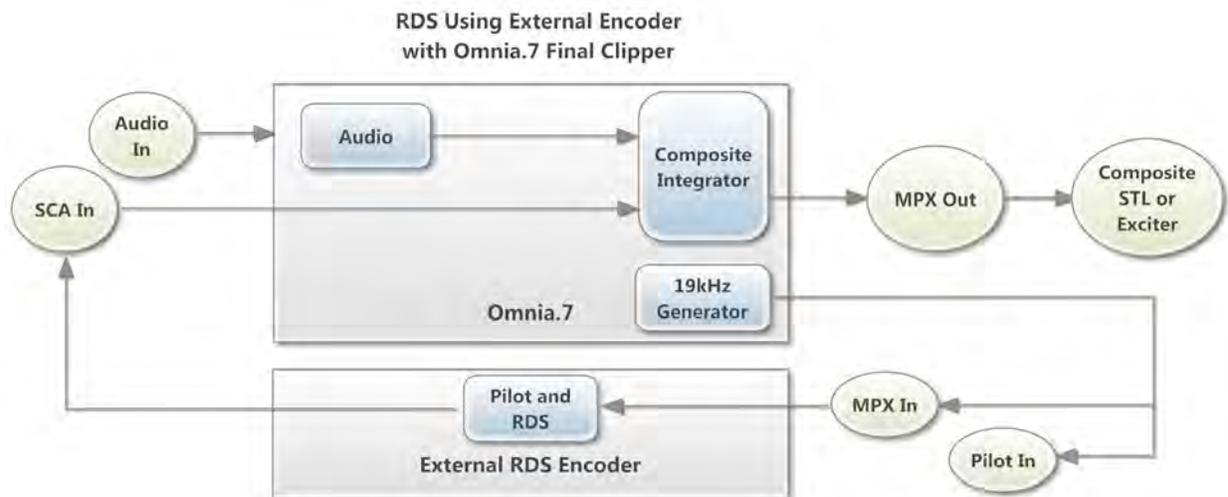
Be sure to enable the proper MPX input for RDS use (Input 1 or Input 2) in the RDS Mode menu, and set the MPX 2 Output control to the 19kHz Generator mode. The MPX 2 Output control can be found in the RDS Menu, the FM Processing Output menu, and in the main I/O menu.

Using an RDS Encoder After Omnia.7

You can also use an RDS encoder after Omnia.7, but doing so means losing loudness since Omnia.7's composite clipper cannot process the fully encoded signal. In this case, Omnia.7's MPX1 Output will feed

the encoder's MPX Input while the MPX 2 Output will feed the Pilot Input (Sync) of the external encoder. The output of the encoder will then feed the composite STL or exciter. In this scenario, the MPX 2 Output

RDS Using External Encoder After Omnia.7
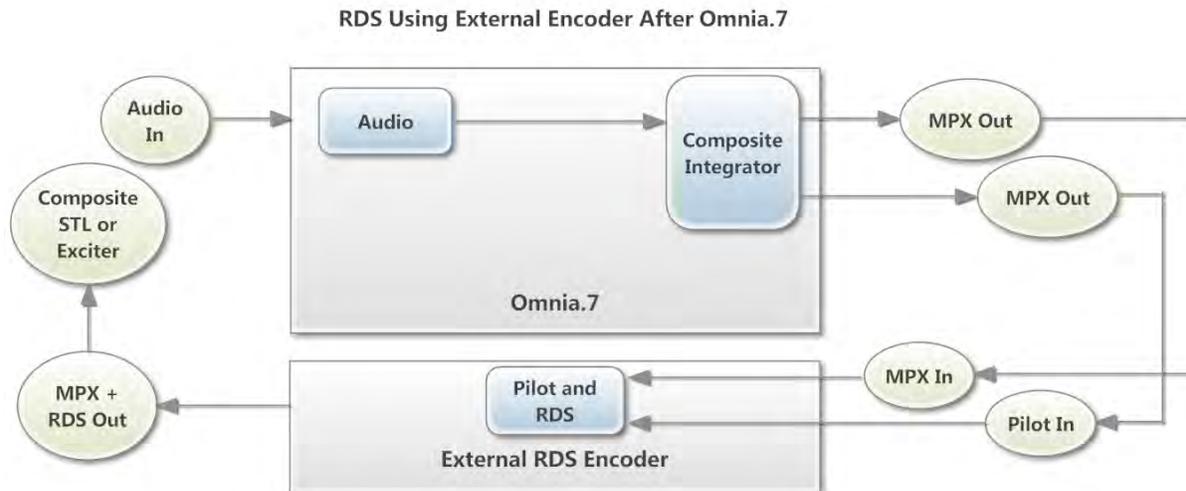
control should be set to the MPX Pilot mode.

Using an RDS Encoder That Does Not Provide a Pilot Signal

Some RDS encoders take the pilot signal of the processor, use it as a sync reference for RDS, and then output only the RDS data without passing the pilot.

To do so, you can use a T-connector on Omnia.7's MPX 2 Output, connect one leg of the tee to the Pilot Input (Sync) on the RDS encoder, and connect the other to one Omnia.7s MPX 1 Input. The output of the RDS encoder should be connected to Omnia.7's MPX 2 Input.

In this scenario, set the MPX 2 Output control to the 19kHz Generator mode and the External Input to the 1+2 mode in so that both MPX inputs are enabled for RDS.

RDS Using External Encoder That Does
Not Provide a Pilot Signal After Omnia.7
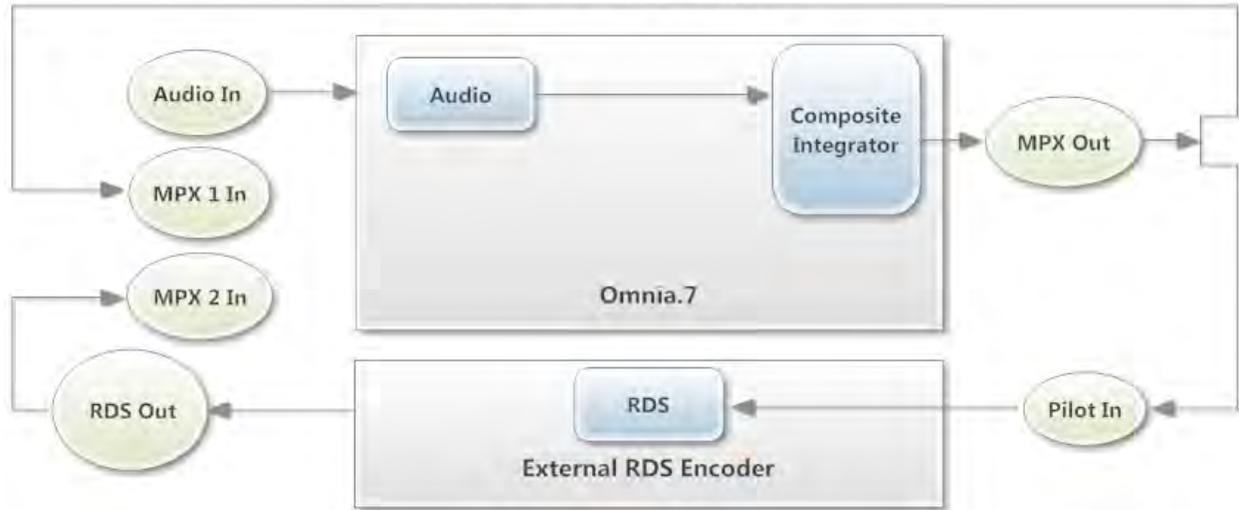
Chapter 16
FM Menu
Meter Options

You want meters? We got your meters right here.
Lots of them.

FM Menu - Meter Options

The **Meter Options** menu contains sub-menus for **Meter Options, Test Options, Loudness Matched A/B,** and **Display Options.**
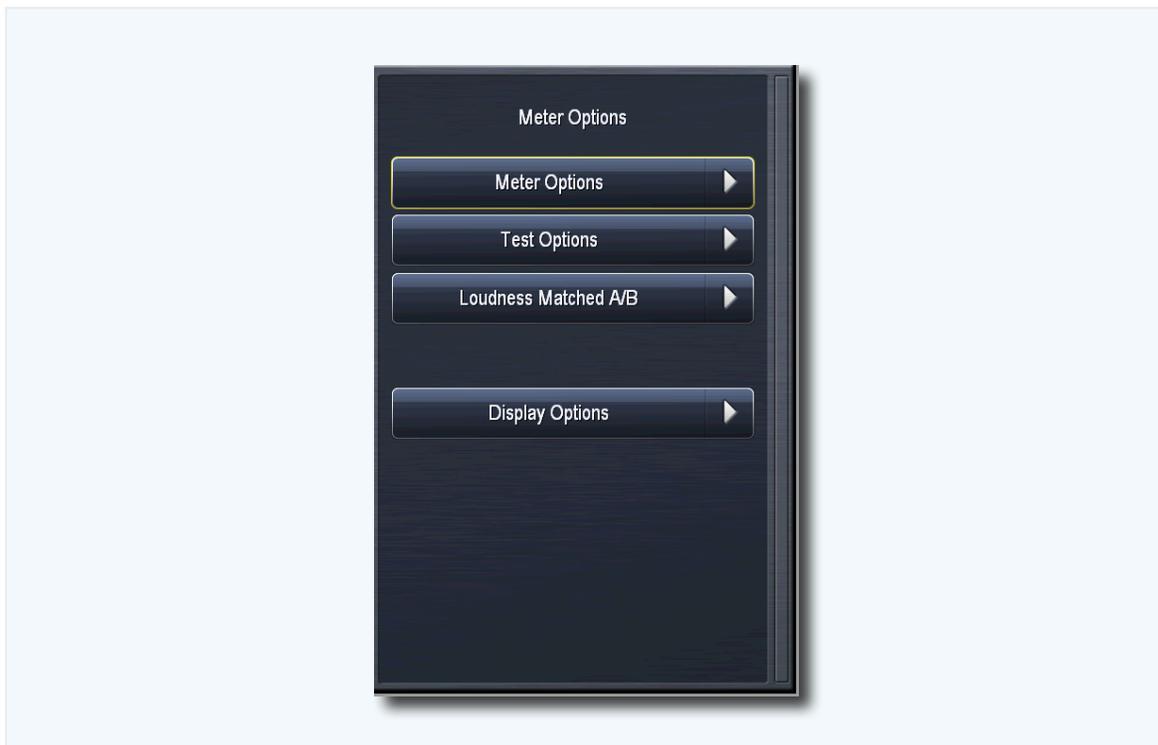
Meter Options Menu

Which meters are displayed in the Loudness Meter, Modulation Meter, and Modulation Numeric display windows are determined by enabling or disabling available options in this menu.

Specifically:

- **Program Input** and **Loudness Match** are available only in the in the Loudness Meter display.

- **MPX Output** and **L/R Output** are available in the Loudness Meter, Modulation Meter, and Modulation Numeric displays.

- The **MPX Power Meter**, **MPX Power Graph, Peak Modulation Meter**, **Pilot Level Meter**, and **L/R Level Meter** can be added to the Modulation Meter display.

- The **MPX Power Numeric**, **Peak Modulation Numeric**, **Pilot Level Numeric**, and **L/R Level Numeric** can be added to the Modulation Numeric display of any enabled MPX section.

- The **Loudness Graph** can be added to the Short Term and Momentary graphing displays.

- The **MPX Power Limit** control sets the center of the MPX Power meter as well as whether the numeric readout is green or red. This can be set differently from the MPX Power Limit control in the FM Processing section, and is available even when Omnia.7 is not operating in MPX Power Mode,to provide a power measurement reference.

Test Options Menu

The Test Options menu contains an **MPX Noise Injection.** Since FM reception is never perfect, this can be a useful tool to simulate real-world conditions when monitoring the output of Omnia.7 on the built-in oscilloscope or FFT analyzer.

Loudness Matched A/B Menu

The ability to compare the sound of the input audio to the processed output audio is valuable when adjusting your processing. Because the human ear often misinterprets "louder" as "better" for the first few seconds after it hears a new sound, making sure the average levels of the input and output audio closely match eliminates that distraction so that your ear can concentrate on the other changes the processor is making to the texture, dynamics, and spectral balance of the audio.

It is possible to manually adjust these levels in the Monitor Output Menu as you switch back and forth between patch points, but because input levels vary so much within and between songs, this can get tricky (or just plain annoying), throws your ear for a momentary loop, and takes your mind off the careful study of the changes you're making to your processing.

To make A/B comparisons easier, Omnia.7 can apply automatic leveling to several key input patch points and makes those available here in the Meter Options Menu (for display purposes) as well as in each of the Monitor Outputs menus.

- **Note:** *This leveling function affects ONLY the audio available at the patch point. It has NO effect on the on-air processing.*

Loudness Matched A/B

Current Gain: 4.88 dB

Integration Time: 1 second ▼

Maximum Gain: 24 dB

Maximum Attenuation: 12 dB

Source: Program Input ▼

Match: MPX Output ▼

- The **Integration Time** setting controls the integration time of the two ITU BS.1770 loudness meters that form the basis for the loudness comparison. The loudness is equalized by a ramping gain to account for the difference between the two loudness meters. The default time is 1 second; 3 seconds is optional. The 1 second integration time will cause the leveler to respond to differences in level more quickly, providing more consistent levels between A and B, while the 3 second time will allow more level variation and reduces the likelihood of audible pumping.

- The **Source** control allows you to choose the audio source for the Loudness Matching patch point. Available options are Program Input and Post Multiband.

- The **Match** control allows you to choose which audio source will be loudness matched.

Chapter 17
Studio Processing Menu

*"Talent is cheaper than table salt.
What separates the talented individual from the
successful one is a lot of hard work." - Stephen King*

Studio Processing Menu

The Studio Processing Core is a low-latency processing core mainly designed for talent monitoring. Its menu is virtually identical to that of the FM Processing section except for the **Band Mix** menu which includes a **Final Limiter** drive (instead of Clipper driver), an **Output Level** control to set the final output level, and the option to bypass the multiband limiters if desired, which further decreases the already low latency throughput time of this processing section slightly.

Chapter 18
HD Processing Menu

Just like processing for analog FM, but different.

The HD Processing Menu

Much like the Studio processing core, the HD processing section is virtually identical to its FM counterpart with one significant difference: It uses a look-ahead peak limiter in lieu of a clipper as the final processing stage.

The HD processing cores are suitable for use in both HD Radio (iBiquity/NRSC-5) and DAB (Eureka 147) applications depending upon the sample rate established in the **System > System Config > Sample Rate** menu.
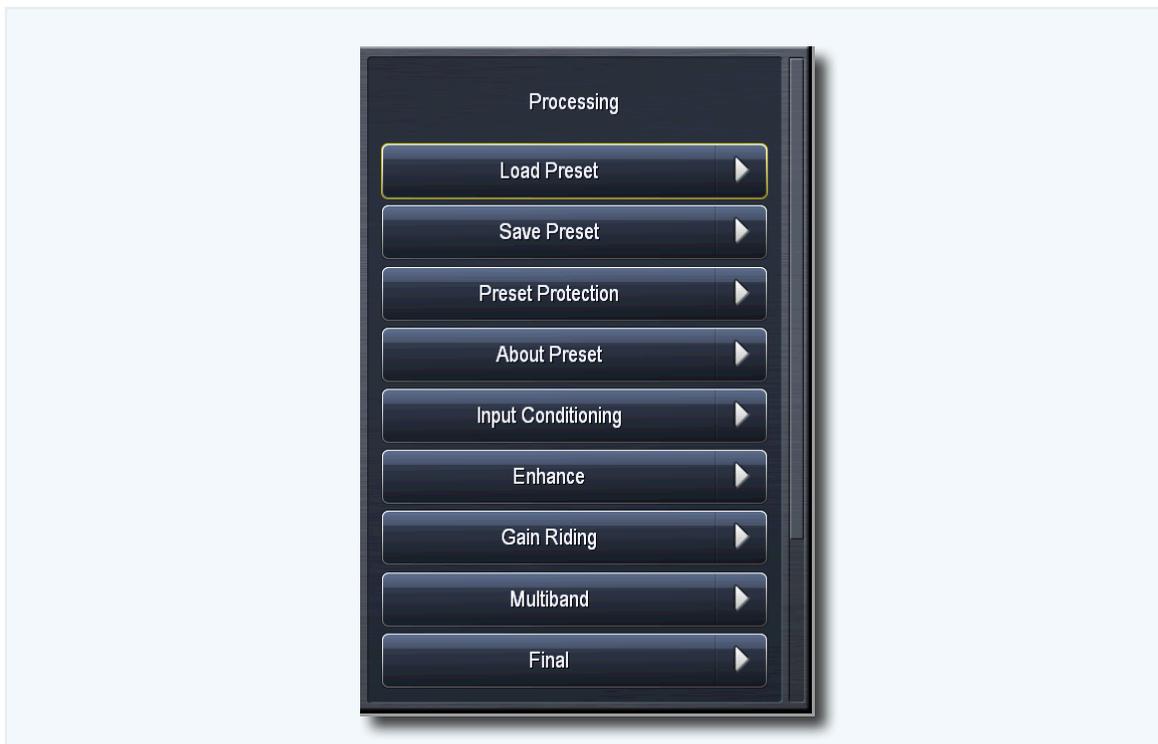
Chapter 19
Streaming Processing & Encoding Menu

Radio without a radio.

The Streaming Menu

Omnia.7 can be optionally configured to provide independent processing for streaming audio as well as built-in streaming encoding. The **Streaming** menu contains sub-menus for processing and for configuring the various encoder and server options.
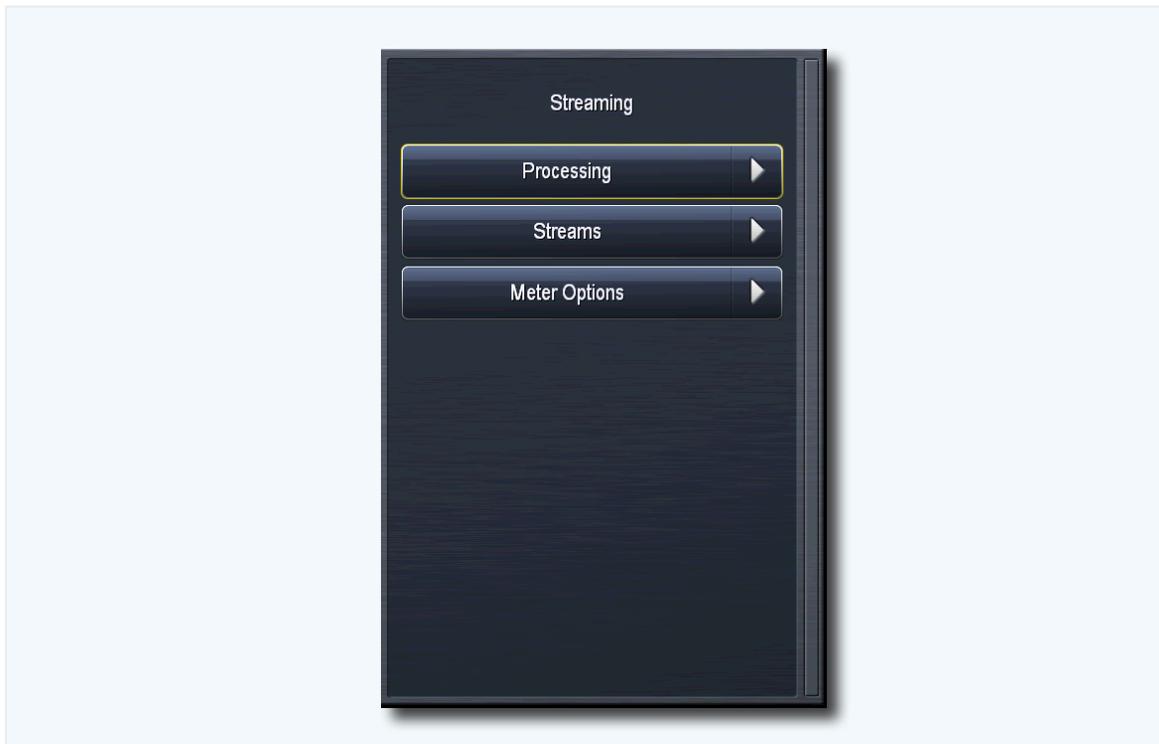
A detailed explanation of setting up and configuring streaming encoders and servers would require an entire manual of its own, and is beyond the scope of the general Omnia.7 manual. We have assumed that users who stream possess at least a basic knowledge of how streaming audio works and an understanding of the differences between the various formats. We encourage you to work closely with your IT administrators to obtain the information specific to your operation.

Processing Menu

Much like the Studio and HD processing cores, the streaming processing section is virtually identical to its FM counterpart with one significant difference: It uses a look-ahead peak limiter in lieu of a clipper as the final processing stage.

Streams Menu

This menu contains the controls necessary to set up and configure each of the enabled encoders and is where details of the servers can be entered. The type and maximum number of encoders can be set up in the the **System> System Config> Streaming Encoders** menu. For ease of illustration, only one type of each encoder will be shown in the examples below.
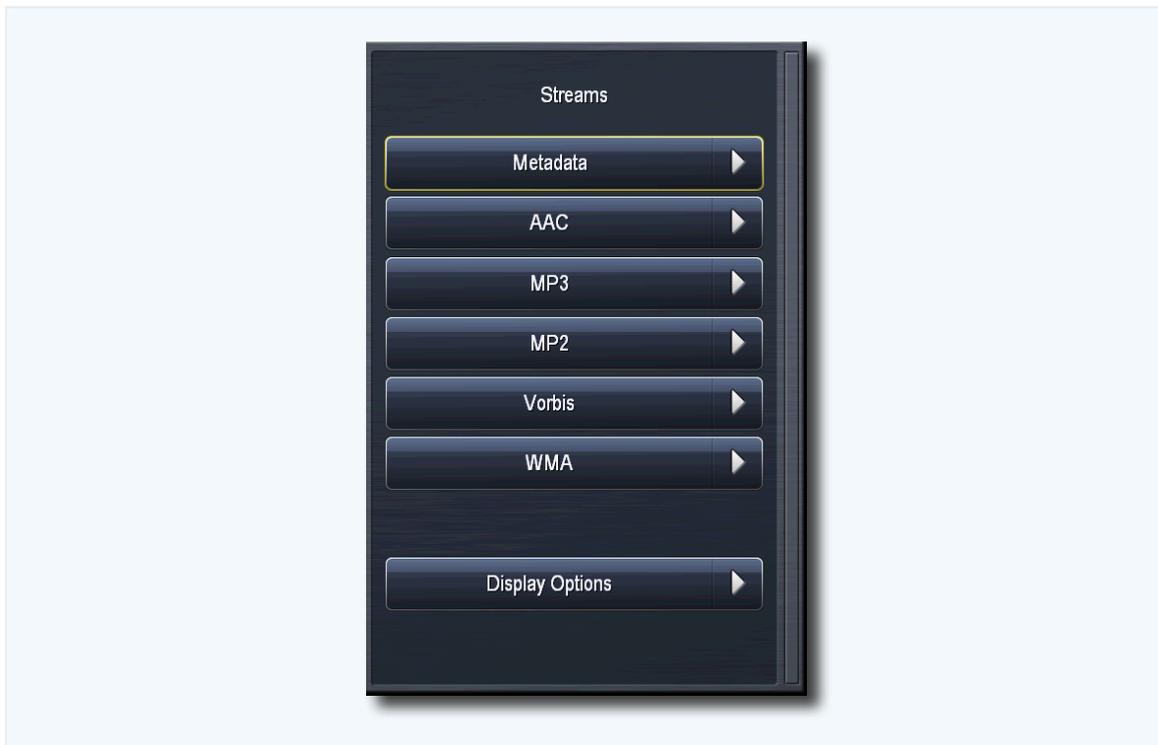
Metadata Menu

Omnia 7's built-in http server can be used to feed information such as the song title and artist information to the stream.
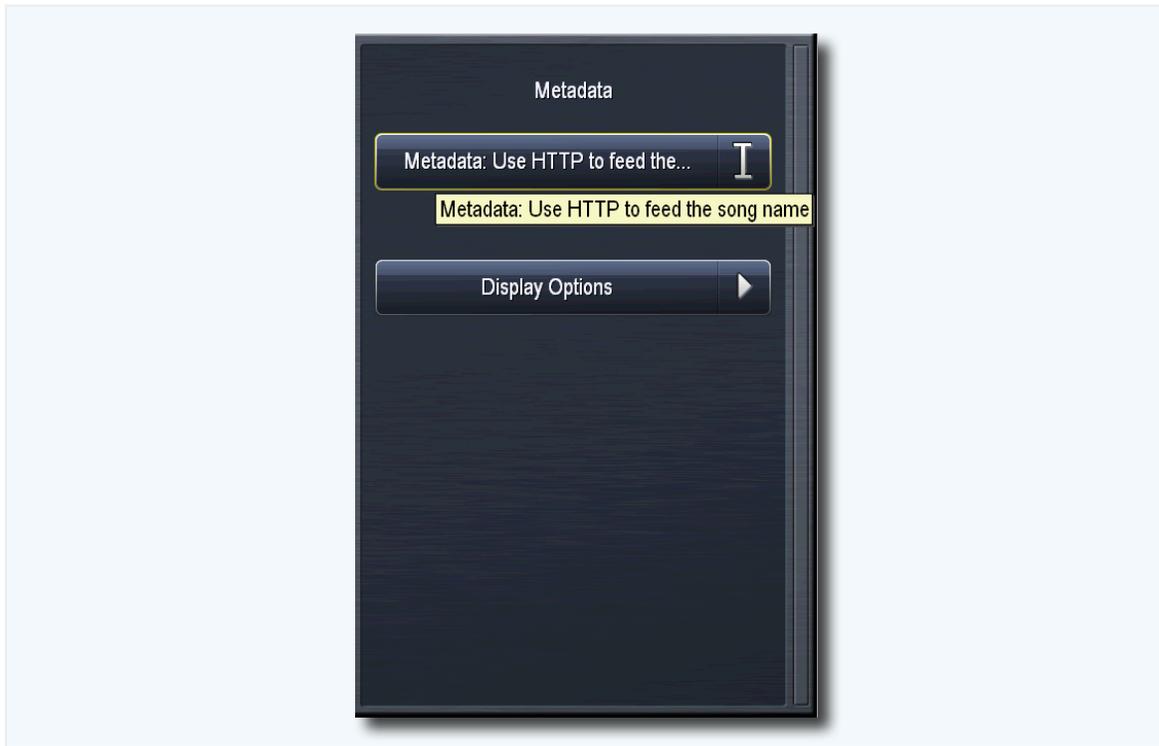
AAC Menu

The AAC menu contains two sub-menus, **Encoder** and **Server**.

The **Encode**r menu allows you to enable or disable the stream, adjust its output gain, enter the stream's

title, and select the SBR Mode, channel mode, sample rate, bit rate, and audio bandwidth.

- The **Title** field allows you to enter the stream title displayed to listeners and on public listings, such as shoutcast.com.

- The **Enable** control enables or disables the stream. When enabled, the encoder will continually try to connect to the specified server.

- The **SBR (Spectral Band Replication) Mode** toggles between Off, On, and Oversampled. We recommend setting this control to Off (AAC) for bit rates of 160kbps or higher, On (AAC+) for bit rates of 96kbps or lower, and Oversampled for bitrates between 96 and 128kbps.

- The **Channel Mode** menu provides a choice between Mono, Stereo, Stereo Independent, Parametric Stereo, and Dual Channel. We recommend setting this control to Stereo for bit rates over 40kbps and to Parametric Stereo for bit rates of 40kbps and lower. Mono should be used only if the program material is mono. Because the Stereo Independent and Dual Channel settings force the encoder to divide bits equally between the left and right channels instead of allowing it to allocate the bits as needed, we recommend not using these settings unless you have a specific reason to do so.

- The **Bit Rate** menu allows you to choose encoding bit rates between 16kbps and 320 kbps. Your choice of bit rate settings will significantly influence the audio quality of your stream. However, you will also need to take other factors into consideration, such as the total amount of bandwidth available for the stream, the anticipated number of users, your maximum upload speed, and the download speed limits of your intended users.

- The **Audio Bandwidth** menu allows you to set the high frequency range of the stream between 8 and 20kHz. Unless you have a specific reason to set the bandwidth manually, we strongly recommend leaving this control set to Encoder Default.

- The **Sample Rate** menu will either maintain Omnia.7's system sample rate of 44.1kHz or 48kHz (depending on the sample rate setting) in the encoder, or result in a high-quality re-sample to 32, 44.1, or 96kHz.

- The setting of the **Gain** control is critical. Normally, this control can be left at 0.0. However, there are times when you will want to reduce the input level into the encoder. For example, if you are employing a lot of peak limiting in the Streaming core and using AAC+ encoding at a low bit rate, there will be peak overshoots created as a side effect of the bit rate reduction. Unless the input level into the encoder is reduced, it will be up to the listener's decoder to deal with the excessive levels, which will most certainly degrade the quality of the audio. You may also consider backing off the Final Limiter Drive from within the Streaming processing core.

The **Server** menu menu allows you to input and set up your server settings.

- The **Title** field should contain the name of your audio stream.

- The **Server** field should contain the URL of the server, including the port, in the following format: "streamingserver.example.com:8000"

- The **Mount Point** field (for Icecast 2 servers) should contain the mount point on the server, in the following format: "/example1.mp3" following the server name.

- Enabling the **Allow Public Listing** control sets the "public listing allowed" flag in the stream, as determined by the server.

- The **Server Type** control allows you to choose between Shoutcast and Icecast2.

- The **Mime Type** control specifies the HTTP Mime Type of the stream and determines whether Audio/AAC or Audio/AACP settings are used to provide for player compatibility.

- The **URL** field is a metadata field whose information is sent to the server to be (potentially) displayed in the listings and player. The URL is typically the station's official home page

- The **User Name** field contains the user (log-in) name for the server.

- The **Password** field contains the password for the server.

- The **Genre** field is also a metadata field. The type or style of content found on the stream is typically entered here.

- The **Apply Immediately** control determines whether any changes you make to the server settings take effect immediately or when you manually reconnect.

MP3 Menu

The MP3 menu contains two sub-menus, Encoder and Server.

The **MP3 Encoder** menu allows you to enable or disable the stream, adjust its output gain, enter the stream's title, and select the channel mode, sample rate, bit rate, audio bandwidth, and encoding quality.

- The **Title** field allows you to enter the stream title displayed to listeners and on public listings, such as shoutcast.com.

- The **Enable** control enables or disables the stream. When enabled, the encoder will continually try to connect to the specified server.

- The **Channel Mode** menu provides a choice between Mono, Stereo, and Stereo Independent. Because the Stereo Independent settings forces the encoder to divide bits equally between the left and right channels instead of allowing it to allocate the bits as needed, we recommend not using this settings unless you have a specific reason to do so.

- The **Sample Rate** menu will either maintain Omnia.7's system sample rate of 44.1kHz or 48kHz (depending on the sample rate setting) in the encoder, or result in a high-quality re-sample to 8, 11.025, 12, 16, 22.05, 24, 32kHz.

- The **Bit Rate** menu allows you to choose encoding bit rates between 16kbps and 320 kbps. Your choice of bit rate settings will significantly influence the audio quality of your stream. However, you will also need to take other factors into consideration, such as the total amount of bandwidth available for the stream, the anticipated number of users, your maximum upload speed, and the download speed limits of your intended users.

- The **Audio Bandwidth** menu allows you to set the high frequency range of the stream between 3 and 20kHZ. Unless you have a specific reason to set the bandwidth manually, we strongly recommend leaving this control set to Encoder Default.

- The **Encoding Quality** menu provides a choice between Best, Normal, and Low CPU which allows you to balance the tradeoff between higher audio quality and lower CPU usage.

- The **Gain** control determines the final output level into the encoder. If you are encoding to a low bit or sample rate, you will almost certainly need to turn this down to prevent harsh crackling sounds resulting from clipping in the receiving decoder.

The **MP3 Server** menu allows you to input and set up your server settings.

- The **Title** field allows you to enter the name of the encoder.

- The **Server** field should contain the URL of the server, including the port, in the following format: "streamingserver.example.com:8000"

- The **Mount Point** field (for Icecast 2 servers) should contain the mount point on the server, in the following format: "/example1.mp3" following the server name.

- Enabling the **Allow Public Listing** control sets the "public listing allowed" flag in the stream, as determined by the server.

- The **Server Type** control allows you to choose between Shoutcast and Icecast2.
- The **URL** field is a metadata field whose information is sent to the server to be (potentially) displayed in the listings and player. The URL is typically the station's official home page.

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- The **User Name** field contains the user (log-in) name for the server.

- The **Password** field contains the password for the server.

- The **Genre** field is also a metadata field. The type or style of content found on the stream is typically entered here.

- The **Apply Immediately** control determines whether any changes you make to the server settings take effect immediately or when you manually reconnect.

MP2 Menu

The MP2 menu contains two sub-menus, **Encoder** and **Server**.

The **MP2 Encoder** menu allows you to enable or disable the stream, adjust its output gain, enter the stream's title, and select the channel mode, sample rate, and bit rate.
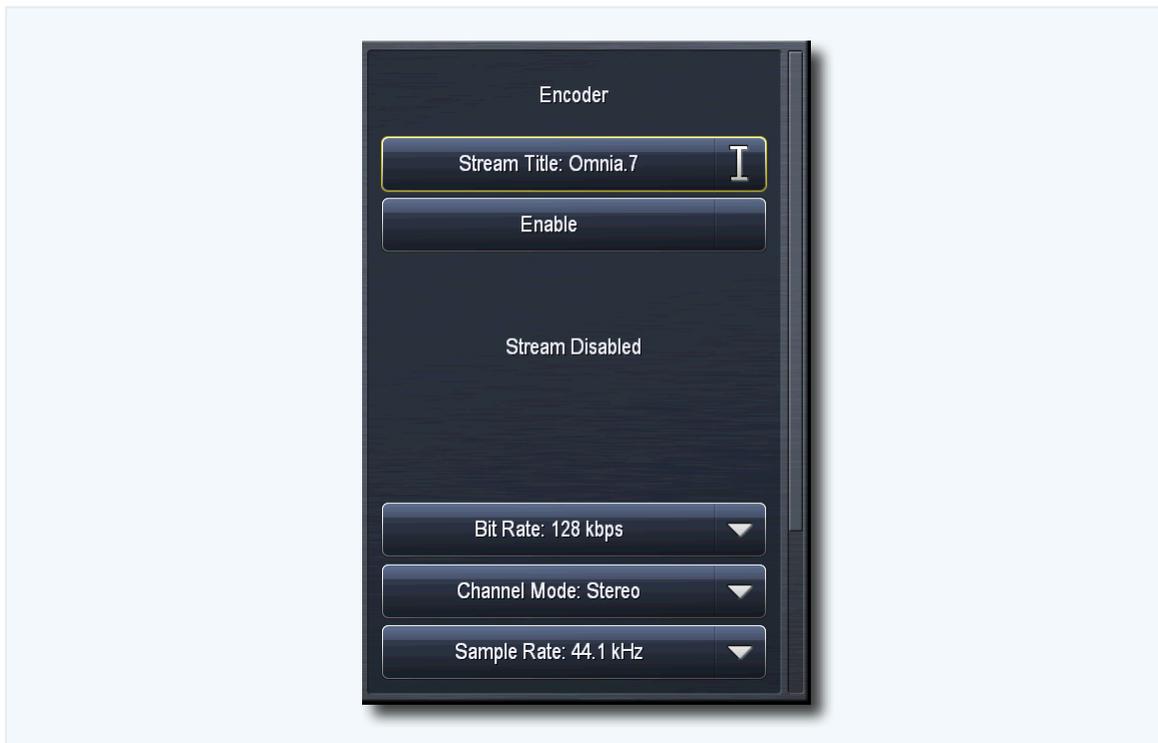
- The **Title** field allows you to enter the stream title displayed to listeners and on public listings, such as shoutcast.com.

- The **Enable** control enables or disables the stream. When enabled, the encoder will continually try to connect to the specified server.

- The **Channel Mode** menu provides a choice between Mono, Stereo, Joint Stereo, and Dual Channel.

- The **Bit Rate** menu allows you to choose encoding bit rates between 64kbps and 384kbps. Your choice of bit rate settings will significantly influence the audio quality of your stream. However, you

will also need to take other factors into consideration, such as the total amount of bandwidth available for the stream, the anticipated number of users, your maximum upload speed, and the download speed limits of your intended users.

- The **Sample Rate** menu will either maintain Omnia.9's system sample rate of 44.1kHz or 48kHz (depending on the sample rate setting) in the encoder, or result in a high-quality re-sample to 8, 11.025, 12, 16, 22.05, 24, 32kHz.

- The **Gain** control determines the final output level into the encoder.

The **MP2 Server** menu allows you to input and set up your server settings.
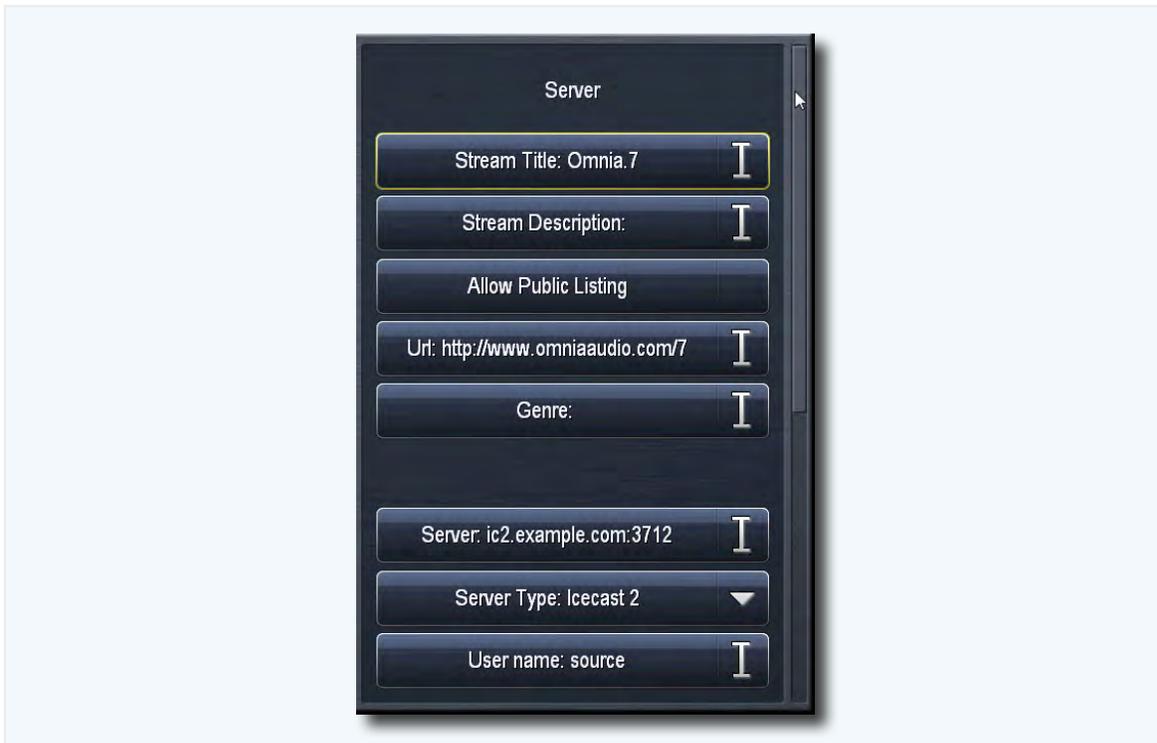


- The **Title** field allows you to enter the stream title displayed to listeners and on public listings, such as shoutcast.com.

- The **Server** field should contain the URL of the server, including the port, in the following format: "streamingserver.example.com:8000"

- The **Mount Point** field (for Icecast 2 servers) should contain the mount point on the server, in the following format: "/example1.mp3" following the server name.

- Enabling the **Allow Public Listing** control sets the "public listing allowed" flag in the stream, as determined by the server.

- The **Server Type** control allows you to choose between Shoutcast and Icecast2.

- The **URL** field is a metadata field whose information is sent to the server to be (potentially) displayed in the listings and player. The URL is typically the station's official home page.

- The **User Name** field contains the user (log-in) name for the server.

- The **Password** field contains the password for the server.

- The **Genre** field is also a metadata field. The type or style of content found on the stream is typically entered here.

- The **Apply Immediately** control determines whether any changes you make to the server settings take effect immediately or when you manually reconnect.

Vorbis Menu

The Vorbis menu contains two sub-menus, **Encoder** and **Server**.

The **Vorbis Encoder** menu allows you to enable or disable the stream, adjust its output gain, enter the stream's title and Ogg Metadata, and select the channel mode, sample rate, and quality mode.
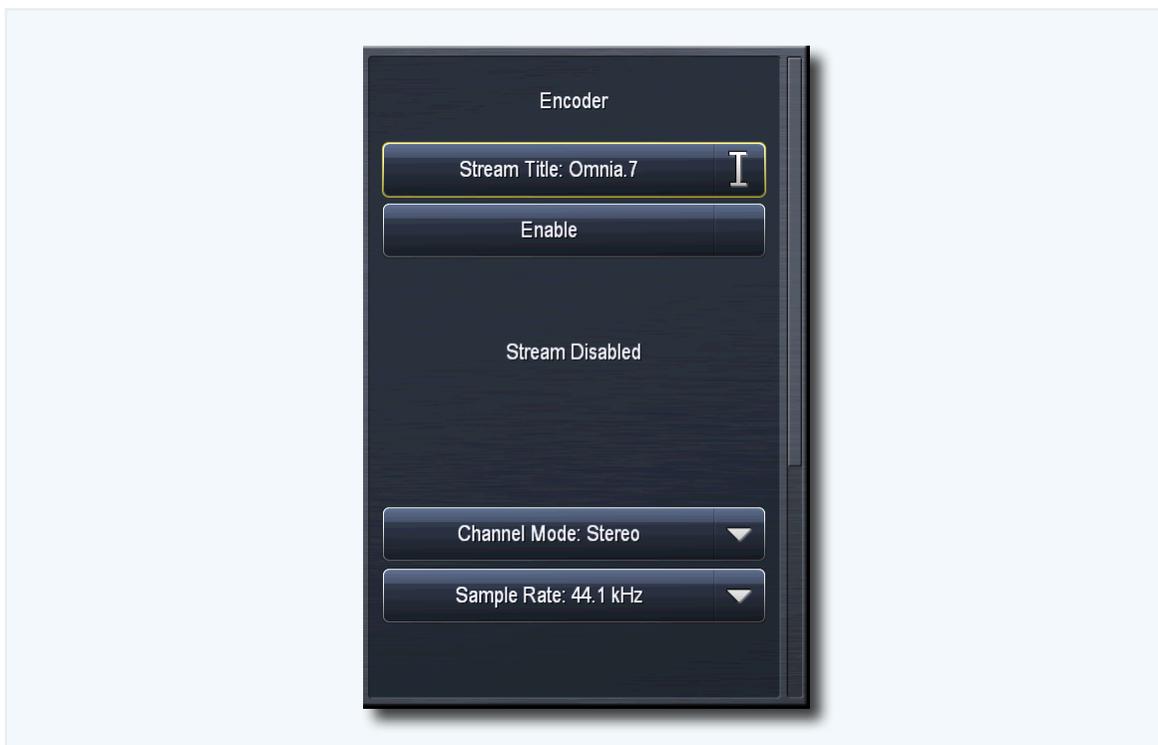
- The **Title** field allows you to enter the stream title displayed to listeners and on public listings, such as shoutcast.com.

- The **Enable** control enables or disables the stream. When enabled, the encoder will continually try to connect to the specified server.

- The **Channel Mode** menu provides a choice between Mono and Stereo.

- The **Sample Rate** menu will either maintain Omnia.9's sample rate of 44.1kHz or 48kHz (depending on the sample rate setting)in the encoder, or result in a high-quality re-sample to 8, 11.025, 16, 22.05, 24, 32, or 44.1kHz.

- The **Quality Mode** menu allows you to choose from a range of settings between VBR -2 and VBR 9. The Vorbis codec is by nature a variable bit rate encoder, but for reference, we have included an approximate average bit rate for quality modes lower than VBR 4.

- The **Gain** control determines the final output level into the encoder.

The **Vorbis Server** menu allows you to input and set up your server settings
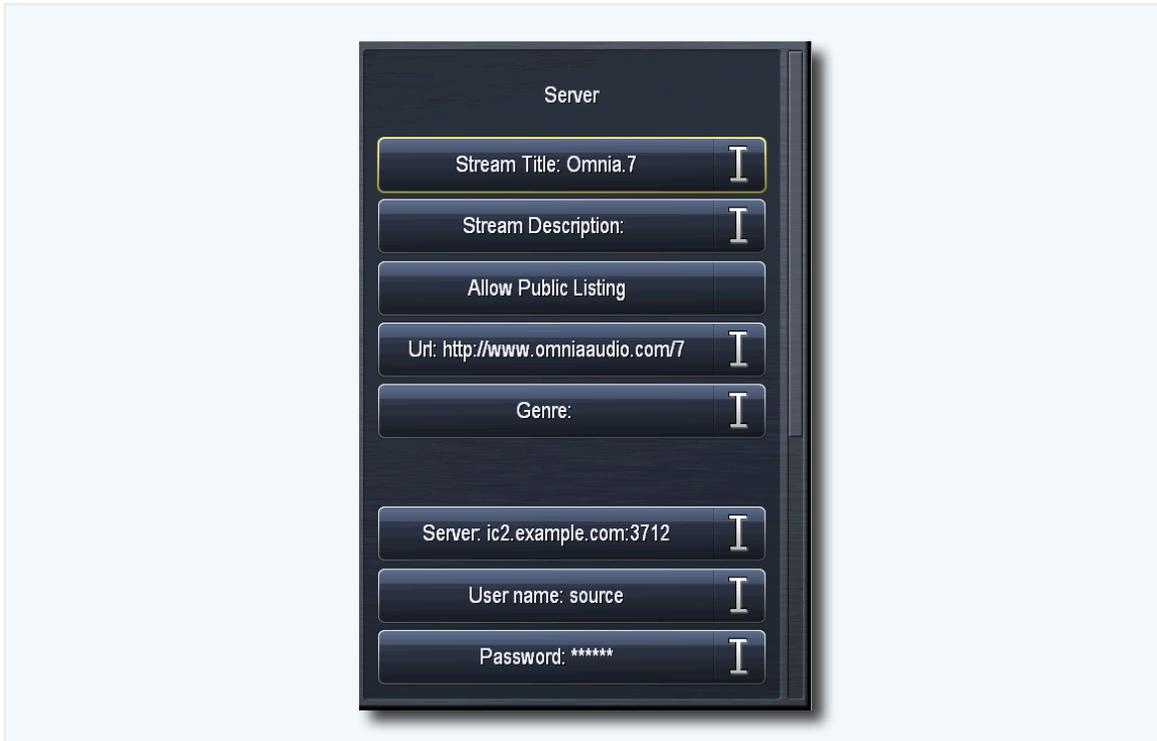
- The **Server** field should contain the URL of the server, including the port, in the following format: "streamingserver.example.com:8000"

- The **Mount Point** field (for Icecast 2 servers) should contain the mount point on the server, in the following format: "/example1.mp3" following the server name.

- Enabling the **Allow Public Listing** control sets the "public listing allowed" flag in the stream, as determined by the server.

- The **URL** field is a metadata field whose information is sent to the server to be (potentially) displayed in the listings and player. The URL is typically the station's official home page.

- The **User Name** field contains the user (log-in) name for the server.

- The **Password** field contains the password for the server.

- The **Genre** field is also a metadata field. The type or style of content found on the stream is typically entered here.

- The **Apply Immediately** control determines whether any changes you make to the server settings take effect immediately.

WMA Menu

The WMA menu contains two sub-menus, **Encoder** and **Server**.

The **WMA (Windows Media Audio) Encoder** menu allows you to enable or disable the stream, adjust its

output gain, enter the stream's title, and select the encoder type and format.

- The **Title** field allows you to enter the name of the encoder.

- The **Enable** control enables or disables the stream. When enabled, the encoder will continually try to connect to the specified server.

- The **Encoder** menu lets you choose between Windows Media Audio 9 and Windows Media Audio 9 Professional

- The **Format** menu allows you to choose a combination of bit rates and sample rates to determine the quality of the audio stream.

- The **Gain** control determines the final output level of the encoder.
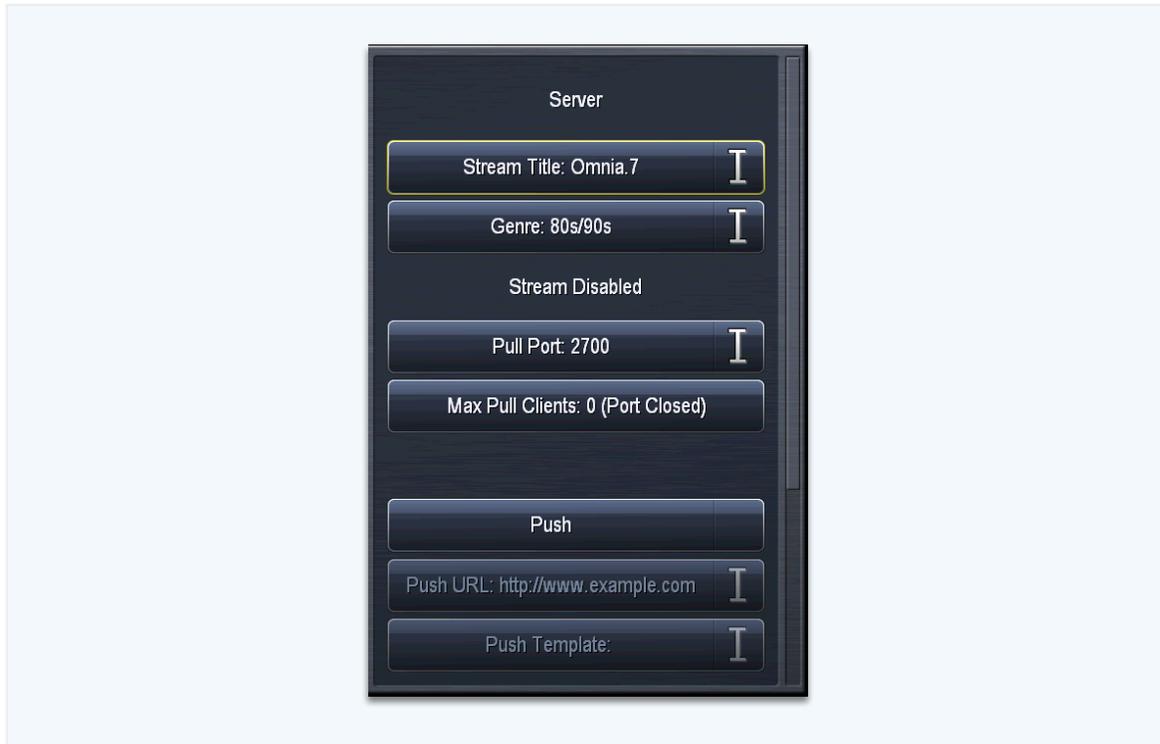
The **WMA Server** menu allows you to input and set up your server settings.

- The **Title** field allows you to enter the name of your audio stream.

- The **Genre** field is also a metadata field. The type or style of content found on the stream is typically entered here.

- The **Pull Port** field allows you to enter the server's port number.

- The **Max Pull Clients** control lets you set the maximum number of pull clients. We strongly recommend against letting listeners through directly without a server in between.

- The **Push** control enables or disables push capabilities outward toward the server, much like Icecast or Shoutcast. When enabled, fields for providing the Push URL, Template, User Name, and Password are accessible. Note that the mount point must be part of the server push URL - for example, http://omniaaudio.com/mountpoint

Chapter 20
Monitor Output Menu

Q: If blissfully clean audio reaches the transmitter but you can't hear it in the studio, does it make a sound?

A: Yes, but you're really missing out.

Monitor Output Menu

The **Monitor Output** menu of Omnia.7 allows you to independently configure the Speaker Output and Headphone Output. The menus and controls for each of these sections are identical, so any images or references to one applies to the other.
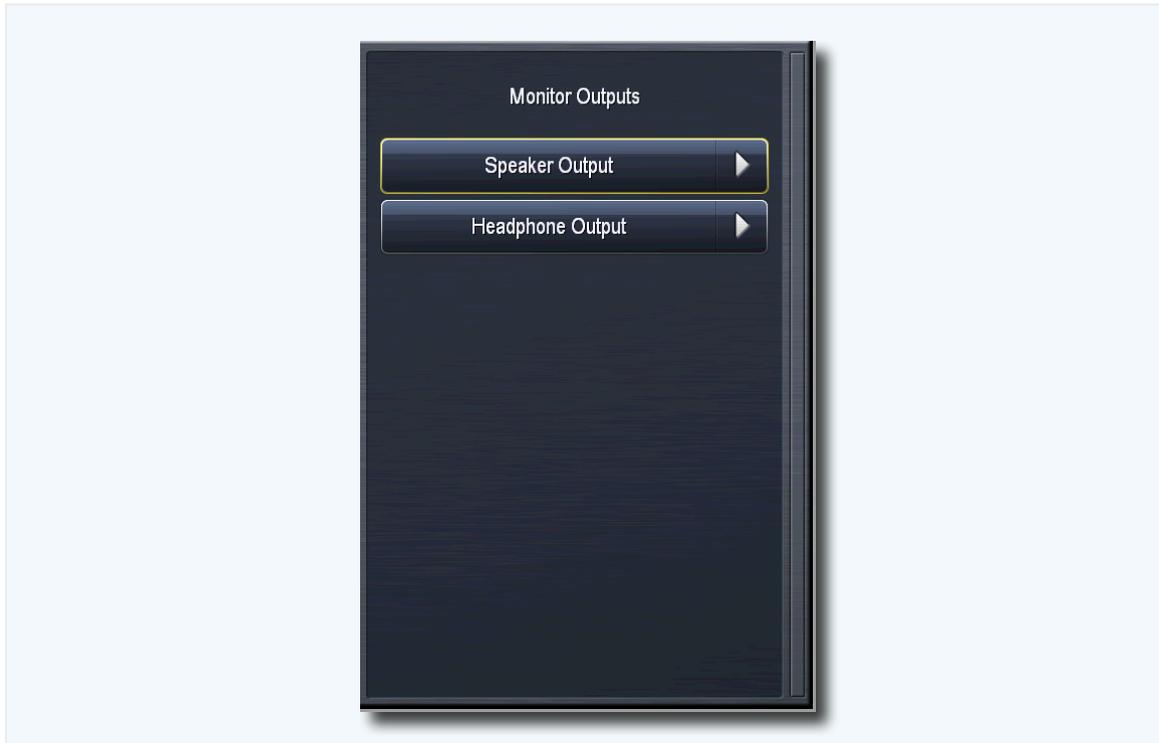
Speaker/Headphone Output Menus

From here, you can choose which of Omnia.7's processing cores you wish to monitor, and from within each core, which specific patch point.

Additionally, you can Load and Save presets, adjust overall volume levels and individual left and right channel levels, access the built-in pink noise generators, independently delay the output of the left and right channels, solo the left and right channels, invert the phase of each channel, couple and un-couple the left and right channels for delay and EQ, set the frequency of the high pass filter, set the Bass Clip and Limiter thresholds, and access the loudness and parametric equalizer sections.

- *Note: Keep in mind that although some of the features, terms, and tools in the Monitor Output sections are similar or identical to their counterparts in Omnia.7's various processing cores - such as the term "preset" - they have no impact on the air. Monitor Outputs only control what you hear through the Speaker or Headphone outputs.*

Load Preset / Save Preset Menus

These menus work just as their counterparts in the FM, Studio, and HD processing menus.

Patch Points Menu

The Patch Point menu lets you choose which of Omnia.7's processing cores you wish to monitor in the Speaker and Headphone outputs, and, more specifically, which point within that core you want to hear. The patch point currently being monitored appears in the corresponding volume control at the top of the screen.

In a typical radio station scenario, the Speaker Output might be used to feed the control room monitors and the Headphone Output might be used to feed talent headphones. Each situation and application will be different, and the choice of how to utilize the monitor outputs is up to you.

One important feature to understand well is the Follow control, which is set to "Off" by default. When Follow is enabled in a particular user interface on a particular Monitor Output, the patch point (source audio) of that Monitor Output will conveniently "follow" along with you as you navigate to different processing cores in that user interface. Keep in mind that anyone else listening to that same Monitor Output will also be affected. The On/Off status of Follow is independently associated with each remote connection (or the front panel).
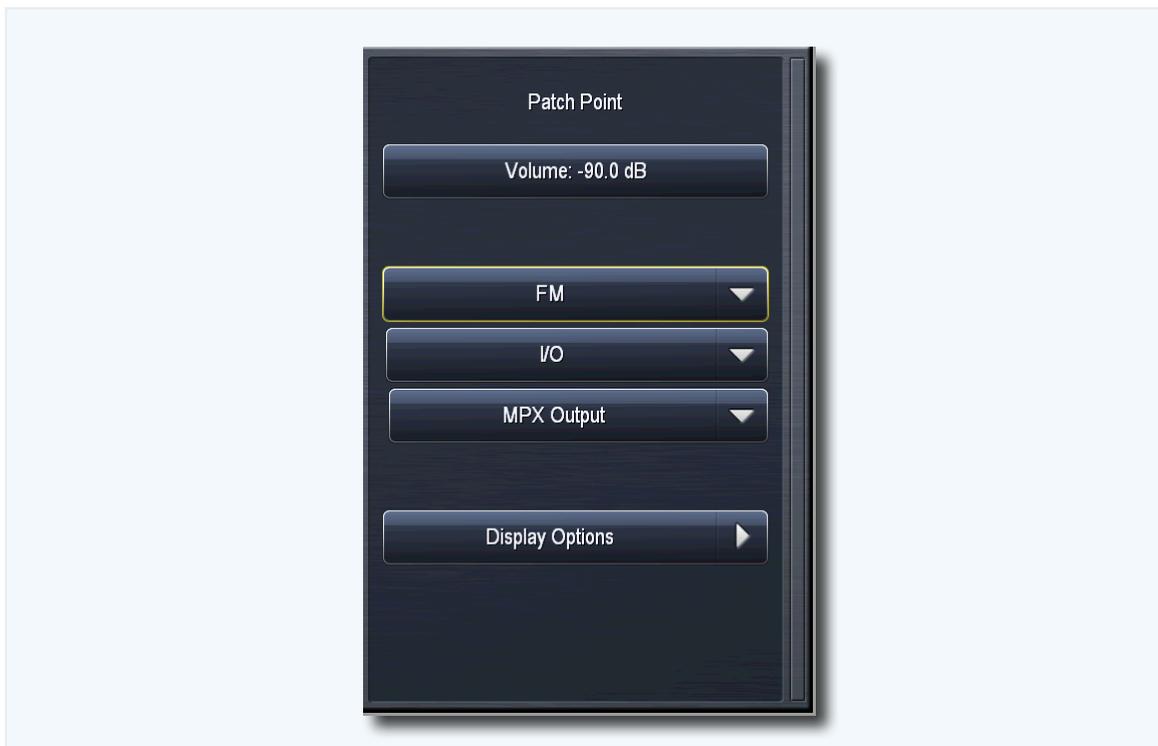
FM Processing Patch Points

There are several categories of patch points from which to choose, including **I/O, Undo, Miscellaneous, MPX Decoded, Physical Inputs, Sidechains,** and **Multiband.** The **Studio** and **HD** processors have the same or similar options.

- The **I/O** category lets you listen to Program Input, Loudness Matched A/B, MPX Output, and L/R Output of the FM processing core.

- The **Undo** category lets you hear audio either before or after the de-clipper, or after the multiband expander.

- The **Miscellaneous** menu lets you listen to the audio after Input Filtering, after Multiband processing (Pre Final), after the Bass Clipper, or as an MPX signal with injected noise.

- The **MPX Decoded** menu allows you to listen to decoded (pre-emphasized/de-emphasized) audio from the MPX Output or de-emphasized audio from the L/R Output.

- The **Physical Inputs** menu allows you to monitor the rear-panel Analog or AES inputs.

- The **Sidechains** menu allows you to monitor the audio passing through the Input AGC, Wideband AGC 1, and Wideband AGC 2 sidechains, as well as the actual output audio from each of those stages.

- The **Multiband Solo** menu allows you to individually monitor the audio in each band of the multiband AGC.

Main Menu

The Main 1 menu contains the controls to set the output level of each Monitor Output, enable or disable any adjustable parameters of each output, adjust the master gain level, adjust the left and right levels individually, solo an individual channel, and set a high pass filter frequency for both the left and right channels.
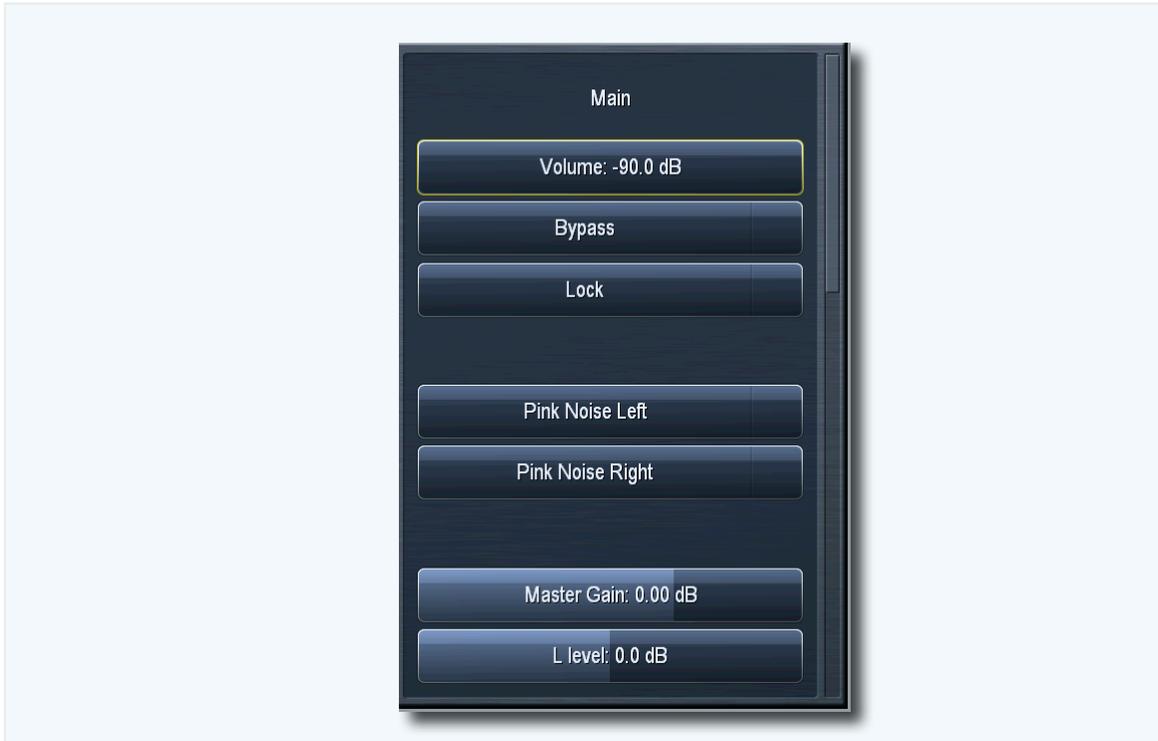
- The **Volume** slider controls the output level to the speaker or headphone output.

- The **Bypass** control enables or disables the parametric EQ, loudness contours, and high pass filters.

- The **Lock** control allows you to "lock down" all of the settings, including the patch points and the shortcut settings (such as volume controls) at the top of the user interface. When locked, the controls will appear grayed out. This is especially useful when the "Follow" control is enabled, as it prevents the selected patch point from being accidentally changed by someone connected via a remote client.

    - *Imagine the surprise - not to mention confusion - this would cause the talent if, say, the Speaker Output, which normally feeds the studio monitors with the low latency Studio output, got switched over to the HD-2 signal! And while we're on the subject, let us go on record as stating we do not endorse the idea of deliberately confusing the talent in this manner. We're just saying it could accidentally happen… Officially, we strongly recommend locking down any monitor output put in active use.*

- The **Pink Noise Left** and **Pink Noise Right** controls turn the pink noise generator in each channel on or off.

- The **Left Level** and **Right Level** controls allow you to adjust the output gain of each channel individually and act as a sort of "balance" control in situations where the left and right speakers are not equally spaced from the monitor point.

- Master **Bypass Gain** and **Left Level** and **Right Level** sliders are also provided when the Monitor Outputs are in bypass mode.

- The **Solo Left** and **Solo Right** controls allow you to monitor only the left or only the right channel.

- The **Left High Pass Filter** and **Right High Pass Filter** controls allow you to set the high pass filter cutoff point to avoid over-driving small speakers. When calibrating smaller bass-shy speakers, there will come a point where you can no longer compensate for such a deficiency by EQ-ing, and it is more practical to simply not try and pass those frequencies at all. That point will be clear on the RTA and is explained in more detail in the Speaker Calibration section.

There are four additional sub-menus in the **Main** menu: **X-Over, Delay/Phase, Channel Coupling,** and **Protection Limiting.**

- The **X-Over** menu contains the controls for the **Volume-based High Pass Filter.**
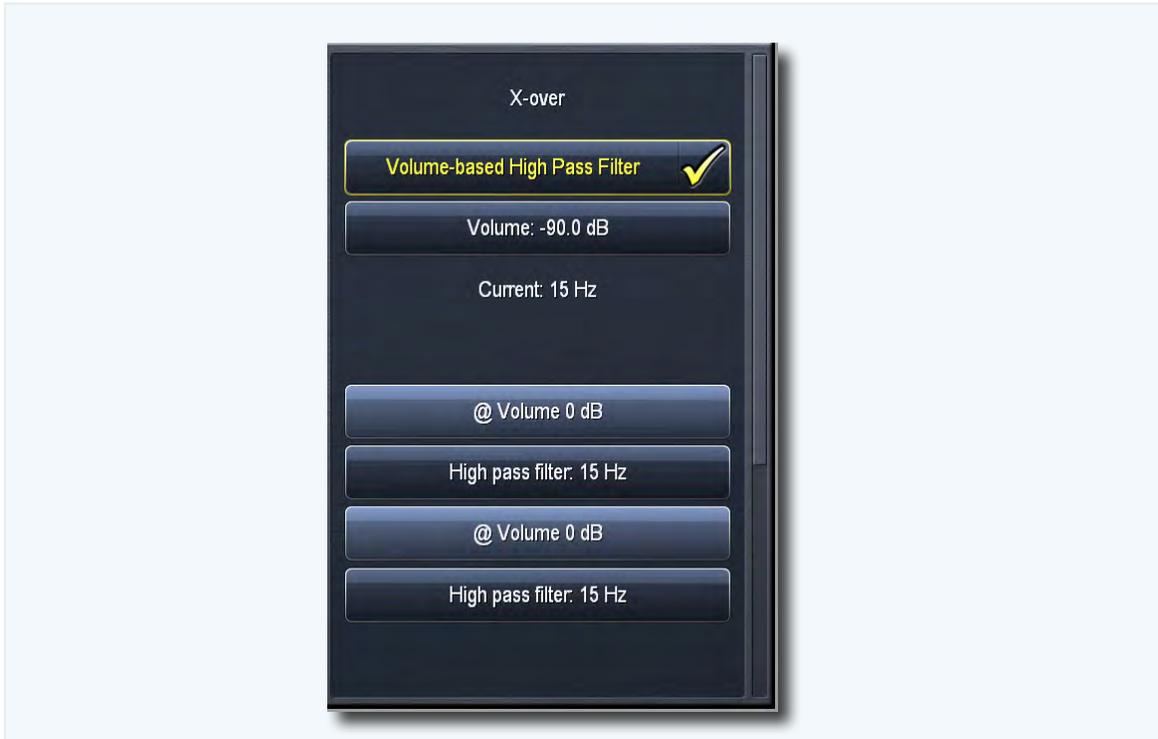
- The **Volume-based High Pass Filter** provides a means by which adjust the high pass filter frequency on the monitor outputs as the volume level is raised. This can help protect smaller monitor speakers by reducing the amount of low frequency energy routed to them at higher listening levels.

- In most studios, the left and right speakers are likely to be equidistant from one another and typically place the talent directly between them. However, in some situations, it may be advantageous to delay either the right or left channel. The **Delay/Phase** menu contains the controls necessary to do so.

Delay, Phase

Volume: -90.0 dB

Master Gain: 0.00 dB

Defeat Delay

Delay All: Off

Delay L: Off

Delay R: Off
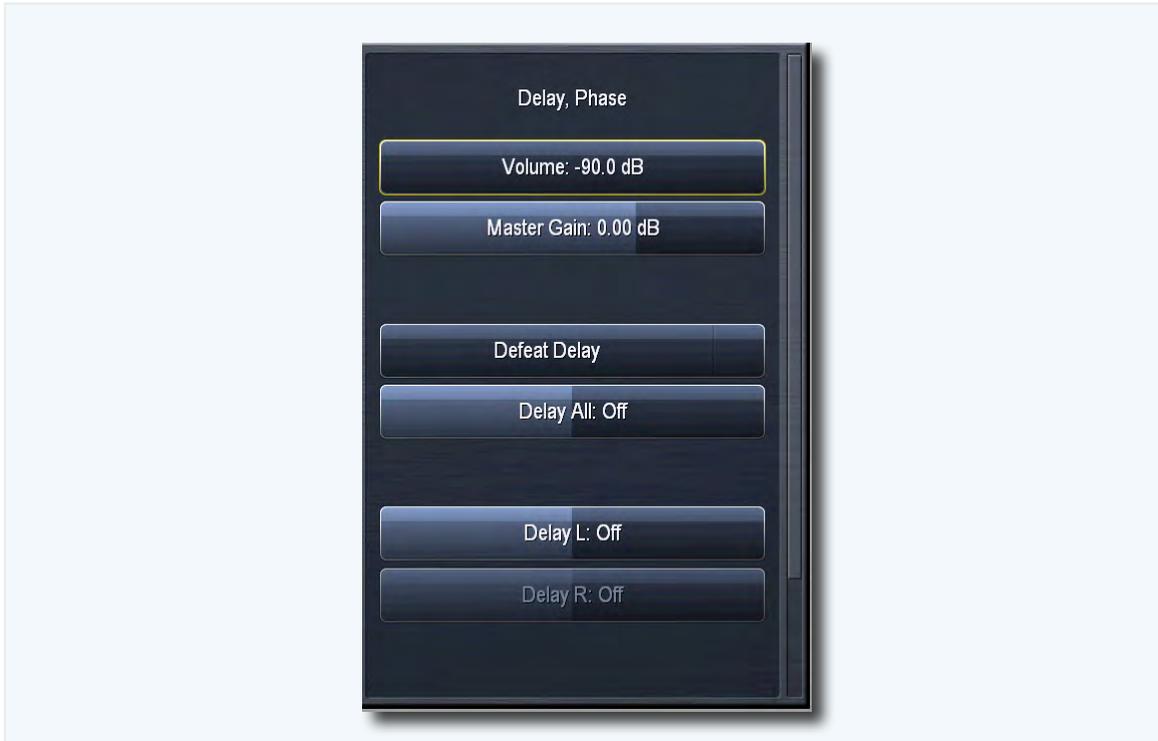
- The **Defeat Delay** control turns off the delay entirely to both channels.

- The **Delay All** control allows you to delay the audio output of the Speaker and Headphone outputs.

- The **Delay Left** and **Delay Right** controls provide a means by which to delay one channel independently of the other.

- The **Invert Left** and **Invert Right** controls let you swap the polarity of each channel. The ability to do so in one channel or the other can be useful if you discover that one of the speakers has been wired out of phase and it is not practical or convenient to physically switch the positive and negative wires. Being able to do so to both channels simultaneously can come in handy if you are in a situation where both channels have gotten out of phase at some point in the studio wiring.

- The **Channel Coupling** menu provides ganged left and right controls for the EQ and Delay circuits.
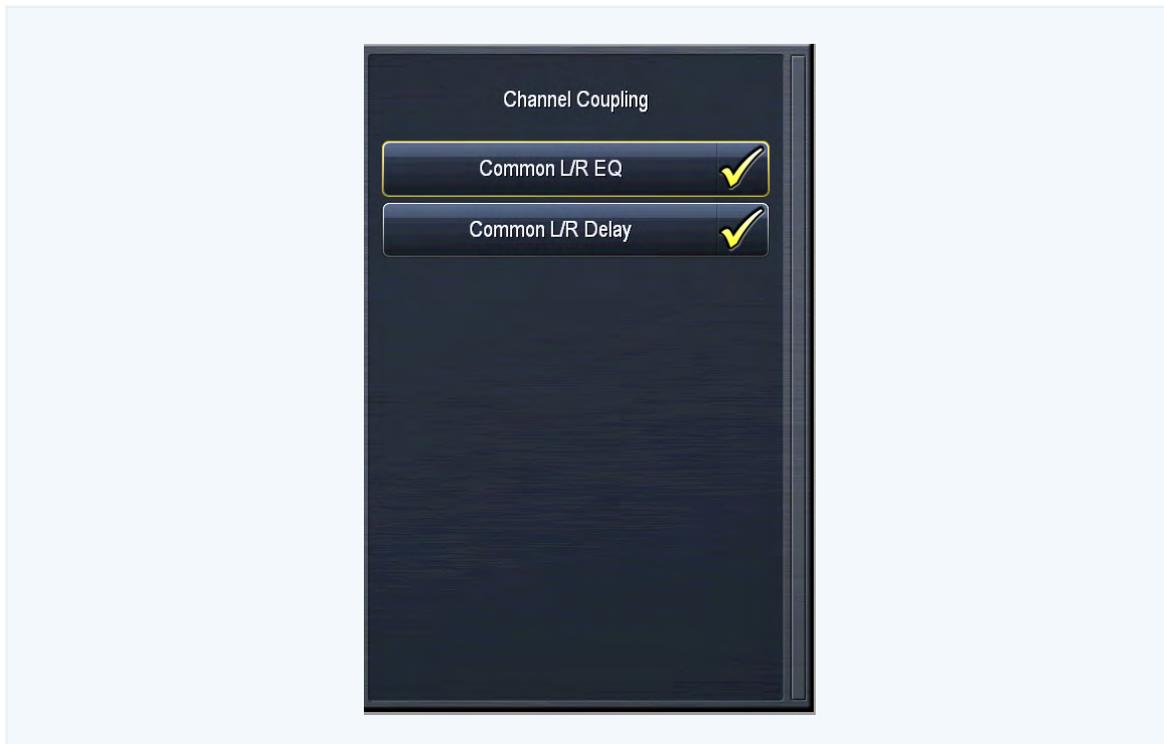
- When enabled, the **Common L/R EQ** control "couples" the left and right channels together in the parametric equalizer so that any changes make to the left channel will also be made in the right, eliminating the need to make the same adjustments twice. Disabling this control allows you to EQ the left and right channels differently. This can be useful if, for instance, one speaker is placed in the corner of a room while the other is not, resulting in a different bass response at the monitoring point.

- The **Common L/R Delay** controls functions in the same manner, for the delay.

• The Monitor Output sections each contain **Protection Limiting**, a useful feature when performing speaker calibrations (which are often performed at higher than normal volume levels and can involve radical amounts of parametric equalization in the pursuit of a flat frequency response).

When the limiters are active, orange bars in the corresponding volume controls will appear indicating that the master gain should be reduced. The **Master Gain** control adjusts the output level of each Monitor Output section relative to the Protection Limiter. You may also find that in the course of calibration you have made significant cuts to achieve a flat output, and need to use this control to raise the output level so that the calibrated and un-calibrated outputs match volume-wise when you compare them by using the Bypass control.
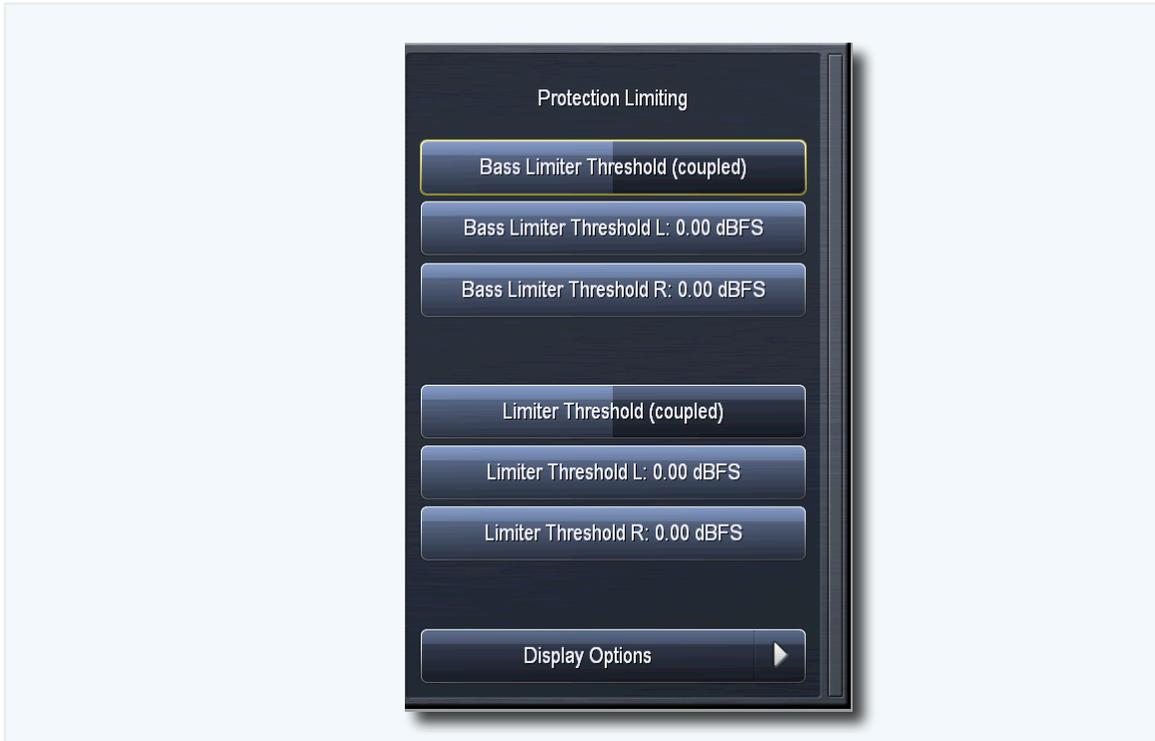
- The **Bass Limiter Threshold** controls for the Left and Right channels set the threshold of the bass limiters. *Keep in mind that these controls affect only the monitor output audio and have no effect on any of the on-air processing cores,* but they are very useful when pushing higher volumes and more bass through very small speakers. The **Bass Limiter Threshold (coupled)** slider moves the left and right channel controls together.

- The **Limiter Threshold** controls for the Left and Right channels set the threshold of the Protection Limiters in each Monitor Output section and operate in the same manner as their counterpart in the HD (and other non-FM) Processing cores. As with the Bass Clip Threshold controls, *only the monitor output audio is affected,* and a **Limiter Threshold (coupled)** control is provided to adjust both channels simultaneously.

Loudness Menu

Speaker calibration, which is covered in greater detail later in this manual, is normally done at relatively high volume levels in order to provide adequate gain into the mic to overcome room noise. Normal listening levels may be substantially lower. While the EQ curve of the output of the speakers technically remains the same, the way our ears perceive different frequencies at lower sound levels will cause the audio to sound different. Specifically, lower and higher frequencies will sound softer than mid-range frequencies.

Do not be alarmed if you find you need to add several decibels of low-frequency boost (at a very low frequency and a width of 3.0 octaves or so) in order for the bass to sound balanced at lower volumes. The same is true for higher frequencies, but normally a dB or two is sufficient (perhaps at a very high frequency with a width of 2.0 octaves or so).

- The **Frequency**, **Width**, and **Gain** sliders operate in the same manner as their counterparts in other sections of the Omnia.7 in which a parametric equalizer is offered.

- The **Band Min** slider sets the point at which any equalization established by the Frequency, Width, and Gain sliders are begins to take place.

- The **Band Max** slider sets the point at which the maximum amount of equalization is reached.

  If the **Gain** slider is set to 0dB and the **Band Min** and **Band Max** sliders are set to the same value, the equalizers in the Loudness menu can be used as additional "static" EQ bands if, for whatever reason, more bands are needed.

Left EQ and Right EQ Menus
These menus provide six bands of fully parametric equalization per channel for each Monitor Output.

- The **Frequency**, **Width**, and **Gain** sliders operate in the same manner as their counterparts in other sections of the Omnia.7 in which a parametric equalizer is offered.

- The **Copy** control places the settings the equalizer onto a "clipboard" so that they can be shared in the opposite channel EQ by using the **Paste** control. This is especially handy if your left and right speakers require nearly - but not quite - identical equalization.

Chapter 21
System Menu

*Whatever control you are looking for
that is not directly related to processing
is probably in here.*

The System Menu

The **System** menu contains the controls and settings used for "global" parameters such as the input/output configuration, sample rate, time/date settings, IP configuration, and software updates and upgrades. Generally speaking, any control that does not relate directly to processing is found here.

There are seven sub-menus within the main **System** menu: **System Status, I/O Options, File Recorder,Time/Date, Scheduling, GPI,** and **System Configuration.**

System Status Menu

The **System Status** menu is divided into three sub-menus: **System Information, Network Information,** and **Audio I/O Status.**
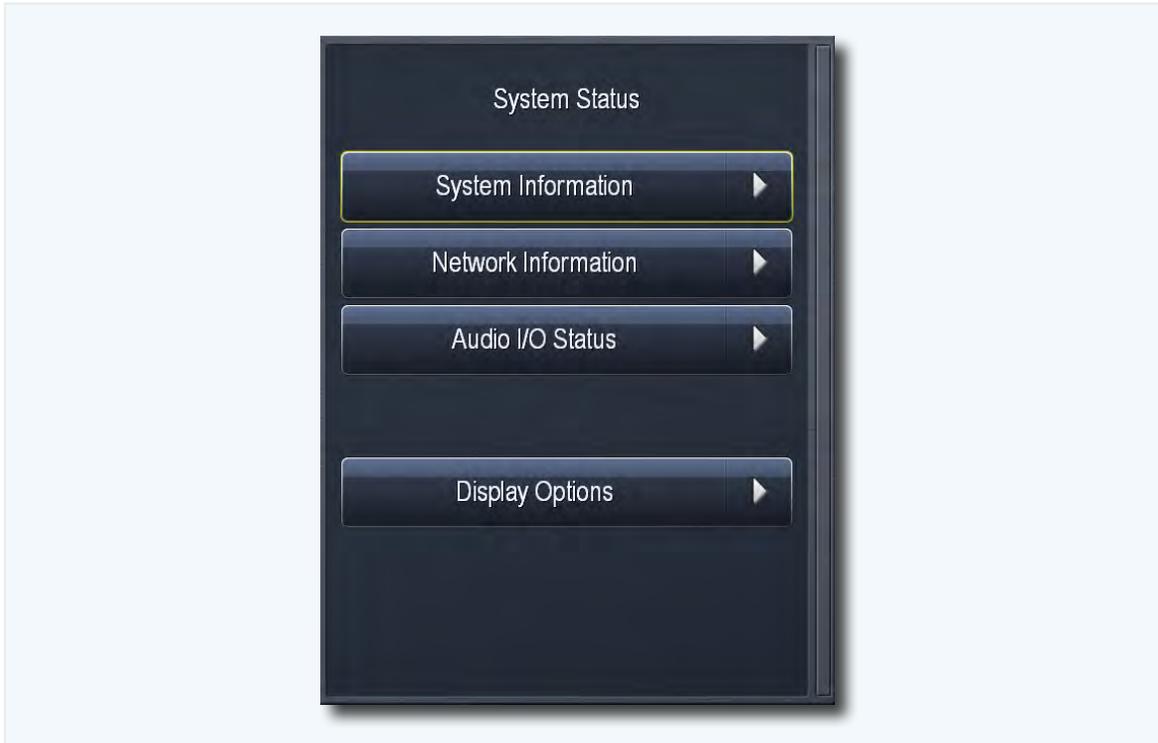
System Information Menu

The **System Information** section shows detailed information about Omnia.7's operation, including CPU load, available RAM, power supply health, up time, and various software, firmware, and hardware versions. The information contained here will typically be requested by support engineers when providing setup or trouble-shooting help.

System Information

Software by Leif Claesson

CPU Load: 13 %

Available RAM: 1422 MB

Up time: 0 years, 0 days, 01:25.12

Licensed to: Development Version

Software Version: 3.14.18

GUI Version: 3.14.18

Built: 2014-10-21 17:21:40

Network Information Menu

The **Network Information** section provides IP-related information including the host name, IP address, and

Network Information

Host Name: omnia7-00001

IP Address: 172.22.22.105

MAC Address: 0C-C4-7A-31-5C-40

Remote Connections: 1

Remote Port: 7300

Current User: Administrator
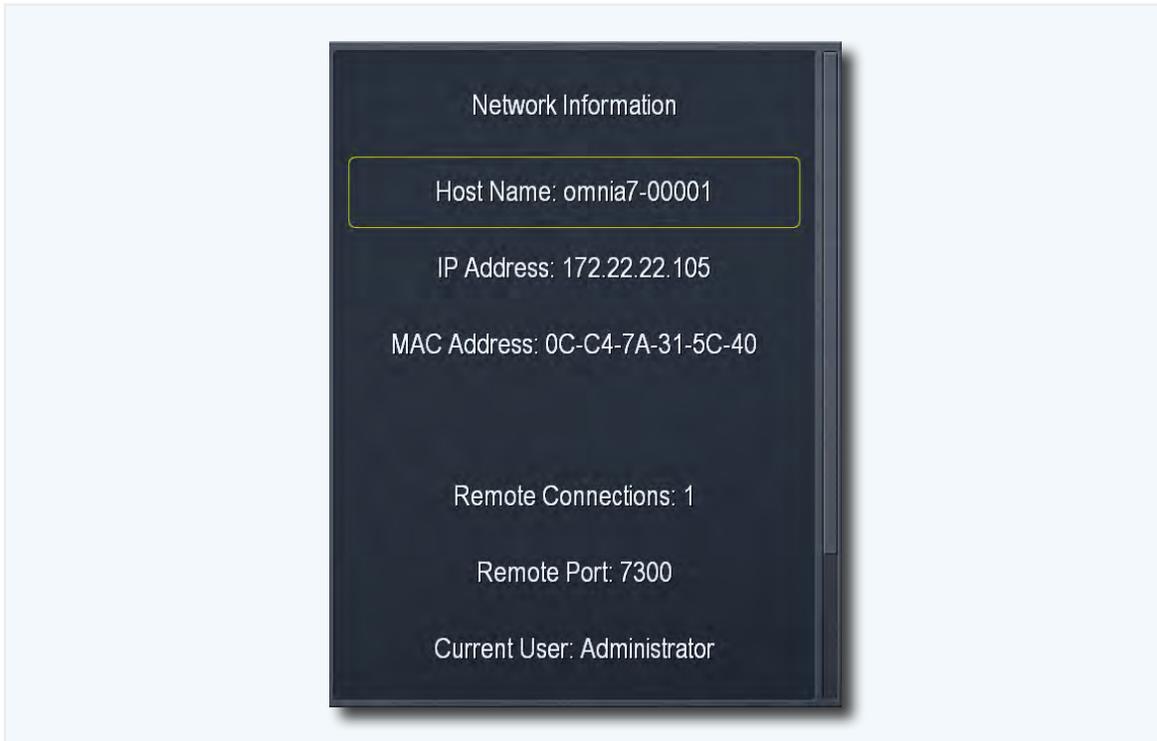
MAC address of the unit. It also indicates how many users are remotely connected, the remote port number, and the security level of the current user.

Audio I/O Status Menu

The **Audio I/O Status** section shows the current system sample rate as well as detailed information aboutaudio input and output configurations.

Audio I/O Status

Sample rate: 48000

Main Process: Buffer 512, 47998.76 Hz

LL: 47998.89, BS 64

J: 39% (W 5, H 0, R 0)

Ex: 5/15, AR: 0
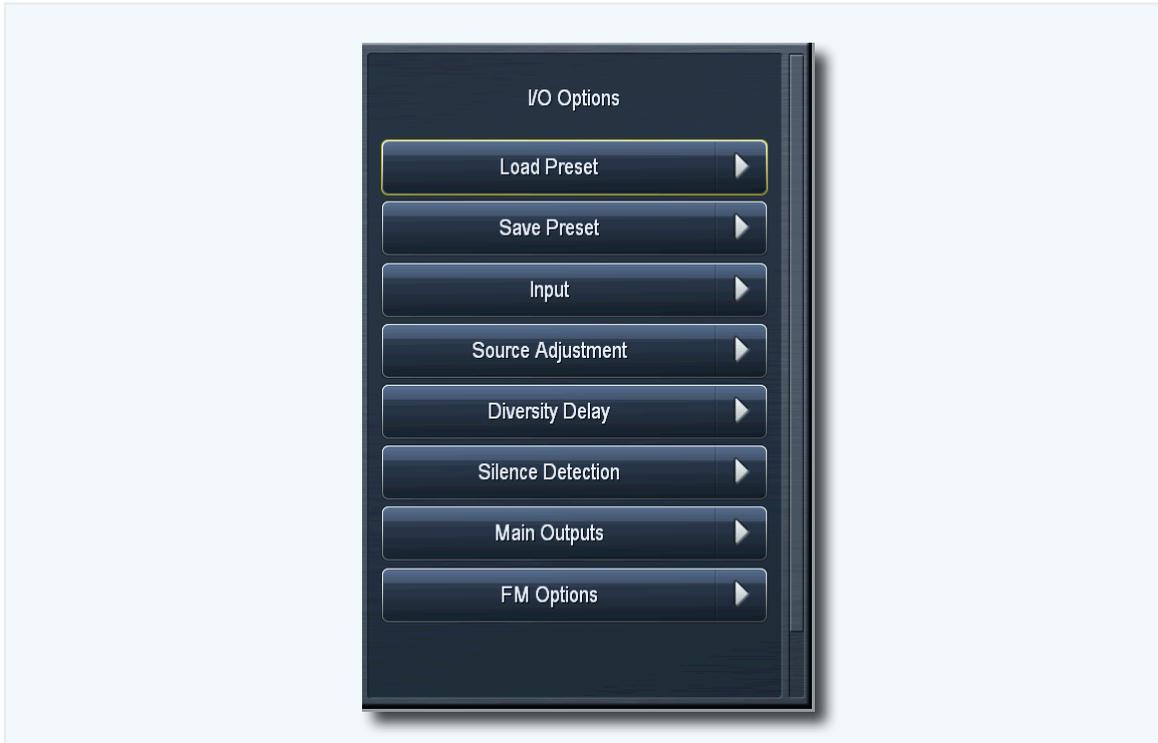
I/O Options Menu

The I/O Options menu has eight sub-menus: **Load Preset, Save Preset, Input, Source Adjustment, Diversity Delay, Silence Detection, Main Outputs,** and **FM Options.**

Load Preset and Save Preset Menus

All I/O settings in the Input, Source Adjustment, Diversity Delay, Silence Detection, Main Outputs, and FM Options can be saved to an I/O preset file. This makes it very easy to return to a known good configuration if you make a change to one of these settings and need a quick way to "get back home" or if you want to clone settings to transfer to another Omnia.7. The controls in these menus operate in the same manner as the **Load Preset** and **Save Preset** controls in previous sections of Omnia.7.

Input Menu

The Input Options menu are where you choose which physical rear panel input (Analog or Digital) will be used as the primary, secondary, and studio sources. High- and low-pass filters are also provided and work on both the analog and digital inputs.
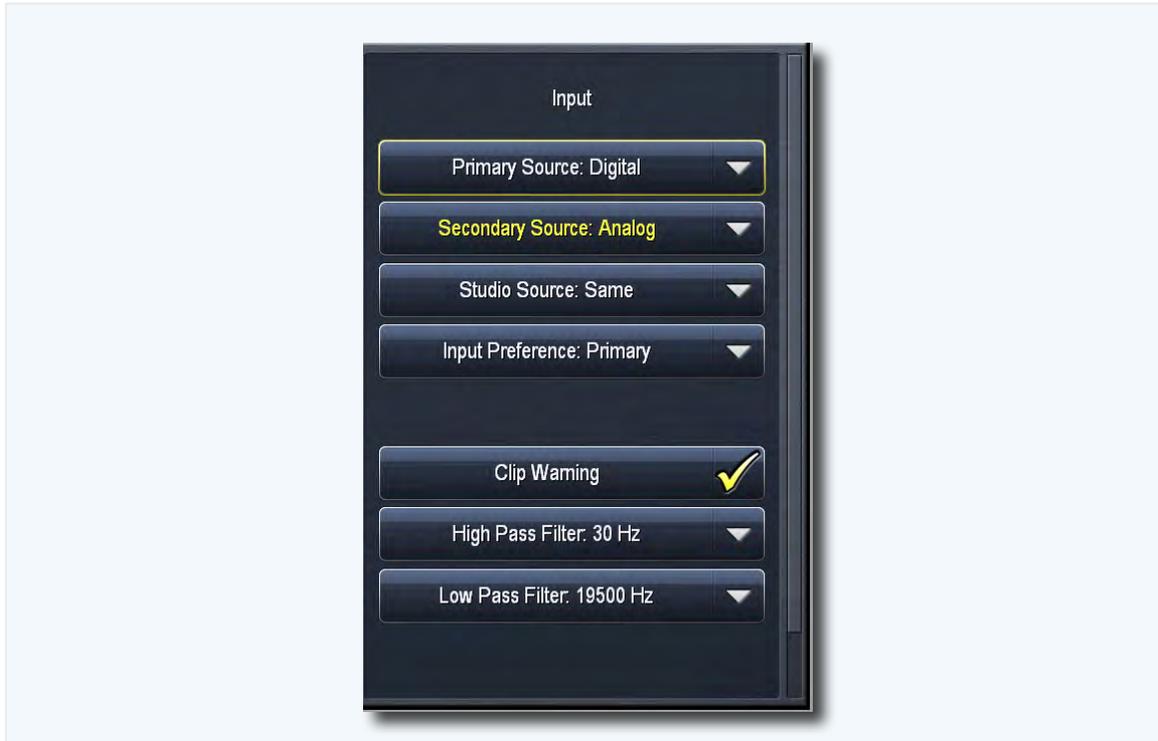
- The **Primary Source** defines the normal main audio input, either digital or analog. In the event you lose audio from the primary source, selecting the unused input as the **Secondary Input Source** provides a backup or alternate audio source.

- The **Studio Source** menu selects the audio source for the the low-latency studio processing core. Choosing "Same" forces the studio feed to follow whichever source is currently on the air.

- The **Input Preference** control determines whether or not Omnia.7 keeps the current, secondary audio source on the air after audio returns to the primary input source or switches back to the primary source.

- When enabled, the **Clip Warning** control will cause the Input meters to flash red when the audio hits full scale. In a normal studio environment, Clip Warning should be turned on to keep the operator from overloading Omnia.7's input. However, if you are in a test environment and feeding a CD player directly into one of the digital inputs, you may wish to turn this control off as clipping present on the CD itself may trigger the Clip Warning.

- The **High Pass Filter** drop-down menu allows you to completely disable the filter or set its frequency to your choice of 15, 30, 45, 60, 70, 80, 90, or 100Hz. The 60, 70, 80, 90, and 100Hz filters are extremely sharp, completely eliminate hum and rumble, and are useful for an all-talk format or a station that still plays live vinyl. The default setting is 30Hz. It is worth noting that the HPF is phase linear.

- The **Low Pass Filter** drop-down menu allows you to completely disable the filter or set its frequency to 17,000, 17,500, 18,000, 18,500, 19,000, 19,500 or 20,000 Hz.

Source Adjustment Menu

The **Source Adjustment** menu contains the controls to set the input gain and L/R channel balance, invert polarity, and swap the left and right channels of the input audio. Independent silence thresholds are also provided for each input.
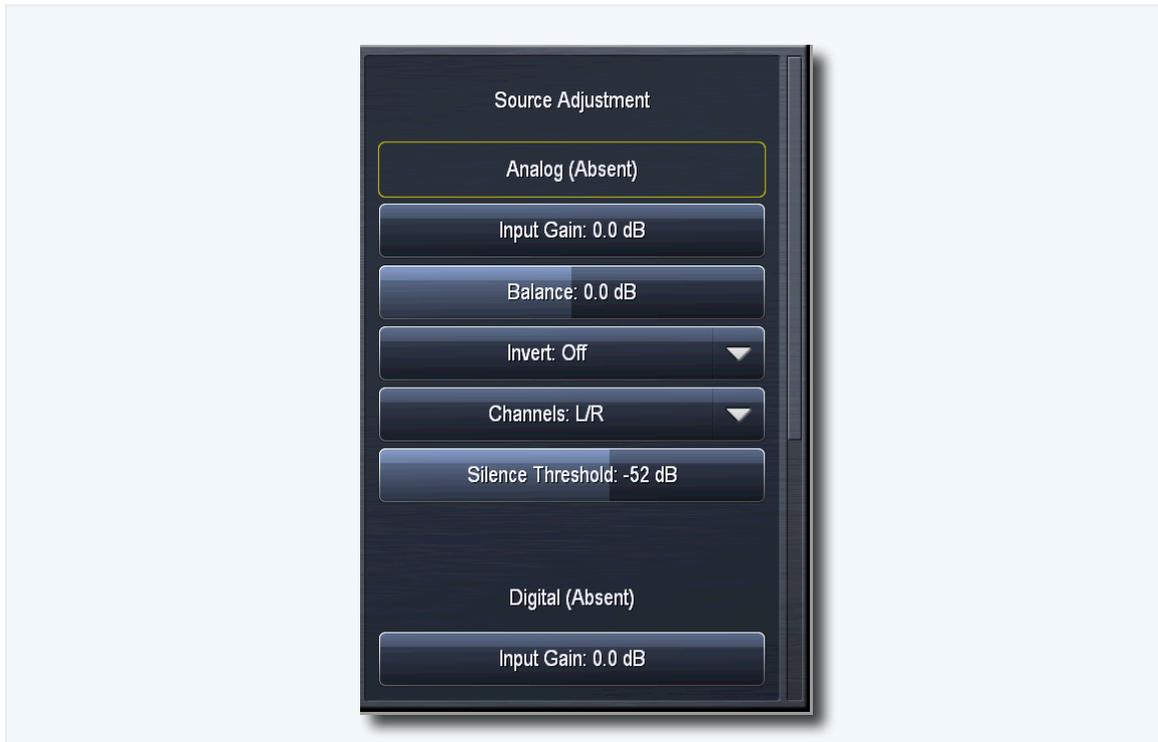
- The **Input Gain** control allows you to adjust a variable gain stage after the clip detector and can be used to boost levels to meet Omnia.7's reference input level as indicated by a green color on the input meters over a range of 18dB.

- The **Balance** slider provides a means by which to dial in a fixed left-to-right channel gain offset. This can be useful if something ahead of Omnia.7 (board, DA, STL) introduces a L/R gain shift that cannot otherwise be corrected. Positive values indicate increased gain in the right channel. Negative numbers indicate more gain in the left channel.

- The **Invert** control allows you to swap the polarity of only the left channel input, only the right channel input, or both the left and right channels simultaneously.

- The **Mode** control offers five combinations to determine how the input audio is fed into Omnia.7 in terms of left and right channels.

  - **L/R** sends left channel input audio to the left channel and right channel input audio to the right channel (default setting).

  - **R/L** sends left channel input audio to the right channel and right channel input audio to the left channel.

  - **L+R** sends both right- and left-channel input audio to both the left and right channels.

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- **L** sends only left-channel input audio to both the left and right channels.

- **R** sends only right-channel input audio to both the left and right channels.

Diversity Delay Menu

The amount of delay introduced to the FM analog signal in order to match the corresponding HD-1 audio is set with in this menu with the **FM Diversity Delay** slider. Setting this control properly (and monitoring your FM and HD-1 signals regularly) will ensure as smooth a transition as possible between the analog and digital signals for listeners with HD receivers.

It is also possible to delay the HD-1 audio with the **HD Diversity Delay** slider. Delaying the HD1 signal by 2 seconds will provide the most accurate and seamless operation of Omnia.7's Speech Detection circuit.
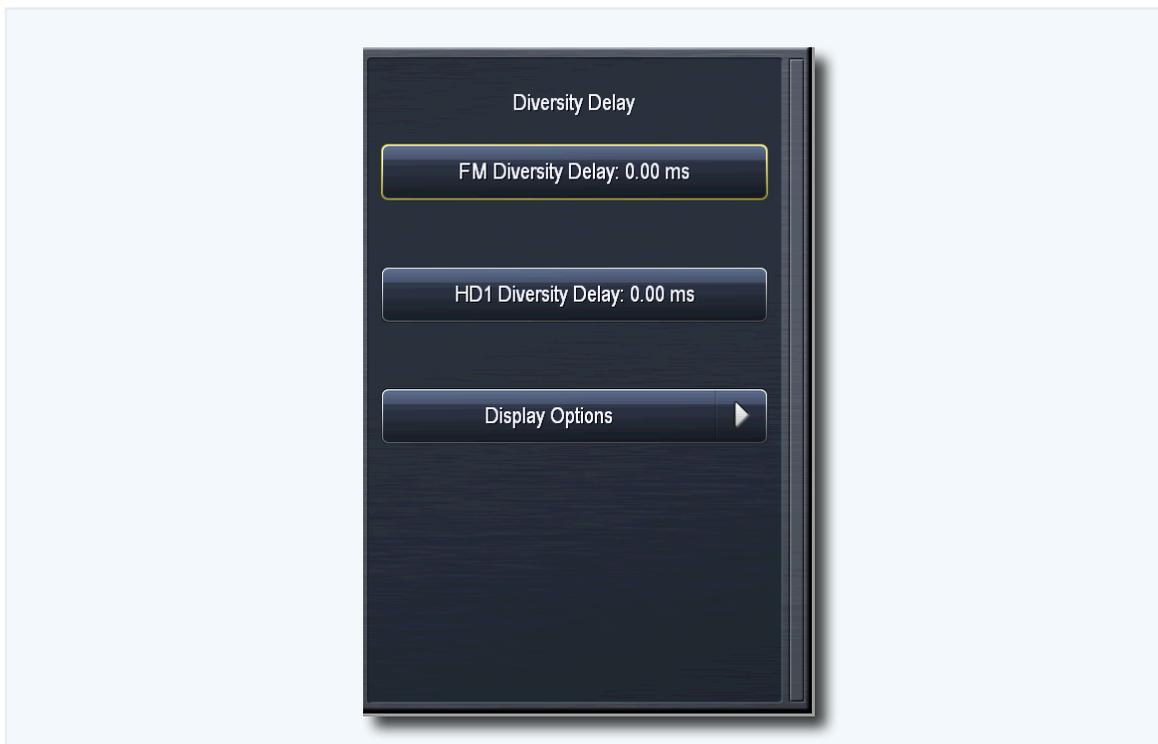
Silence Detection Menu

As mentioned earlier in the I/O menu, Omnia.7 can switch over to a secondary input source when audio
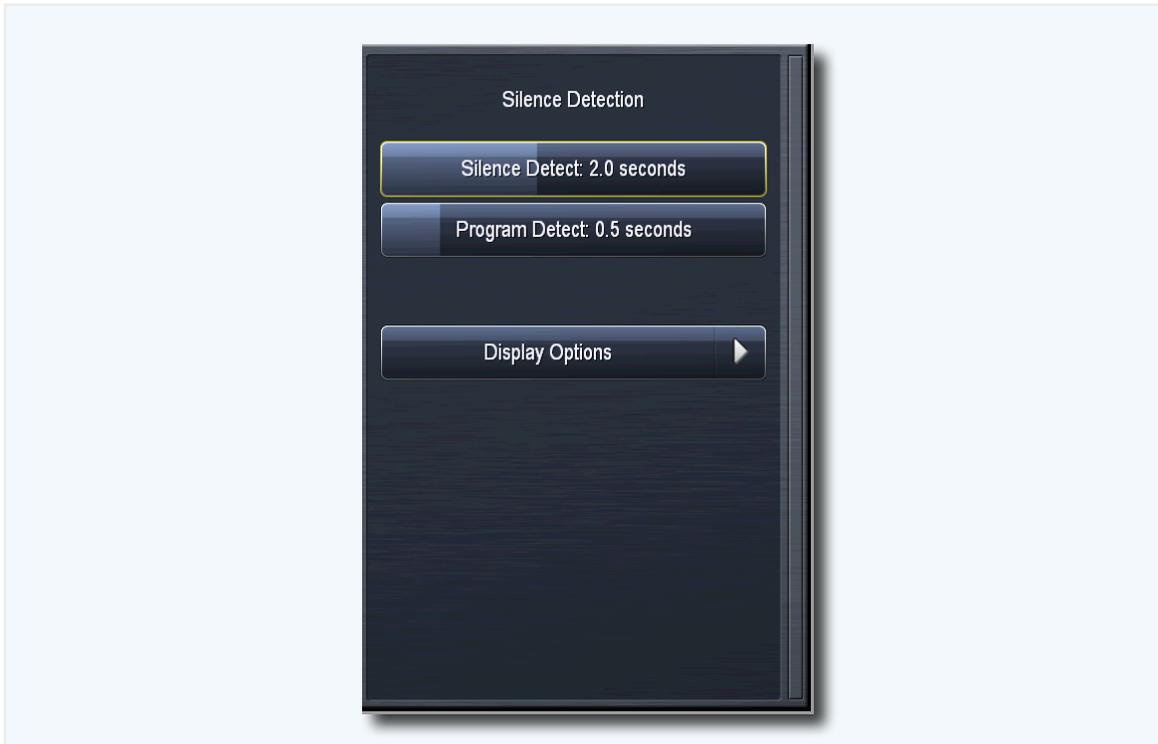
from the primary source is interrupted.

- The **Silence Detect** control determines how long Omnia.7 will wait before switching over to the secondary input source. It also determines how long the unit will wait before switching back to the Primary source if the Input Preference control in the **Input > I/O Options** menu is set to Current.

- If the Input Preference control in the **Input > I/O Options** menu is set to Primary, the **Program Detect** control adjusts how long the unit will wait once it has determined that audio has been restored to the primary input. If the Input Preference control is set to Current, this control will determine how long it waits to return to the primary input if audio is lost on the secondary input.

Main Outputs Menu

The **Main Outputs Menu** determines the audio source is present on rear-panel Analog and Digital output connections and provides output levels for each.
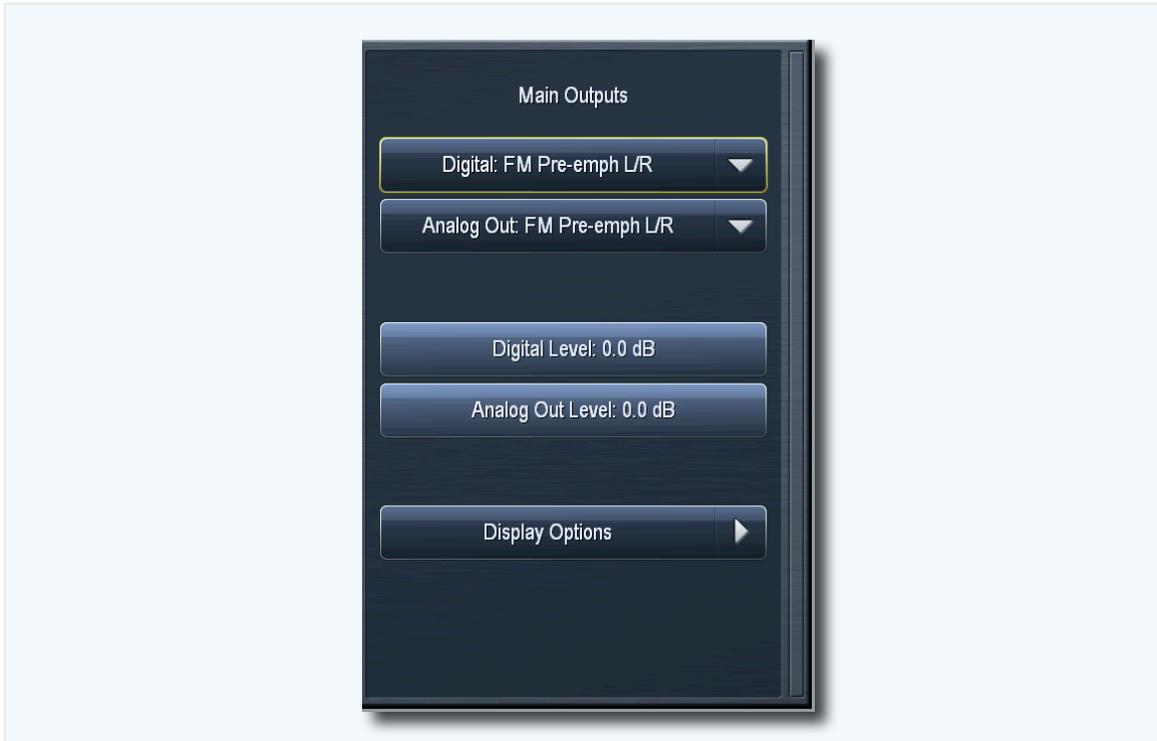
- The **Digital FM** output sources include **FM Pre-emphasized L/R, FM De-emphasized L/R, FM Pre-final L/R, HD, Headphone Out,** and **Speaker Out.** The same sources are provided for the **Analog Out** with an additional selection for the **19kHz Generator.**

  - Note: **FM De-emphasized L/R** can feed a stereo generator which provides pre-emphasis, but this scenario does have the potential to cause overshoots which could result in a slight loss of loudness. Ideally, Omnia.7 should be the ONLY device providing FM Pre-emphasis and any pre-emphasis in the FM Exciter/Transmitter should be defeated.

- The corresponding **Level** sliders adjust the output levels.

FM Options Menu

The **FM Options** Menu contains controls related to the composite and L/R output sections. Included here are adjustments for setting the amount of pre-emphasis (if any), pilot level, composite audio bandwidth, stereo mode (dual- or single-sideband), and the source and level of the rear panel MPX outputs.

- The **Pre-Emphasis** controls determines whether the output audio is flat or follows the 50us or 75us pre-emphasis curve. If **ITU-R BS-412 Power Control** has been enabled in the **System > System Configuration > Processing Cores** menu, the **MPX Power Limit** slider appears instead and is used to set the MPX power as appropriate for a particular region.

- The **Pilot Level** control allows you to set the level of pilot injection over a range of 0 to 20% in 0.1% dB increments.

- The **MPX Output Bandwidth** control gives you the choice of setting the bandwidth of the composite outputs to either 16.5kHz or 16kHz. 16.5kHz is fully compatible with all receivers, and is the recommended setting.

- The **Stereo Mode** control allows you to choose between single-sideband (SSB) or dual-sideband (DSB) operation.

- The **MPX1 Output** and **MPX2 Output Level** sliders provide very precise control of the composite output levels of each MPX output section with a range of -30 to 0db in one-hundredth dB increments.

- The **MPX1 Mode** and **MPX2 Mode** controls determine which signals are fed to the composite outputs. Choices include MPX Output and L/R Output.

- The **MPX Test Generator** and **L/R Test Generator** are described in detail below.

- The **L/R Output Bandwidth** slider performs the same function for the Left/Right outputs but with a choice of 15, 15.5, 16, or 16.5kHz.

  Note: If you are using a 32kHz STL, you will need to set the L/R Output Bandwidth to 15 or 15.5 to prevent over-modulation.

- The **L/R Codec Safety** drop-down control can be used to limit high-frequency headroom of the L/R output, a benefit when using a compressed digital STL and lower bit rates as it may help prevent bit rate reduction-induced peak overshoots. Settings are Off, Light, Medium and Heavy. You can see the exact effect it has by looking at the oscilloscope set to L/R Output with oversampling enabled.

- Enabling the **RF Bandwidth** Control can tightly control the RF bandwidth to reduce multipath problems. The **Strength** slider determines the amount of control applied.

  Because multipath issues are so specific to particular locations, the only practical way to determine the best setting for your station is by trial-and-error while driving to locations that are known to be problematic. With a Wi-Fi hotspot and a laptop or tablet running Omnia 7's remote software, it is entirely possible to make these adjustments on the fly and in real time.

- *Note: The significance of this feature warrants a detailed explanation. Because certain sounds such as stereo-mic'ed piano (the first few notes of "My Immortal" by Evanescence serves as a good example) can cause excessive stereo reception problems.*

  Looking at the MPX spectrum of this song in particular, you will notice two very tall high frequency peaks: One at 37890 Hz and another at 38110 Hz. The original audio had a piano note at 110 Hz, recorded with stereo microphones, and has very little phase correlation between the left and right channels. Thus, due to the FM stereo system, which amplitude modulates the Left-Right difference signal by 38000 Hz, these two high frequency peaks result.

You may also notice that they are several dB's stronger than the pilot tone, but at twice the frequency. When this signal _____ (_____ exciter will do), these very tall high frequency peaks will c_____ RF carrier, potentially causing multipath reception problems _____ here due to the sparse audio content.

The careful observer may rec_____ leband) normally reduces RF bandwidth, it will not help in _____ Hz peak, but we still have the 37890   Hz   peak,   a_____   stronger   than   before.

One solution would be to stati_____ processors do. However, this narrows the entire stereo in_____ tent and is the equivalent of shooting   a_____   a   cannon.

Instead, Omnia.7's RF Bandwi_____ iter with thousands of bands) allows it to attenuate only th_____ ithout affecting the rest of the stereo image. This means t_____ without audible loss of stereo separation!

MPX and L/R Test Tone Gener_____ ed Applications

The MPX and L/R Test Tone Genera_____ veral key test tones which can be very useful for testing and proofing _____

- **Square** is a 60Hz square wave useful for visualizing tilt.

- **Quick Sweep** is a very fast 1,000 – 60,000Hz sweep with a click before each sweep, designed to offer a visual reference as to the high frequency performance of your STL or exciter. If you were to connect an oscilloscope to a calibrated tuner with MPX output (such as the Belar Wizard, for example)
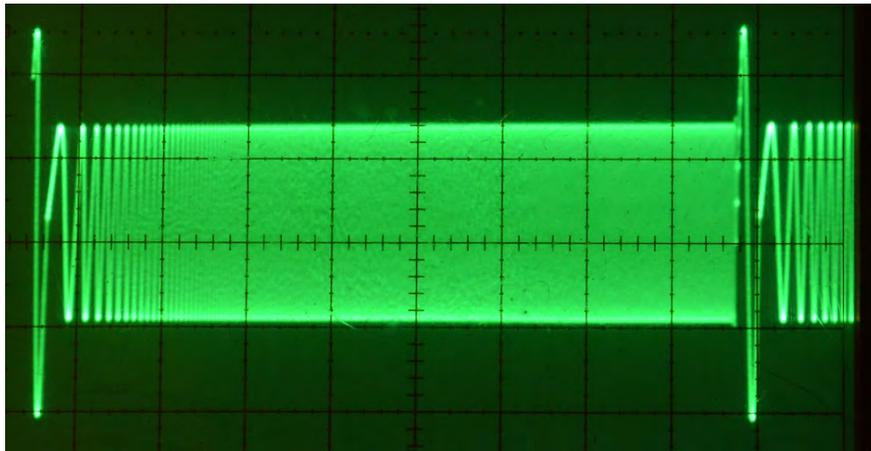
this is the shape you would see if your STL or exciter had a flat high frequency response: Any deviation from a flat high frequency response means a loss of loudness and/or stereo separation.

- **Sweep (MPX)** is a slow linear frequency sweep between 30 and 60,000 Hz.

- **Log Sweep (MPX)** is a logarithmic equivalent.

- **400Hz** is a full amplitude sine wave to allow you to set an exact 75kHz deviation with a mod monitor.

- **0.5 – 5.0** and **0.5 – 30.0** are subsonic sweeps that allow you to see the extreme low frequency response of your air chain.

- **30Hz** is a 30Hz sine wave. *Certain exciters will go into protection mode if fed a full modulation sine wave this low in frequency, so please be careful!*

- **30 Hz Phase Invert** produces a 30 Hz sine wave which abruptly changes phase twice per second. This test tone allows you to verify DC coupling of Omnia.7's composite output (with an external oscilloscope), as well as your exciter and your modulation monitor. Many exciters and even more modulation monitors have inaccurate low frequency response, which will cause severe over-modulation (or erroneously display severe over-modulation) if the low frequencies abruptly change, such as is customary in music that contains kick drums (which most songs do!).

- **Bessel Null 31,187.6Hz** allows you to set exact +/- 75kHz modulation with a direct off-air spectrum analyzer.

Omnia.7 provides extremely tight modulation control. Your modulation monitor's meter should essentially stand still at 75kHz. (The composite meter in Omnia.7 will stand still at 75kHz no matter what any external equipment is doing). If it does not, **lack of DC coupling** is a likely culprit. To test for this, follow these steps:

- Connect an Oscilloscope (making sure it is DC coupled, not AC coupled) to Omnia.7's composite output.

- Select 400 Hz. Adjust the oscilloscope input level to accurately reach a particular set of lines.

- Select 30 Hz. Verify that the peaks reach the same lines at the exact same spot.

- Select 30 Hz Phase Invert. Verify that the peaks reach the same lines and never overshoot. For a "control sample", set your oscilloscope to AC coupling, and watch the waveform bounce.

We have now verified that Omnia.7's composite output is exactly accurate. You may also try the other test tones as well as program audio.

Here is another test, this time checking for overshoots:

- Connect Omnia.7's composite output to your exciter and look at your modulation monitor.

- Select 400 Hz and adjust for exactly 100% modulation.

- Then select 30 Hz and verify that you are reaching the same modulation level.

- Finally, select 30 Hz Phase Invert.

You will likely see some overshoot, but if you see more than a percent or two, then either your exciter (or STL) is causing the overshoots, OR your modulation monitor is displaying overshoots that are not there. In extensive field testing, this problem has proven to be much more common than we ever thought! Please note that this problem affects every processor, but it has just never been as easy to pinpoint as it is now due to the presence of Omnia.7's built in signal generator.

The **L/R Test Generator** menu section has the same options (minus Bessel Null) but there are a couple of differences to keep in mind. Specifically, **Sweep L/R** is a slow linear frequency sweep between 30 and 16.000Hz and **Quick Sweep** is a quick sweep between 1000 - 18.000Hz, with a click before each sweep.

The click allows you to adjust the trig level of your oscilloscope to stabilize the display. Quick Sweep goes all the way up to 18,000Hz to allow you to visualize the low pass filter of your stereo generator.

All L/R test tones are generated *before* any de-emphasis inside the Omnia.7.

File Recorder Menu

Omnia.7 features three built-in file recorders that allow you to capture audio from various points within the processing chain onto a USB flash drive or hard drive.

Before you begin, select the **Name** input field and assign a name to your new file. Then choose which processing core (FM, HD, or Studio) and patch point you would like to record from using the **Audio Selection** menu. Finally, enable "Rec" to start recording.

- Selecting **Start All** from the File Recorder 1 menu allows the "Rec" control in File Recorder 1 to act as a master start/stop control for all three recorders. This is useful for making exactly the same recording in all three recorders but from different patch points. Unchecking **Start All** returns individual control to each recorder.

- The **Gain** slider controls the input level into the recorder. If, for example, you are recording from the MPX patch point with this control set at -3dB, you will get a -3dB peak MPX file, suitable for use in a modulation monitoring software program such as MpxTool.

- The **Vox** control, when enabled, pauses recording when no audio is present and has a selectable timeout setting.

- The **Minimize File Size** control automatically adjusts the recording resolution to match the actual noise floor of the audio, allowing you to record a full hour of off-air MPX audio in a file size of only 500mb. The resulting FLAC file can still be read by any program that supports FLAC.

If you are recording directly from the Omnia.7 or on a remote computer with a high speed connection to Omnia.7, the Source window will show "PCM" indicating the recording will be uncompressed PCM source data. If you have a slower remote connection, the window will show "Vorbis" indicating that you will be recording the decoded output of a lossy codec. In either case, the recorder always produces a FLAC (Free Lossless Audio Codec) file.

You also have the option to use Omnia.7's Time-Based File Splitting feature, which allows you to record files of a specified length (15 minutes, 30 minutes, 1 hour, 2 hours, 3 hours, or 4 hours). As it is sample-accurate, you can splice the files together after recording if you like. There is no file limit size (other than the amount of space on your external drive) so file splitting is not required, but an option.

Time/Date Menu

The **Time/Date** menu has three sub-menus for setting Omnia.7's internal clock: **Time Zone, NTP,** and **Set Clock Manually.**

Time Zone Menu

The **Time Zone** menu allows you to choose the proper time zone for your particular geographical area. Daylight Savings Time is automatically applied in applicable time zones.

NTP Menupass

The **NTP** menu contains the addresses for five Network Time Protocol servers. When enabled, **NTP Synchronization** will use one of these servers to keep the Omnia.7's clock synchronized.

By default, each of the four address fields are populated with pool.ntp.org servers. Omnia.7 will try to connect to the servers in order. If a connection is established and later lost, it will attempt the next server in the list.

If you are using a private internal NTP server, you may enter its address into the Server 0 field and leave the rest set to their default addresses. This will provide the opportunity to connect to a public server should the private server disconnect or fail.

However, since Omnia.7 will not seek out another server unless the current one fails, this approach could result in the unit getting "stuck" on a public server when the private server returns. To prevent this, you may wish to set all four server fields to the address of the private server.

Set Clock Manually Menu

The **Set Clock Manually** menu contains the controls for manually setting the time and date.

- Selecting the **Update Time** or **Update Date** sliders will refresh the time displayed on the sliders. Use the Set Hour, Set Minute, Set Second, Set Year, Set Month, and Set Day sliders to reflect the current time and date, then select **Apply Time** or **Apply Date** to put the new values you've set into effect.

Scheduling Menu

The **Scheduling** menu allows you to program up to twenty-six (26) day- and time-driven events, including switching Undo presets, changing processing presets for the FM, HD and Studio processing cores, and turning Speech Detection on and off for each core.

Info Menu

The **Info** Menu displays events that are currently active (such as A, E, K, M, O) plus the most recent past event.

Event Menus (A-B, C-D, E-F, etc.)

Each **Event Menu** window simultaneously displays controls for two separate events. An event may be scheduled on one, several, or all days of the week by enabling the Day of Week control for a particular day(s).

- The time at which the event occurs is determined by the **Time** (hours and minutes) and **Second** (seconds) sliders.

- The **Function** control selects the general event category, while the one beneath the Function control is context-sensitive and provides a list of choices appropriate for the general event category. For instance, if the Function control is set to "FM Processing Preset," a list of processing presets will be displayed.

- Once these parameters are set, the **Event Enable** control – not surprisingly – enables that event to occur at the specified date and time.

    Note: Be sure to set the day, time, and function parameters prior to enabling an event.

- Selecting the **Trigger Now** button executes the event immediately.

The current event remains active and on the air until the next scheduled event occurs. If only one event is scheduled, those parameters will remain active indefinitely or until another event is added to the schedule.

GPI Menu

The **GPI** menu contains sub-menus that allow you to enable or disable GPI functionality and set exactly which functions and behaviors are controlled via GPI.

GPI Menu

- The **GPI Enable** control is used to turn GPI on or off. Please note that GPI must be disabled in order to edit and configure the individual GPI functions.

- The **GPI Function A-D** and **GPI Function E-H** sub-menus each contain the controls for their four respective GPI's.

  - The **Function** control in each GPI channel determines which available parameter is affected when the input signal is received.

  - The **Lo** and **Hi** controls work together to determine the specific action that occurs to the parameter selected by the Function control. **Hi** is the normal mode of operation. **Lo** is the mode when the GPI is pulled to ground.

Pins 2 through 9 correspond to GPI inputs 1 through 8. Pins 18 through 25 are grounds.

If a system is using relay logic, a contact closure from GPI to ground is "engaged" and an open contact is "not engaged".

If supplied by a 5V GPO, 0V is GPI "engaged" or "Lo" and 5V is GPI "not engaged" or "Hi". A 3.3V signal will also work.

For continuous behavior, use one GPI for the action as follows:

- LO - Setting 1
- HI - Setting 2

For momentary behavior, use two GPI's for the action as follows:

- GPI 1 LO - Setting 1
- GPI 1 HI - No change
- GPI 2 LO - Setting 2
- GPI 2 HI - No change

Always remember to re-enable GPI after making any changes!

System Configuration Menu

The **System Config** menu contains the controls to select an internal sample rate, determine how many processing cores are available, set a system password, power cycle or shut down the unit, establish an IP "white list" for remote HTTP access, assign an IP address to the unit, and set up SNMP. You can also check the software and GUI versions, save your custom configurations to a USB drive, update to the latest
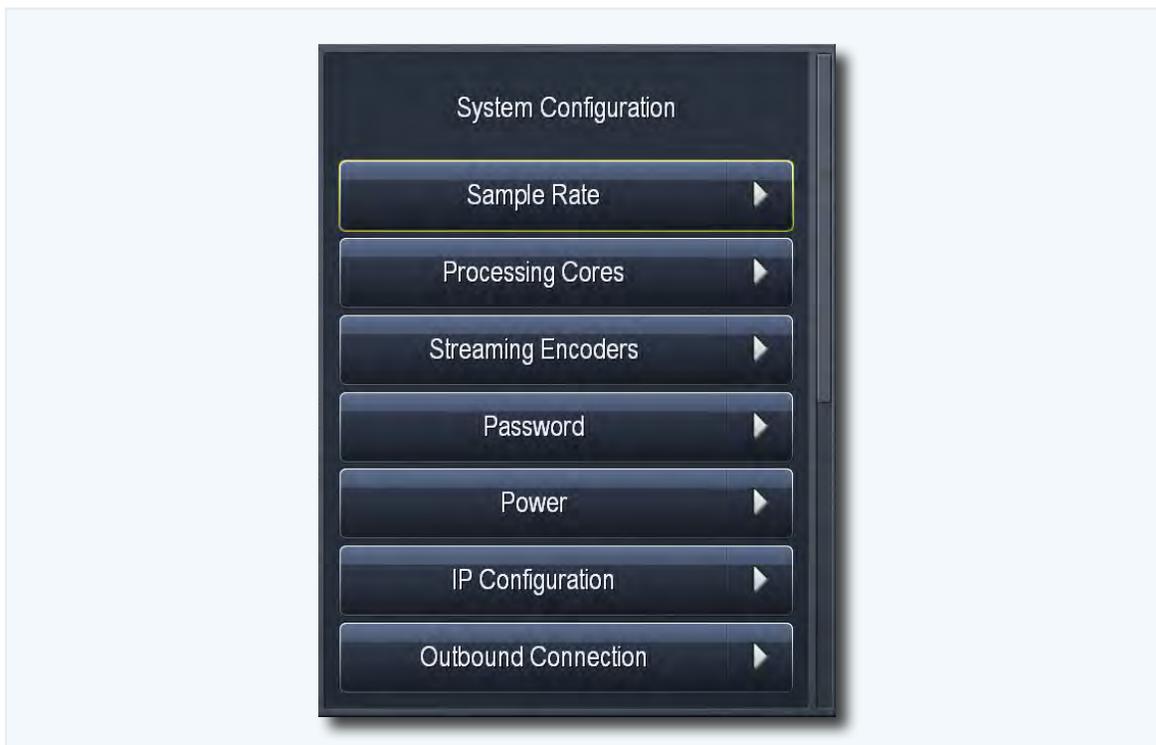
software versions, and add options via a license key.

Sample Rate Menu

The **Sample Rate** menu lets you choose the internal sample rate at which Omnia.7 will run, either 44.1kHz or 48kHz. The default rate is 44.1kHz. Be sure to select **Apply Config** to put the changes into effect, keeping in mind that doing so will cause an interruption to program audio as Omnia.7 re-starts.

The main AES XLR inputs can accept audio with a reference of either 44.1kHz (for HD Radio) or 48kHz (for DAB). To set the sample rate, navigate to the **System > System Configuration > Sample Rate** menu and set the unit's sample rate to match that of the incoming signal and the **Sync Reference** control to "Main Input".

If the incoming AES audio has a different sample rate between 32kHz and 96kHz, it can be up- or down-sampled to either 44.1 or 48kHz by setting the **Sync Reference** control to "Reference Input." The unit's sample rate must be selected in the **Sample Rate** menu.

Finally, a dedicated external reference input is provided on the rear panel via a BNC connector should it be necessary to sync to a clock that is not present on the incoming AES audio (such as an HD exporter at the transmitter site). Set the **Sync Reference** to "Reference Input". The unit's sample rate must be selected in the **Sample Rate** menu. A BNC-to-XLR cable or adapter (Pin 2 hot, Pin 3 shield) may be used for short runs without concern. For longer runs, a transformer should be used as needed.

Processing Cores Menu

The **Processing Cores** menu allows you to enable **MPX Power Control.** Any changes made will not take effect until the **Apply Config"** button is pressed. Bear in mind that this will take Omnia.7 off the air for several seconds.

Password Menu

The **Password** menu allows you to password protect your Omnia.7. Selecting the **Password** field brings up the on-screen keyboard for entering a system password. To unlock the unit, enter your password and

select **Unlock**. If you forget your password, Omnia support can help you unlock your unit. The default

Unit Locked

Unlock

Host Name: omnia7-00001

IP Address: 172.22.22.105

System Location: Rack Room

Software Version: 3.14.49
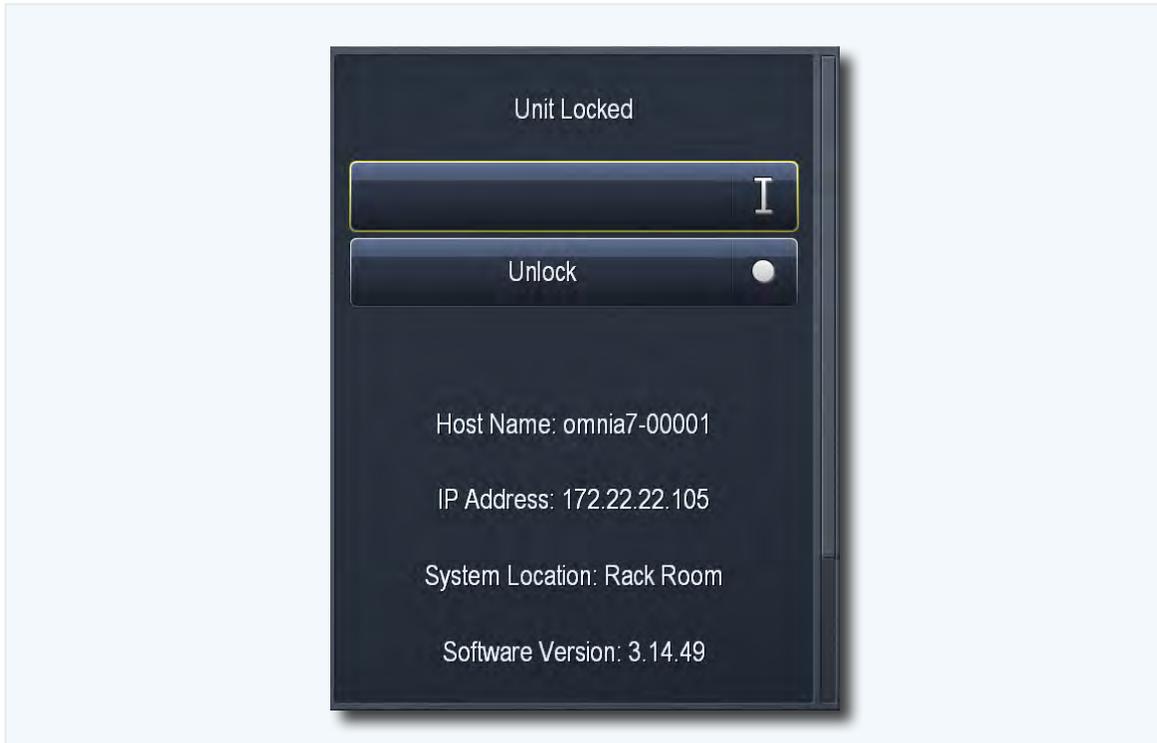
factory password is "1234".

Power Menu

The **Power** menu provides a means by which to restart or shut down your Omnia.7.

- The **Power Cycle** option safely shuts down the unit and restarts it – akin to a computer "reboot."

- The **Safe Shutdown** option properly and completely shuts down the unit. This function is available only on the front panel, not through the remote software, as accidentally pressing it could result in an unplanned visit to the transmitter site!

- The **Display Timeout** menu determines how long the front panel display remains on after it was last used. It can be set to stay on for 10 minutes, 1 hour, 10 hours, or 24 hours.

IP Configuration Menu

The **IP Configuration** menu allows you to choose whether Omnia.7 receives its IP address from a DHCP server (the default setting) or is manually assigned a static address.

- The **Use DHCP** button allows your local router to assign an IP address to the unit.

- If **Use DCHP** is not selected, the fields for entering **IP Address, Subnet Mask, Gateway,** and **DNS** information become active.

- Selecting **Apply** puts any changes you have made to these parameters into effect after a few seconds.

Outbound Connection Menu

A full and detailed description of how to remotely connect to Omnia.7 from a computer via NfRemote software is found in Chapter 25 later in this manual but for now, it is sufficient to understand that normally, an instance of NfRemote running on a remote computer initiates the connection Omnia.7. This is called an "Inbound" connection).

However, there are some situations where it is more appropriate for Omnia.7 to initiate the connection to an instance of NfRemote on a remote computer. This is called an "Outbound" connection and is accomplished using Omnia.7's **Outbound Connection** menu.
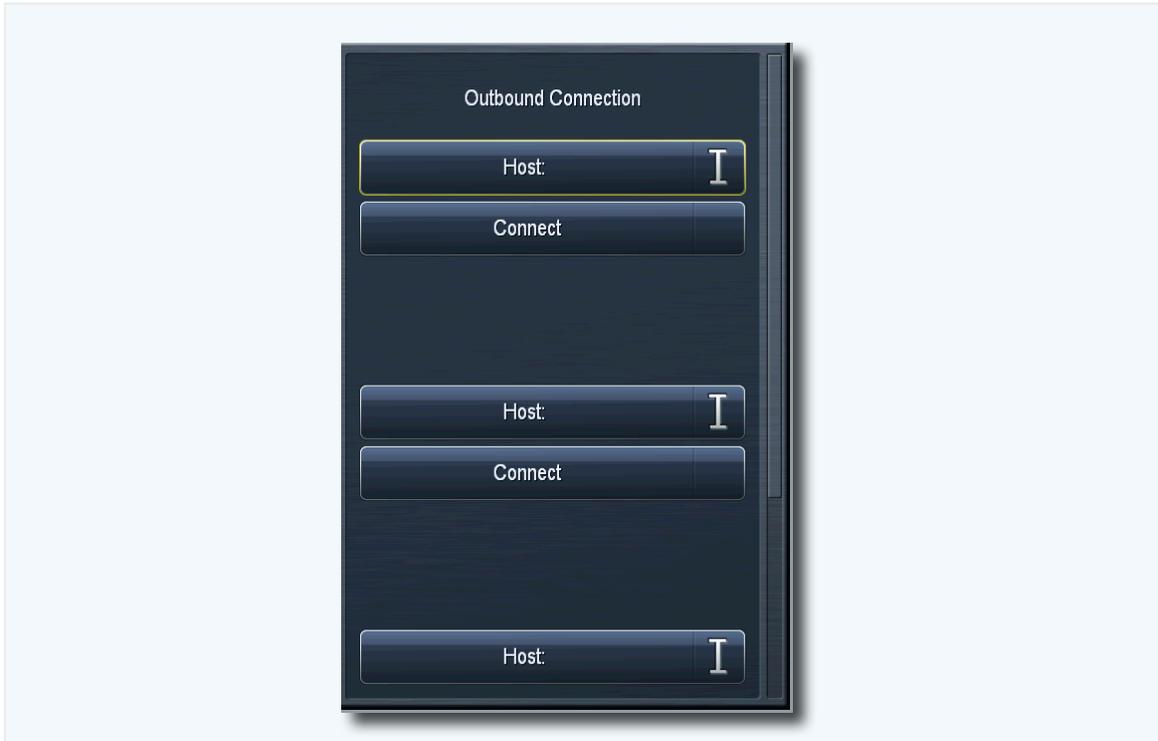
One example of how this can be used is for technical support. By creating an outbound connection, you can connect to the support engineer's NfRemote computer which in turn allows them to control your Omnia.7.

In such a situation, the support engineer would provide an IP address (or host name) and a port number separated by a colon (123.45.67.89:7373 for example) in the **Host** field and click the **Connect** button. Because IP addresses are commonly dynamically allocated, using a host name is the preferred convention.

Up to three outbound connections can be saved for quick recall.

HTTP Access Menu
The **HTTP Access** menu allows you to create a "white list" of allowable IP addresses belonging to network resources that need access to the Omnia.7, such as automation play-out computers.
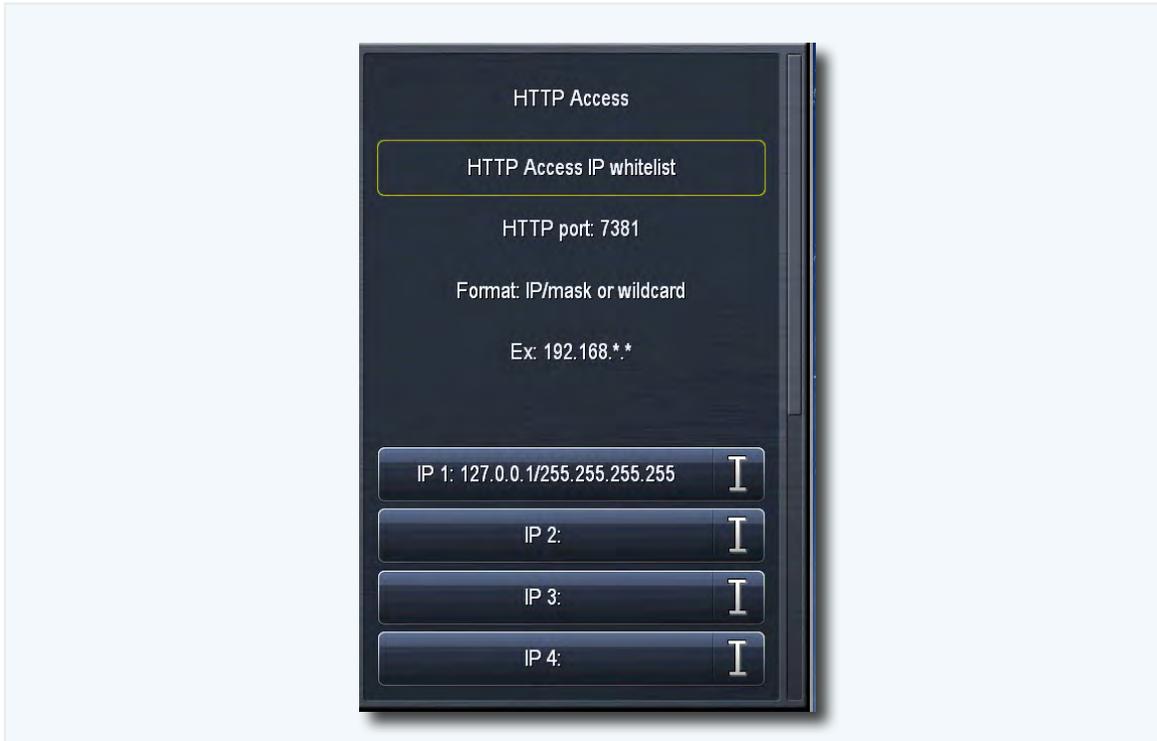
- Enter the IP address and subnet mask information using the following example as a guide: 192.168.1.0/255.255.255.0 (The beginning of the IP range followed by the subnet mask, separated by a forward slash). Standard TCP/IP wildcards such as the asterisk (" * ") are also supported. Up to eight addresses can be stored.

> *Note: You may enter an IP address without a mask to allow only that specific IP address.*

SNMP Menu

The **SNMP** menu provides the means to enter the information necessary to facilitate communication between Omnia.7 and your SNMP manager. It supports SNMP versions V1 and V2c.

The Omnia.7 MIB file is available via the built-in HTTP server on the SNMP Test Page which can be accessed from any white-listed computer on your network.

Enter the IP address of Omnia.7 followed by the port number and /SNMP as follows, substituting your IP address: http://192.168.1.1:7380/SNMP

A Test Mode is also provided to help setup and verify proper SNMP configuration and communication.

> *Note: Please bear in mind that when test mode is enabled, no auto-generated SNMP traps will be sent and any GETs will return the test value, not the actual value.*

- The **SNMP Enable** control enables and disables SNMP. Note that SNMP must be disabled in order to make changes to this section.

- Information entered in the **Location** field appears on the front panel display and on remote connections and makes it possible to quickly identify which particular unit you are viewing. This is especially convenient if you are monitoring more than one Omnia.7 simultaneously.

- The **Contact** field accepts the e-mail address of the designated contact.

- The **Communities** and **Trap Sink** fields accept the community names and IP addresses or names of the trap receiver.

Software Update Menu

The **Software Update** menu displays the current version of the Omnia.7 processing software and the GUI software. Software downloads are available from the Omnia website and can be downloaded to an external USB drive for local installation, or can downloaded to a Windows PC running NfRemote software for remote installation.
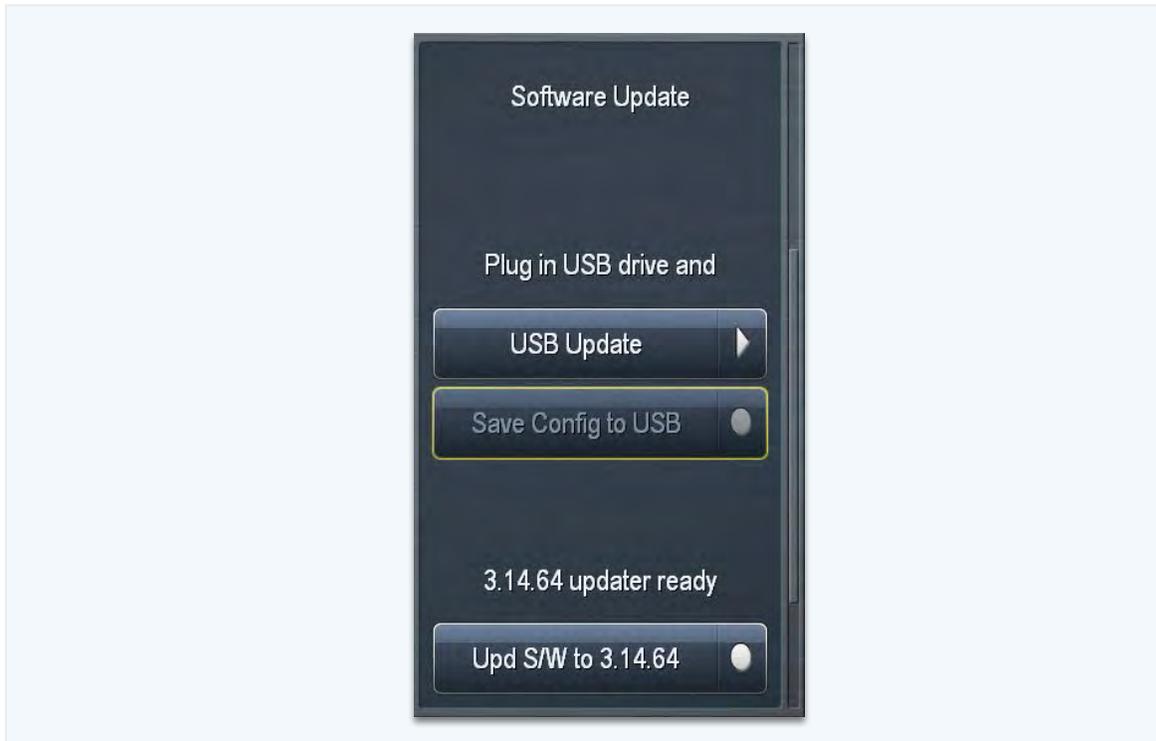
- Selecting **Update Software** button will prompt the Omnia.7 to search the USB drive for the appropriate software and begin the installation process. *Updating software WILL take Omnia.7 off the air, so be sure to switch to your backup processor before beginning the update.*

- If you are using the Omnia.7 NfRemote software, you will also find an option to **Upload Software** there, a handy feature that allows you to update software remotely without making a trip to the transmitter site if your Omnia.7 is not located at the studio.

- The **Save Configuration to USB** feature allows you to back up your current configuration – including input and output settings, levels, audio routing, display presets, calibrated speaker presets, and processing presets. Beyond its usefulness as a backup utility, this is also a great way to carry over and duplicate your custom settings on another Omnia.7.

Backup Menu

The **Backup Menu** appears as an additional System Config item *only when you are connected to Omnia.7 via the NfRemote software, not when viewing the front panel display,* and allows the entire configuration of the unit to be saved to your PC in a single .zip file. It also allows a previously saved configuration to be uploaded to the Omnia.7.

This configuration "profile" includes factory and user-created processing, Undo, I/O presets and other configuration   information.

Should you wish to "clone" your Omnia.7, you can do so simply by uploading the file to the second unit instead of configuring each parameter individually, rather like the concept of creating an "image" in computer terms. This is also handy if you (or someone else) accidentally changes something and isn't sure of the original settings, as uploading a known good configuration can immediately get things back to normal similar to using a "restore point" in PC terms.
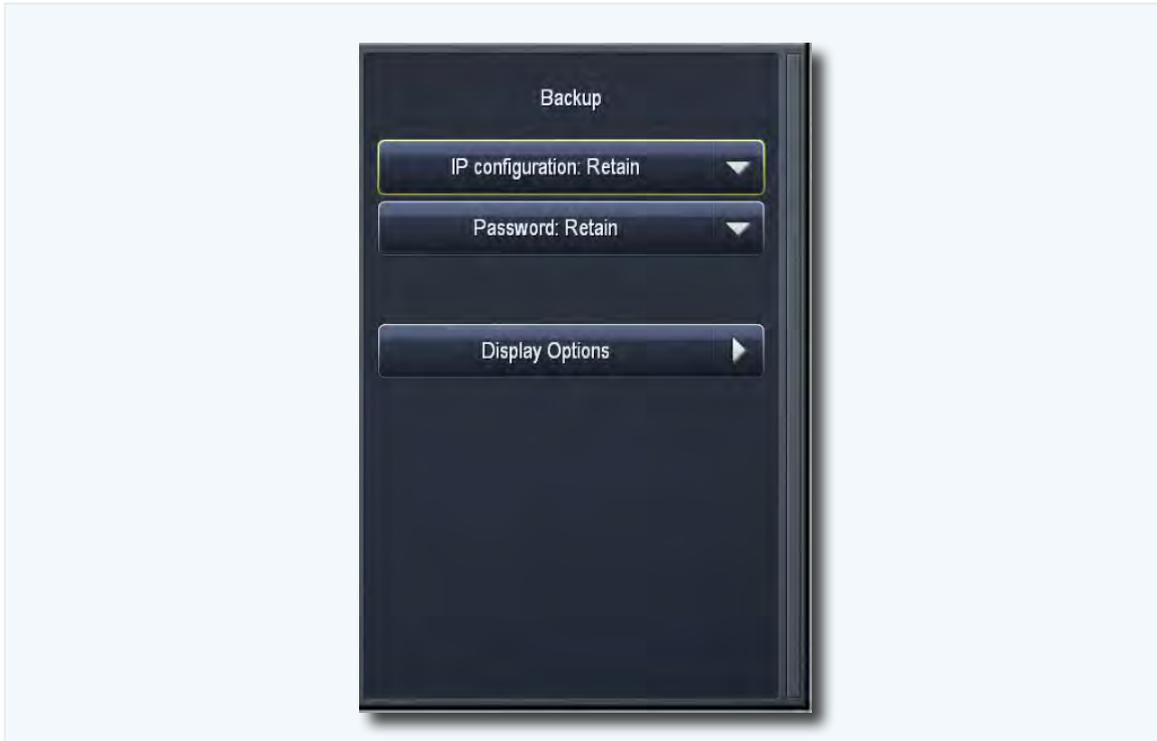
- The **Backup (Download) Configuration** button saves the current configuration to your computer. Selecting it opens up a Windows Explorer window allowing you to name and choose the location of the saved file.

- The **Restore (Upload) Configuration** button uploads a previously saved configuration to Omnia.7. Selecting it opens up a Windows Explorer window allowing you to navigate to the file on your computer and select it. A confirmation message will appear asking you to verify the upload.

   Note: This will temporarily take Omnia.7 off the air and disconnect the remote connection while the configuration file uploads and the unit reinitializes.

- The backup configuration file contains IP-related information and the password belonging to the unit that created the file. The **IP Configuration** and **Password** drop-down menus let you decide whether or not this information will be uploaded to the unit being restored.

   Selecting "Retain" for the IP Configuration (the default choice) ensures the IP settings in the unit will be retained and NOT overwritten by those in the backup file. Whatever settings are already in the unit receiving the upload will be preserved. Selecting "Override" will take the IP settings in the backup file and apply them as part of the restoration process.

   Likewise, choosing "Retain" in the Password menu will keep the existing password stored in the unit while "Override" will apply the password stored in the backup file.

   Generally speaking, if you are working with a single Omnia.7 and need to bring it back to a known good configuration, choose "Override." If you are copying a custom configuration to another Omnia.7 and want to avoid potential IP conflicts (like duplicate IP addresses) or uploading an unknown password, choose the default value of "Retain".

Upgrades Menu

If your Omnia.7 was not initially ordered with a particular optional feature, you can upgrade the unit at any time without having to purchase new hardware or send it back to the factory.
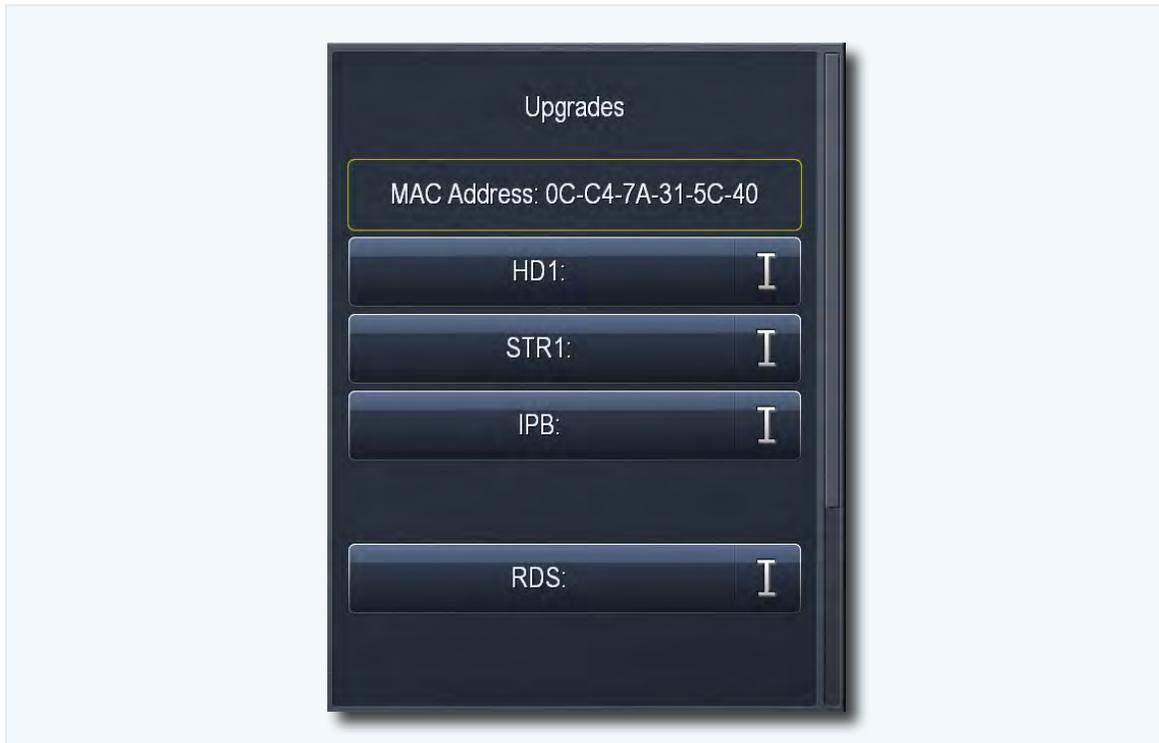
Please call Omnia support for more information.

Chapter 22
Getting the Sound You Want

"Anything you want, you got it." - Roy Orbison

Getting the Sound You Want

Quality v. Loudness

Omnia.7 is capable of providing sound quality superior to nearly any other processor available today, and is equally capable of being louder than the competition, too.

If loudness is your primary goal, you will find that you can match the level of your current processor while getting a much cleaner on-air sound. If high-quality audio is your goal, you will be able easily achieve that goal and get the extra benefit of increased dial presence.

Omnia.7 truly minimizes the impact of the classic "quality v. loudness" trade-off by employing processes like "Undo" and an advanced psycho-acoustic distortion-masking clipper, but bear in mind that NO processor can eliminate that compromise completely.

The trade-off between quality and loudness is still determined primarily by the settings of the Limiters and Clippers. Both processes can add to dial loudness, but each does so in a different way, with different-sounding results (and, if used to excess, different sounding artifacts).

The added short-term density provided by peak limiting can still make audio sound dull or overly-dense and create intermodulation distortion, and a little still goes a long way. The amount of limiting action is somewhat dictated by the program material itself. Audio that is already dense and has a high average level – even after being processed by Undo – will still cause less peak limiting than material that is more open with lower average levels and higher peak levels.

For example, almost any poorly mastered current CD that's already been squashed down and has only a few dB's of dynamic range already is not going to get the limiters moving – but a well-mastered Steely Dan song will!

Excessive clipping, on the other hand, creates harmonic distortion and can make things sound "edgy" or "torn." It is imperative to remember that even when all-out loudness is your goal, *there will come a point when driving the clippers harder will not create additional loudness but will create more distortion*, and there is no benefit to going beyond that point.

Achieving a High Quality Sound

When all-out loudness isn't your primary processing goal, and you are willing to give up just a bit of dial dominance in the name of quality, here are some suggestions to help you achieve that goal:

- Reduce the Clipper Drive (FM core) or Final Limiter Drive (HD core) in 0.25dB steps until you reach the point where the quality no longer dramatically improves, but you're losing too much loudness - then go back up a notch. It's surprising how much a small change can open up your sound without giving up much in the way of loudness.

- Reduce the level of the Band Mix section, especially if you have increased the output of one or two particular bands to achieve a particular sound.

- Raise the threshold of the Multiband Limiters to keep the audio from hitting the limiters as hard or as often. (You may need to lower the Band Mix level to keep from driving the final clipper too hard when making this adjustment).

- Lower the targets of the Multiband AGC compressors

- Use slower attack and release speeds in the Input AGC, Wideband AGC, and Multiband AGC sections.

- Use "looser" ratios in the Input AGC, Wideband AGC, and Multiband AGC sections.

Achieving Loudness

If loudness is an important processing goal, and you are willing to accept more processing artifacts and give up some quality, here are some suggestions:

- Use "tighter" ratios in the Input AGC, Wideband AGC, and Multiband AGC sections.

- Use faster attack and release speeds in the Input AGC, Wideband AGC, and Multiband AGC sections.

- Raise the target of the Multiband AGC compressors.

- Lower the threshold of the Multiband Limiters. (You may need to raise the Band Mix to compensate for the additional gain reduction this produces in the limiters).

- Increase the overall Band Mix level.

- Raise the Clipper Drive (FM core) or Final Limiter Drive (HD core) in 0.25dB steps until advancing the control no longer yields additional loudness, only more distortion, and then back off a notch.

Spectral Consistency & Equalization

Stations often want to create their own "signature sound" on the air with a spectrally consistent output without regard to the frequency balance of the original source material.

In the Basic mode, altering the spectral balance is done by way of the **Enhance** controls - **Deep Bass, Warmth, Presence,** and **Brilliance.**

If you are in the Intermediate or Expert modes, there are basically three ways to alter the spectral balance of your sound with Omnia.7, and each provides a different end result: The **Parametric Equalizer**, the **Multiband AGC Targets**, and the **Band Mix** control. Adjustments to each section can produce somewhat similar or very different outcomes depending upon a variety of factors.

- The **Parametric EQ** is a very versatile and powerful means by which to shape your sound. You can set up a shelving EQ to create low bass "slam," set up a broad, gentle cut to the high-mids to smooth out horns or female vocalists, or add some "air" or "sparkle" to your sound by adding a bit of a boost to the very top of the spectrum.

  Because the Parametric EQ is located fairly early in the processing chain and ahead of the Multiband AGC and Limiters, these processing sections are likely to make some attempt to compensate for large changes in the spectrum. However, because the crossover slopes of the multiband processors are relatively broad, the Parametric EQ can have more impact than you might expect.

  Finally, remember that EQ is a *static* process. That is, it increases or reduces gain to a particular part of the spectrum irrespective of program content. In other words, if you apply 8dB of bass boost it is applied to *all* incoming audio whether it is bass shy or bass heavy.

- Adjusting the **Multiband AGC Targets** can have a very significant effect on the spectral balance of your sound as well but there are important factors to consider when adjusting these controls. For example:

    - Raising the target of a particular band can make the audio within that band louder (providing increased gain) but this can also slow down the release rate if Progressive Release is employed, as Progressive Release is driven by the current amount of gain in that band.

        The opposite is true when lowering a target. Doing so can make a particular band softer (providing decreased gain) but can result in an accelerated release rate when Progressive Release is used.

    - Since raising the target increases gain, doing so means that audio in a particular band may not be increased sufficiently if the source material is lacking in that part of the spectrum. For example, if the source material lacks brightness and the target of the top bands is raised too much, there may not be enough "room" in those bands to sufficiently increase their output.

        The result may be spectral inconsistencies from source-to-source. If creating a consistent spectral signature is important, this may be problematic. If, on the other hand, your goals lean more toward preserving the spectral balance of the original material, this could be advantageous.

- Making adjustments to the **Band Mix** will also influence the spectral balance, but since this is the final point in the processing chain before the Final Clipper (FM core) or Final Limiter (HD and Streaming cores), any peaks that result from adjustments made here will be dealt with only by these more aggressive processing stages. While it is not always a bad idea to increase the output level of a particular band, depending upon the sound you are trying to create, you may have better results by decreasing the output of the rest of the bands by that amount instead. Or, you may instead wish to make the adjustments to suit your tastes and then reduce the overall Band Mix level.

The Multiband AGC Target and Band Mix controls can be used together to help fine tune your sound.

For example, let's say you are using a 5-band preset and you want to create a more dense-sounding mid-range. By lowering the targets of bands 3 and 4, you will drive those bands further toward a state of gain reduction (and increase their release rate when Progressive Release is utilized) but this can also cause them to become softer in the mix if Progressive Release is not used or the source material doesn't have significant content in those bands. You can compensate for this loss by increasing the gain of those bands in the Band Mix.

Or, let's say you want an open and dynamic low end, and have raised the targets of Bands 1 and 2 to achieve less compression but now find that the bass seems too prominent in the mix. You can decrease the gain of these bands in the Band Mix section to restore a more balanced sound.

Chapter 23
Factory Presets

Now we're getting to the fun stuff.

Factory Presets

Omnia.7 contains a good assortment of factory presets created by a handful of folks who are deeply passionate about audio processing and have extensive experience with the product. Some of these are exact duplicates of those found in Omnia.7's big brother, Omnia.9, while others are 5-band variations of presets that have 6 or 7 bands in Omnia.9.

Creating a preset takes countless hours of critical listening to a wide variety of music, including hand-picked "problem songs" that contain passages that are known to be difficult for a particular section of any processor to handle. Each preset has been created with a particular sonic goal in mind. Some are relatively simple in structure, while others exploit Omnia.7's unique processing functions and utilize a few "tricks" to achieve a particular sound.

We have deliberately avoided naming presets by format or genre (with the occasional exception) so you'll find no "Urban," "Open Country," "Rock," or "Smooth Jazz" badges here. With conventional naming, many presets that would work quite nicely on your station will be overlooked simply because no one would ever think of trying something called "Hot Country" if they were running a Light AC format that needed some extra punch.

Instead, we encourage you to audition each preset, preferably "on the bench" and not on the air at first, to get a feel for each. Listen for a spectral balance that appeals to you first, and then for texture, without much consideration for loudness. Most of the presets (minus the ones specifically created for maximum loudness) have plenty of "room to grow" in terms of loudness, so if you find something you like but it doesn't seem quite loud enough, don't summarily dismiss it; instead, try it out and use the suggestions in the "Getting the Sound You Want" chapter of this manual to up the loudness.

Finally, we are often asked how best to create a custom preset "from scratch". Since all custom presets are initially based upon a factory preset, we recommend building off of "Reference Settings" since it is the most neutral-sounding factory preset and one upon which many of the factory presets themselves were built.

Amsterdam 5B- by Leif Claesson and Jim Kuzman
Created in the very city for which it is named, "Amsterdam" offers extra brilliance in the upper high end for a crisp, clean sound while mids are rolled back a bit in comparison. A loose multiband ratio keeps things sounding open but this is still one of the louder factory presets, on par with "Radium" but with less emphasis in the "presence" portion of the spectrum. Lang leve de nederlandse soundprocessing!

Classical/Jazz – by Leif Claesson
Lifted directly from Omnia.9, "Classical/Jazz" is a 3-band preset designed to provide gentle wideband and multi-band dynamics control without interfering with the original spectral balance of the music. It is not designed for loudness, as it utilizes a modest amount of slow multi-band gain riding and minimal final clipping. It has a much wider gain range than corresponding presets in most other processors, yielding excellent consistency and listenability at lower volumes (such as an office setting) or in noisy environments (in cars). This preset works equally well with classical and jazz programming.

Cosmic 5B - by Mark Manolio
A high TSL preset, Cosmic 5B was inspired by the preset of the same name found in Omnia.11 and before that, Omnia.6. It is smooth and bright but with plenty of mids and offers a very wide AGC range As a result of utilizing fairly tight ratios in both the Input AGC and multiband sections, it offers good source-to-source and spectral consistency. Another preset to try that can handle pretty much anything you can throw at it!

Echoes 5B - by Jim Kuzman

A 5-band variation of the Echoes preset in Omnia.9, this preset was created with openness and dynamics in mind. Despite that mission it remains competitively loud on average. Very slow multiband attack and release rates, high multiband AGC target settings, and higher-than-normal Gate and Freeze thresholds prevent soft passages from increasing too much and allow short- to mid-term dynamics to pass through with plenty of punch. This makes it a good choice for stations who play World or New Age music or for any format where long-term listening is a priority.

Espacioso 5B - by Leif Claesson

Espacioso is a relatively open-sounding 5-band preset characterized by good low bass and and airy, open high-end. Vocals are relatively prominent in the mix and nicely warm-sounding. This is a fairly straightforward preset in that it does not employ additional wideband AGC's nor does it add any stereo enhancement. It is comparable in loudness to the default "Rustonium" preset but with a warmer, smoother sound.

Eruption 5B – by Leif Claesson and Johnny Lundholm

Deep, always-present bass compliments of fast attack and release rates in the lowest band and a touch of intentional wideband "breathing" make the dynamic and punchy preset a great choice for techno, electronic, or highly-produced urban music. This variation on Omnia.9's "Eruption 2.0" preset leans heavily on the final clipper to deliver plenty of loudness on-air.

GOLD LIGHT - by Leif Claesson

Despite its name, this preset is actually competitively loud. The multiband attack and release rates are relatively fast which provides excellent spectral balance regardless of the input material, making it a good choice for oldies and gold formats. The Wideband 2 AGC is used in its wideband mode following the multiband section to add extra wideband density and control. The overall spectral balance is very warm.

Imagine Hot Mid – by Rob Morsink

This bright and loud 3-band preset from Omnia.9 puts the emphasis on mids and highs and employs a fast release time in the WB AGC-1 compressor to keep levels consistent going into the multi-band AGC section which uses light ratios over threshold. A great preset for making vocals shimmer and for bringing out all the details in the upper frequencies.

LEIFF - by Leif Claesson

A healthy dose of bass equalization delivers lots of thunder while a boost in the presence region of the spectrum brings out the vocals in the mix. Bass-shy content will get a nice bass boost while content that already has plenty of oomph will be presented with lots of low-end authority. Overall, this is a loud preset but stops short of going over the top like some of the presets that are purpose-built to win loudness wars.

Massive Ego 5B – by Leif Claesson

From time to time, we are asked if we can actually emulate the sound of another manufacturer's processor, specifically the one with the 1980's algorithms. Since Omnia.9 and Omnia.7 are expressly created to deliver clean, distortion-free audio, this is tougher than one might expect, but we've given it our best shot here.

Passive Aggressor – by Jesse Graffam

A 5-band preset with a split personality, "Passive Aggressor" is relaxed and dynamic in feel, yet it provides a great degree of spectral control and overall loudness by utilizing Omnia.7's "Gain Reduction Override" settings. Looser ratios below threshold and very tight ratios above in the low and high bands coupled with very slow multi-band attack and release times make this preset a great easy-to-listen-to choice for stations that place an emphasis on TSL.

Plutonium 5B – by Leif Claesson

Plutonium 5B is the loudest factory preset and the most aggressive of the "atomic" presets. It was initially designed to satisfy the specific needs of a large European broadcast group who not only wanted large quantities of bass, but plenty of bass punch and minimal distortion as well. When processing for all-out loudness, there's little (or no) room left for bass. Heavy bass clipping makes some room, but at the expense of punch. "Plutonium 5B" solves this dilemma by employing the WB AGC2 compressor in the "Bass Only" mode and incorporating the Sidechain Delay feature. If your needs call for lots of bass and dial domination, "Plutonium 5B" delivers. The FM version over-emphasizes the high-end for a bright on-air sound despite the pre-emphasis limitations so be sure to use the HD version for all other paths to avoid an overly bright sound.

Quintessence - by Sam Sergi

This 5-band preset features full, consistent bass and a sparkling high end. Mids are pushed further back in the mix and loudness is made a priority over openness and punch. Fast multi-band AGC settings ensure spectral consistency regardless of the balance of the source material, making it a good choice for formats where the music spans multiple decades.

Radium 5B – by Leif Claesson

Derived from "Uranium-238" but with less clipper drive and looser multiband ratios, this modified Omnia.9 preset is a member of the "atomic" family that strive for loudness. The result is a slight loss of loudness over "Uranium-238", but considerably more open and dynamic. That said, this is still not a quiet preset. If you find yourself in a "loud" market and feel like you need to keep up, "Radium 5B" is a great place to start and will likely be as loud on the dial as the competition but with a significantly more dynamic sound.

Reference Settings - by Leif Claesson

"Reference Settings" is the most neutral-sounding factory preset, but that does not diminish its suitability for a wide variety of formats. It has been used with only slight modifications on active rock stations in very "loud" markets with great success. If you have your eyes set on creating your very own custom preset for your station, this is the preset with which we recommend you begin your masterpiece as it is straightforward and doesn't include any little tuning "tricks" to create a particular effect.

Rustonium 5B – by Leif Claesson and Jesse Graffam

A hybrid of two past presets – Jesse's "Rusticity" and Leif's "Plutonium" – "Rustonium 5B" is Omnia.7's default preset. The bass is always present but punchy, while the high end is bright and prominent but never shrill or edgy. The multi-band attack and release times are relatively slow, but this 5-band preset makes extensive use of Omnia.7's progressive release feature to allow plenty of gain control in each band without the fear of any band getting "stuck" with too little gain. This preset also places the Wideband AGC2 after the multi-band section to build some extra loudness just before the final clipper. A great "as-is" out-of-the-box preset for nearly every contemporary format.

Stacked Boxes – by Jim Kuzman

Remember back when the dial-dominating air chain was made up of a rack full of analog gear? Say, one box for compression and leveling, another pair of boxes with lots of LED's providing 4-band compression, and a program/peak limiter (maybe from the same folks as the compressor/leveler) – all driving a final limiter/clipper with edge meters and a key-locked front panel? We do too. "Stacked Boxes" pays homage to the not-so-distant past of analog processing.

Trinity – by Leif Claesson

Inspired by the sound of the classic Omnia.3 FM Turbo, this 3-band preset is dynamic and punchy with an open mid-range and a more classic "Omnia" sound. "Trinity" doesn't use any parametric EQ or stereo enhancement, runs with a very light ratio in the multi-band section, and presents itself very transparently on the air, making it suitable for nearly any format.

Upsidasium 5B – by Leif Claesson

The smoothest and most open of the "atomic" presets, "Upsidasium 5B" is still relatively loud but thanks to very loose multiband ratios, is also extremely open-sounding. Drums and other transient sounds cut through the mix, vocals are dynamic, and the upper high end delivers that "lighter than air" sound (here's looking at you, Denny!). If your situation permits giving up the last dB of loudness in favor of a sound that's easy to listen to long-term (but you still don't want to sound underpowered on the dial), "Upsidasium 5B" offers the perfect compromise.

Uranium-238 5B – by Leif Claesson

The second loudest of the "atomic" presets, "Uranium-238 5B" is slightly less radioactive version of "Plutonium FM". It has a similar sound to its parent preset, but does away with one stage of wideband compression and employs less final clipping. A good choice if market-dominating loudness is still your goal but "Plutonium 5B" feels too over-the-top.

Chapter 24
NfRemote Client Software

Connecting to the other side, no seance necessary.

Omnia.7 Remote Interface Software

Omnia.7 can be controlled remotely via the included remote interface software, NfRemote. This is a separate "client" software application that can be downloaded and installed on nearly any desktop, laptop, or tablet PC of reasonably modern vintage running on Windows 2000, XP, Vista, 7 or 8. The most recent version even offers support for high DPI displays. This same remote client can also be used to connect to other Omnia products, including Omnia.9, as well as many Linear Acoustic products.

While the client software interface does look different than the menu system on the front panel of the Omnia.7 itself, its general layout and functionality are very similar. If you can do it on the front panel, you can do it via remote - a feature you'll appreciate if your Omnia.7 is located in a noisy rack room, at the transmitter site, or even thousands of miles away at a distant station you oversee. Remote access also offers the benefit of more screen real estate, making adjustments easier to make and displays easier to read.

Perhaps one of the most valuable capabilities of the client software is speaker calibration. Since your Omnia.7 already contains a built-in pink noise generator and an RTA, adding your own calibrated microphone to the setup will allow you to perform a calibration of any speaker system – including your studio, control room, rack room, production facility, or any remote monitor point.

You may wonder why we consider this to be such an important exercise when listeners aren't going to be hearing your station on calibrated monitors. Great question! Yes, listening to your station's processing on speakers of different qualities in a wide variety of listening environments is important to get a "real world" feel of how things sound – but we feel strongly that having at least one set of calibrated "reference" monitors is absolutely critical to making educated decisions as you adjust your processing.

If you make adjustments based upon what you hear on un-calibrated speakers (from within the Program Director's car, for example...) every decision you make will be influenced by the inaccuracies of those speakers in that room. Details of how to perform such a calibration are found later in this chapter.

Downloading, Installing, and Configuring the Client Software
Before the client software can be downloaded, your Omnia.7 must be connected to your network and must have an IP addressed assigned to it, a process outlined earlier in this manual. It must also have a password enabled and be HTTP "whitelisted" at least until you connect with the remote.

Connect to your Omnia.7 by entering http://<IP Address>:7380 into the address window of any standard web browser (for example, http://192.168.0.183.7380) You will see a screen entitled "Welcome to Omnia.7 HTTP Server" with a current version number.

Under the "Downloadables" section, click on the link following "Download Remote Interface." This should be done each time you update the software in your Omnia.7 to ensure full compatibility between the unit's software and the remote software.

Some Important Ethernet/Wi-Fi Network Considerations
While the client software itself is not a terribly resource-intensive application, it does place some demands upon your local network. The client allows you to make "live" adjustments to the Omnia.7, observe its meters (as well as other displays such as the oscilloscope) in real time, and on networks with sufficient bandwidth

play audio from the Omnia.7 to your remote control PC. The more information the client asks for, the more critical it is to have a robust Ethernet or Wi-Fi connection to the between it and Omnia.7.

Understanding the NfRemote Connection Window
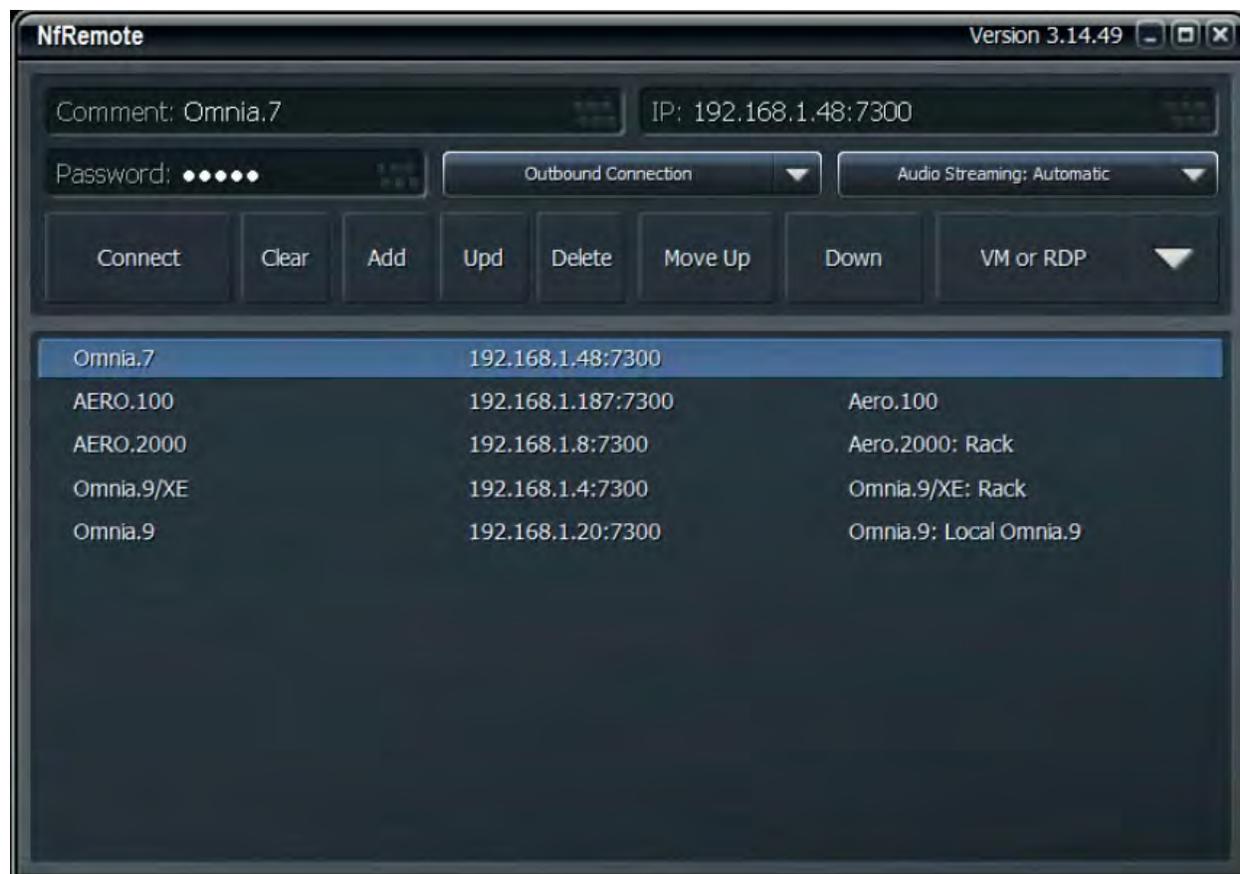
It is possible to connect to any number of Omnia.7's individually or concurrently using NfRemote.

- The **Comment** field allows you to enter a "friendly" name for each device to which you plan to connect.

- The **IP Address** field should contain the IP address of the Omnia.7 host computer.

- The **Password** field should contain the same password established in the Omnia.67.

- The **Connection Type** dropdown menu determines whether the connection is **Outbound** (NfRemote initiates connection to Omnia.7) or **Inbound** (Omnia.7 listens for an incoming connection request from an instance of NfRemote). Note that the IP addresses of inbound connections are enclosed by chevrons.

- It is possible to stream audio from the Omnia.7 to a remote PC using NfRemote. The **Audio Streaming** dropdown menu enables this feature and determines the type of data compression used to deliver the audio as well as the oscilloscope, RTA, and FFT display information.

  - **Automatic** chooses the best audio format based upon connection speed.

- **Off** completely disables audio streaming and the client-side oscilloscope, RTA, and FFT displays.

- **Force Lossy** enables lossy streaming even on connections that are on the border of being too slow and forces lossy streaming even on fast connections.

- **Force Lossless** enables lossless streaming even on connections that are too slow. This choice is best reserved for local networks with sufficient bandwidth to support it.

- Clicking on the **Connect** button will initiate a connection to Omnia.7 whose IP address is currently displayed.

- The **Clear** button removes all information from the Comment, IP Address, and Password fields.

- The **Add** button collects the current Comment, IP Address, and Password information and carries it to the bottom of the window where it is saved for easy recall later.

- The **Update** button refreshes the list of saved connections.

- Clicking on the **Delete** button will remove the selected connection from the list.

- The **Move Up** and **Move Down** buttons will move the selected connection up or down respectively in the list so that you can sort them in any order.

- The **User Interface Pointing Device** dropdown menu offers several choices for optimizing NfRemote depending upon the type of device you are using.

  - **Local Mouse or Touchpad** should be selected if you are running NfRemote on a local PC or laptop.

  - **Virtual Machine or Remote Desktop** is the correct choice if you are connecting to the computer running NfRemote from another computer. This includes software like Parallels, VMware, Team Viewer, GoToMyPC, Remote Desktop Connection, or a VNC client. Wacom Digitizer users should also select this option.

  - **Local Mouse (Touch Simulation)** allows you to use the finger-friendly layout of the Touch Screen option but with a mouse. It can also be used instead of the Virtual Machine or Remote Desktop option.

  - **Touch Screen** provides a finger-friendly layout optimized for touch screen devices like tablets or all-in-one PC's with a touch interface.

  - **Touch Screen Presentation** operates just like Touch Screen but with a large cursor, making it ideal for situations when you are using a projector for demonstration or instructing a group on how to use NfRemote.

Initiating an Outbound Connection from Omnia.7

Normally, an instance of NfRemote running on a remote computer initiates the connection to an Omnia.7 ("inbound" connection). However, there are some situations where it is more appropriate for Omnia.7 to initiate the connection to an instance of NfRemote on a remote computer ("outbound" connection).
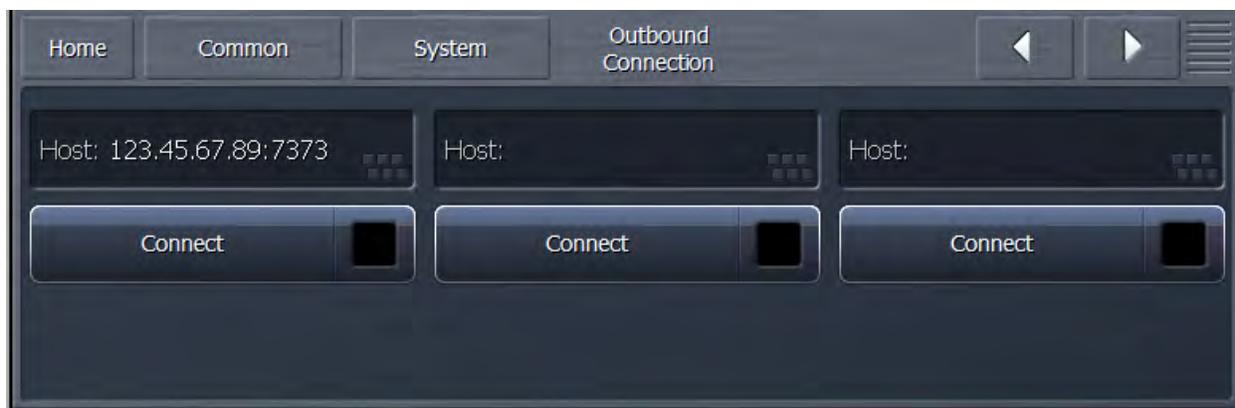
One example of how this can be used is for technical support. By creating an outbound connection, you are connecting to the support engineer's NfRemote computer which in turn allows them to control your Omnia.7.

In such a situation, the support engineer would provide an IP address (or host name) and a port number separated by a colon (123.45.67.89:7373 for example). Because IP addresses are commonly dynamically allocated, using a host name is the preferred convention.

The NfRemote Home Screen

Depending upon the size of the display on the PC hosting the NfRemote software (and upon how the window itself is sized), the Menu Bar at the top of the Home Screen shows two or more drop-down menus capable of showing different controls. The current processing core being viewed as can the location of the particular Omnia.7 (user-customized) along with the CPU load of Omnia.7 itself or that of the remote PC. Controls for Speaker Volume, Headphone Volume, and Client Audio Volume are also available here. The Menu button and 6 display preset buttons round out the display.

- The **Speaker Volume** control adjusts the output level of whatever audio you have routed to the Speaker Output. Likewise, the **Headphone Volume** control adjusts the output level of the audio you have routed to the Headphone Output. Each control displays the patch point currently being monitored. Orange bars within the controls indicate that the limiters in the corresponding monitor output are active. Details of the Speaker Output and Headphone Output are described in the **Monitor Outputs** section of this manual. The **Client Audio Volume** adjusts the output level of audio streaming back to the host PC from Omnia.7.

- The **Menu** button on the front panel has four options: **Displays Only, Tree Navigation, Tabbed Navigation, Lock Position, Maximize, Full Screen** and **Close Window.**

- Selecting **Displays Only** allows whichever displays you have selected to occupy the entire front panel while hiding the controls, useful when you want a more detailed view of the processing meters or an oscilloscope or FFT display. Clicking or tapping anywhere on the screen returns you to the normal view, which shows both displays and controls.

- **Tree Navigation** shows fewer controls at once and offers a cleaner and perhaps less intimidating view of the menus, sub-menus and controls. However, it does require more steps to navigate
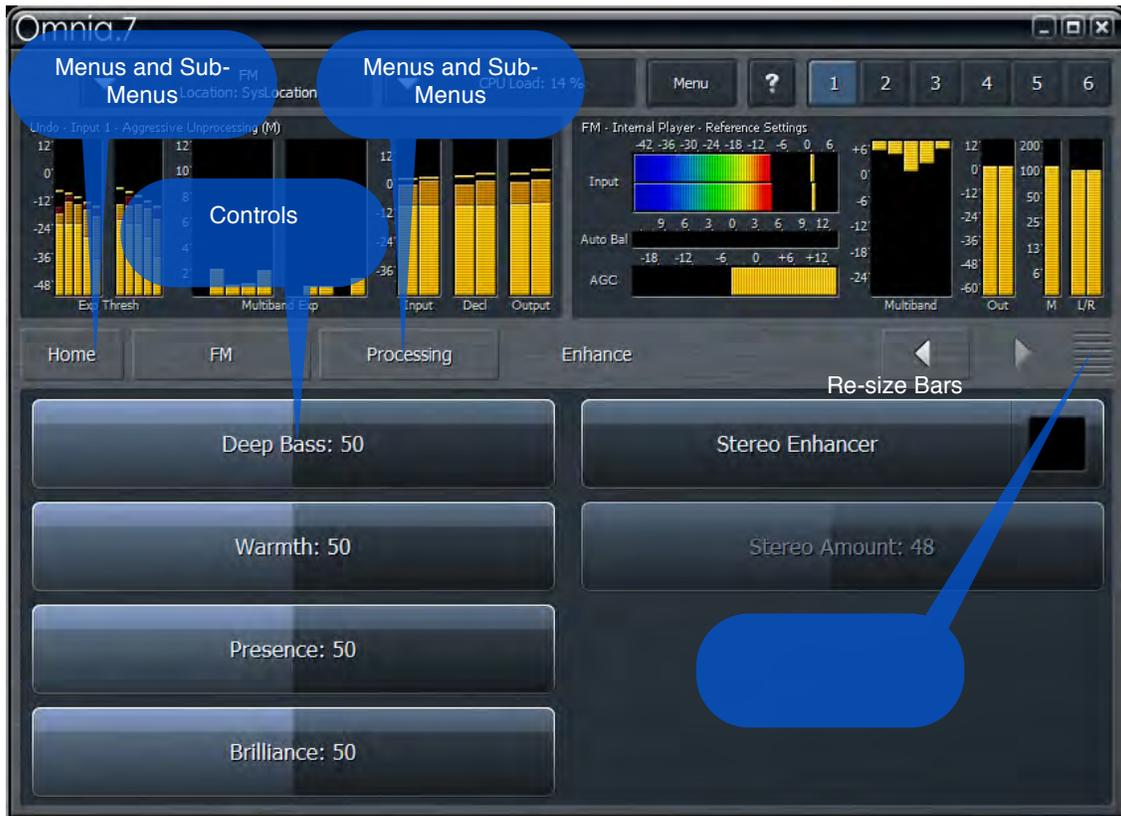
through   the   system.

The screen in this view is divided into two sections; the top portion is dedicated to displays while the bottom is reserved for controls. In between these two areas is a navigation bar that shows you exactly where you "are" within Omnia.7 along with navigation arrow buttons that let you go forward   or   backward   to   most   places   you   have   visited   in   the   fourth   tier.

Double-tapping or double-clicking on a control brings up a magnified view and multiple sliders for various   "Course"   and   "Fine"   adjustments.

You can make individual portions of the window larger or smaller to devote more or less on-screen real estate to display windows or control windows by dragging up and down on the re-size bars.

- **Tabbed Navigation** shows all menus and sub-menus at once, and all available controls for selected menus. This view can be more intimidating (or even more difficult to use on devices with smaller screens) but it does allow more direct access to the various sub-menus and controls.
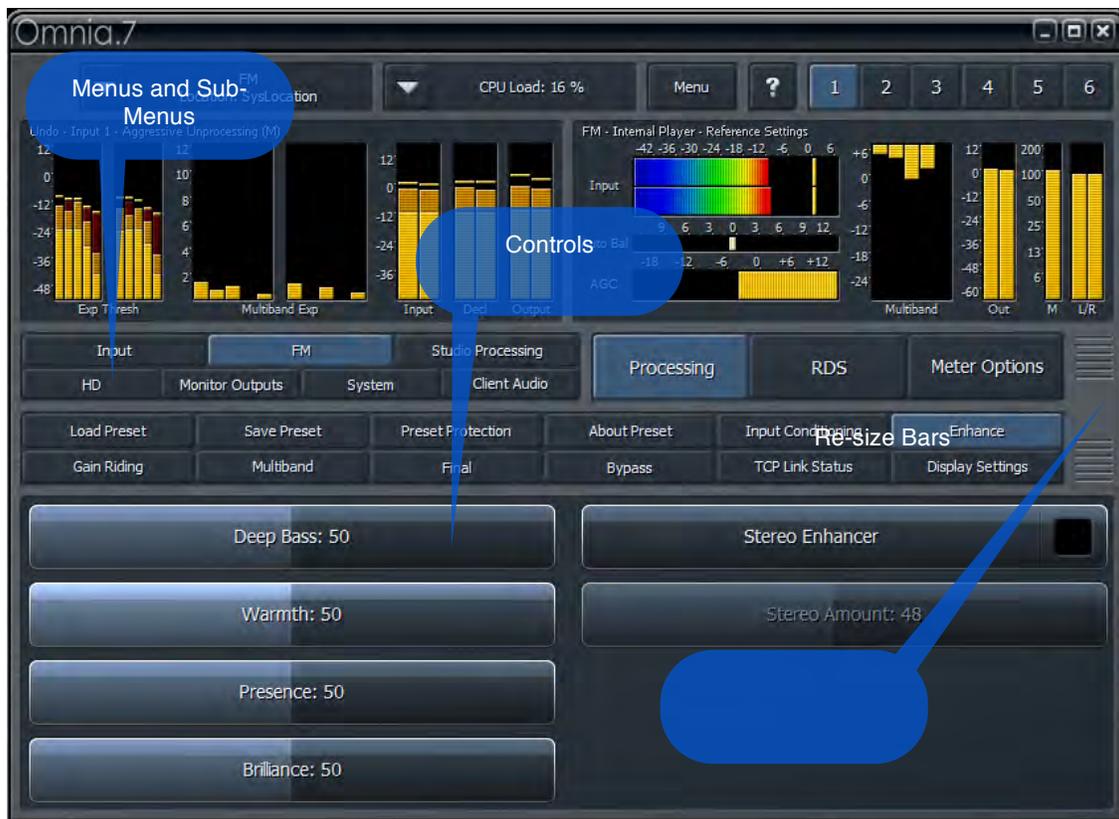
The screen in this view is divided into three sections; the top shows the displays, the middle shows the menus and sub-menus, and the bottom contains the controls.

- The **Lock Position** option allows you to lock the front panel if you have enabled password protection. When you lock the screen, all of the display windows will remain visible in the top portion of the display and the bottom portion will change to accept your password via the on-screen keyboard. Depending upon how you have re-sized the various portions of the screen, the displays may appear smaller when the unit is locked to ensure sufficient space is reserved for the on-screen keyboard.

- **Maximize** duplicates the function of the standard Windows "maximize" icon and resizes the interface to utilize the entire desktop area. The "minimize," "resize", and "close" icons are still visible as is the Windows quick launch bar and system tray.

- **Full Screen** works similarly to **Maximize** but uses the entire display; re-sizing icons and other Windows graphics are not displayed. To exit Full Screen, go to the **Menu** control and select **Restore.**

- **Close Window** - not surprisingly - closes the NfRemote session.

- The **Display Preset** buttons, numbered 1 – 6, let you create and save six separate Home screens. For example, you may wish to devote one display preset to nothing but the Undo and Processing Meters to display these parameters in greater detail. Or, you could devote an entire display preset to the oscilloscope and monitor the program input, the output of Undo, the MPX before the clipper, and the final MPX output to see what the various stages within Omnia.7 are doing to the audio signal.

Client-Only Controls

There are certain controls that are not available on the front panel menu interface, but rather only when connected remotely via NfRemote. There are located in the Client Audio menu, which contains additional menus for **Client Audio Output, Client Microphone Input,** and **Client File Recorder.**

Additionally, the **Save Preset** and **Load Preset** menus for each of the processing cores in the client software have the additional capabilities of being able to save a preset to the location of your choice on the remote PC itself, or load a preset from the remote PC to your Omnia.7. This includes flash drives and external USB drives, which provides an excellent way to back up any custom presets, or easily duplicate those presets on another Omnia.7.

When using the **Load Preset** function, be aware that the preset will be loaded to the **Current Preset** position and will therefore *immediately go on the air*. Additionally, in order for the preset to appear in the list, you must save it using the **Save Preset** function.

Client Audio Output Menu

The Client Audio Output Menu contains additional controls similar to those in the Monitor Output menus of the Omnia.7 (with a few differences) and a TCP Link Status window to provide information about the remote connection.

Patch Point Menu

The Patch Point Menu provides additional controls for enabling Client Audio and SRC, choosing an Output Device, adjusting Client Volume, and setting the Audio Buffer. An additional patch point for monitoring the Client Mic Input is also available.

- When selected, the **Audio Enable** feature allows processed audio to from various patch points within the Omnia.7 to be streamed directly to the client PC. Keep in mind that audio streams require bandwidth, as does displaying patch points on the oscilloscope, FFT spectrum analyzer, or RTA. During handshaking, the remote control software measures the available network bandwidth. If you are on a local network, you will get PCM (NICAM) streaming. If you connect over the internet with sufficient bandwidth, you will get data-reduced streaming. If bandwidth is marginal, certain patch points such as MPX Input/Output (which requires at least 800kbps) or L/R Pre-emph Input/Output (which requires at least 400kbps). will be grayed out. You can still monitor the patch points under "MPX Decoded", which do the decoding and de-emphasis in the Omnia.7 itself and transport flat audio, which require only 200kbps.

- Enabling the **SRC** control lets the client software dynamically adjust the sample rate of the client playback. If you are experiencing interruptions or dropouts to the client audio stream, enabling SRC will result in a steadier connection, though at a slight cost to CPU usage. Regardless, the client software will automatically determine whether to stream client audio in a linear (uncompressed) PCM format or in a data-reduced format, which, while compressed, can still provide excellent audio quality.

- The client software recognizes any audio output devices (speakers, headphones, sound cards) installed on the remote control PC, and makes them available in the **Output Device** drop-down menu.

- The **Client Volume** slider controls the volume of the selected output devices on the remote PC. This control is duplicated on the top menu of the client software where it is available at all times.

- Depending upon the bandwidth available on your local network, it may be necessary to buffer incoming audio to the client to avoid dropouts by adjusting the **Audio Buffer** control. The range of this control is between 0 and 10,000 milliseconds (10 seconds). The meters on the remote PC will automatically adjust so that they are always synchronized with the client audio as long as client audio

is enabled. In addition, you can use the meter delay control in the display section to delay meters further to compensate for any delay occurring after the client PC (such as when using Bluetooth speakers).

- The **TCP Link Status** window provides information about the connection status between Omnia.7 and the remote PC, including Current Ping time in milliseconds, Link Bandwidth in KB/sec, the Audio Format (PCM or Vorbis) of the stream, and Send and Receive rates.

Client Microphone Input Menu

The Client Microphone Input Menu allows you to pick which microphone you'd like to use, a parametric equalizer to create custom EQ curves for individual mics, and the ability to save and recall custom mic presets. There is also a duplicate button to the TCP Link Status window and the Display Settings menu for convenience.

Input Device Menu

The Input Device Menu provides a list of available microphones, including built-in mics and any outboard microphones you may have plugged into the PC running the remote interface software. If you plug in an outboard mic while this window is open, you may need to tap the "Refresh List" button in order for the software to recognize the addition.

Load Preset Menu

This menu operates in a manner similar to the **Load Preset** menu in the various processing cores of the Omnia.7. However, the client software offers an additional **Load From** button that allows you to call up a preset file from the remote PC, including from a flash drive or external USB drive.

Save Preset Menu

Just like the **Load Preset** menu, this operates like its counterparts in other sections of Omnia.7. The **Save To** button allows you to save your presets to a location on the remote PC, including a flash drive or external USB drive.

Client File Recorder

Just as it is possible to record audio from various patch points within the processing chain on the actual Omnia.7 itself, you can also record audio streamed to the client PC. The recorders in the client software work in exactly the same way.

Speaker Calibration

As mentioned earlier, taking the time to calibrate at least one set of speakers to act as your reference monitors is time well spent. In order to perform a speaker calibration, you need four tools:

- A calibrated microphone to capture the audio.

- A pink noise generator to provide audio for measurement (pink noise having an equal amount of "noise power" in each octave).

- A real-time audio analyzer (RTA) to visually display what the microphone is hearing.

- Some means by which to correct for speaker and/or room inaccuracies (such as a parametric equalizer).

Omnia.7 provides three out of the four tools – the pink noise generator, the RTA, and the EQ. All you need to add is the calibrated mic.

Choosing a Calibrated Mic

It is important to understand that you *must* use a *calibrated* microphone designed for sound measurement purposes to perform a proper calibration. Studio or recording mics – even the high-end, high-dollar ones – are of no value when calibrating a system.

You can spend thousands of dollars on a scientific-grade, high-precision calibrated microphone, but the good news is that you don't have to. Even the least expensive models will provide good quality results and are worthy of consideration.

While we are not in the business of selling microphones, nor do we have any interest in promoting any brand or model over another, we can tell you that Behringer ECM8000 and DBX RTA-M work quite well and can be purchased at local music stores and from various on-line vendors for around $100. If you prefer to connect your mic via USB or Firewire, several manufacturers (M-Audio, E-Mu, and Blue come to mind) offer XLR to USB and XLR to Firewire converters starting at under $50).

Setting Up the Mic

Place the microphone as close as possible to the position you will occupy when monitoring so that it hears what you will hear. In cases where you are calibrating two of the same speakers, and both are placed in similar locations in the room, you can calibrate both the left and right channels simultaneously. If you find yourself in a situation where the speakers will be affected differently by their individual placement in the room – one is suspending from the ceiling in a corner and the other is sitting on a shelf, for example – or one is significantly closer to your monitoring position than the other – we recommend performing an individual calibration for each speaker.

Setting Up the Client Software for Calibration

For the example below, let's assume that you are calibrating your studio monitors, which are being fed audio from the Speaker Output portion of Omnia.7's Monitor Outputs. We will also assume that you are in a situation where you can use the same calibration settings for both speakers. By default, the parametric EQ section is set up in the "common" mode, which means changes made to the left channel will be mirrored in the right channel.

Connect the Client PC and the Calibrated Mic

The first step to calibration is making sure you have a remote connection to your Omnia.7 per the instructions at the beginning of this manual.

Once connected, plug your calibrated mic into the remote PC, install any necessary software or drivers, and establish that it is working properly in Windows.

Set Up RTA and Oscilloscope Display Windows

After microphone installation and setup are complete, you will need to make sure you have the RTA and the oscilloscope set up in a Display Window.

If an RTA is not already visible, select any of the current display windows (Processing Meters, Undo Meters, etc.) to bring up a Display Settings menu. Set up one of the windows to monitor the Client Mic input (for example, Display 3, RTA, I/O, Client Mic Input).

1/3 octave resolution will provide more of a "big picture" overview, while the 1/6 octave will identify more specific peaks and valleys. We suggest an Average setting of 40 and a Target Range of 2.0dB. You will need to adjust the Target and Range controls for your individual situation once you have pink noise running through the speakers at a reasonable volume.

We also recommend setting up an Oscilloscope menu in the same manner so that you can watch for any clipping that may occur should you need to make any significant boost to a particular part of the audio spectrum during calibration. If you see (or hear) any clipping during the process, turn down the **Master Gain** control in the Main 1 menu.

Feeding Pink Noise To the Speakers

From the Home menu, select **Client Audio**, **Client Microphone Input**, then **Input Device** from the **Home** menu of the Omnia.7 client software on the remote PC. Your calibrated mic should be available in the device menu. You may need to refresh the list to make it visible.

Return to the **Home** menu, select **Monitor Outputs**, then **Speaker Output**, then **Main 1**. Turn down the Speaker Volume to a fairly low level, then enable Pink Noise for the left channel. Turn up the Speaker Volume enough to bring the level of pink noise well above the noise floor of the room, and to a level that approximates the volume at which you would normally listen to program material when adjusting your processing. As you adjust the overall volume, you should see the RTA display respond. Orange bars in the Speaker Volume control will indicate when the Speaker Output limiter is active and the Master Gain level should be reduced accordingly.

Final Adjustments to the RTA

Once you have established an overall pink noise level, adjust the **Range** control so that you can see the entire spectrum easily on the display, normally in the vicinity of 70 – 80dB.

Adjust the **Target** control so that the band with the lowest level (not counting very low or very high frequencies that are clearly beyond the ability of the speaker to reproduce) is situated at the top of the bright red target window. This will allow you to reduce, rather than boost, most of the frequencies with the parametric EQ.

When reading the RTA, it is important to know what peaks and dips are actual representations of "problem areas" with the speaker/room combination and which are microphone placement anomalies. If you move the microphone just slightly and the problem area magically corrects itself, you're seeing such a placement-skewed reading. A little experimentation will quickly reveal this. Once you have finalized the mic placement, it's time to begin correcting things with the PEQ.

Using the Parametric EQ to Smooth Things Out

Methods of equalizing speakers in their rooms vary, but generally speaking, using the fewest number of bands of EQ to achieve the desired result is preferred. Cutting (reducing) frequencies is usually preferred to boosting (increasing) them, although sometimes boosting a certain range is not easily avoided. Remember that there are a total of 12 available bands of EQ available to you – 6 in the **EQ1** menu and 6 more in the **EQ2** menu.

We assume that if you've gotten this far, you have a general idea of how the controls of a parametric equalizer work, but as a quick review:

- The **Gain** control determines how much the specified frequency range is amplified or attenuated, expressed in decibels.

- The **Bandwidth** control determines how wide or narrow a range of frequencies will be affected, measured in octaves.

- The **Center Frequency** control determines what frequency will lie in the middle of the adjustment curve, expressed in Hz.

You will be able to identify where your speakers start to roll off in terms of frequency response (especially on the low end) pretty quickly. You can't overcome pure physics with an equalizer, and small speakers will never reproduce bass with the same authority as larger ones, so there's no point in trying to give a 15dB boost at 30Hz to small monitors in the hopes that you'll get the equivalent of a free subwoofer. (What's frequently more effective with bass-shy speakers is taming the often over-boosted mid-bass that manufacturers dial in in the hopes that you think you have more low end than you do).

As you study the RTA, we recommend identifying and correcting any glaring peaks or valleys over a relatively narrow ranges of frequencies first to take care of any "hot spots." Then, work your way out to making broader changes to the overall curve.

Chasing Your Tail

Speaker calibration can be a frustrating process, especially if this is your first go-around with it. Sometimes it's like squeezing a balloon: When you squish one end, the other end puffs out. So it goes with calibration. Make a boost to one frequency, and the surrounding frequencies go up, too.

Experimenting with the center frequency and bandwidth controls will help, as will a good dose of patience and allotting enough time to do it up right. Your efforts will be rewarded when you play music through your calibrated setup for the first time and wonder if someone swapped out your tired old monitors with something new and much more expensive!

Saving Your Calibration Settings

You can save your calibration settings in the form of a preset by going to the **Save Preset** menu and typing in a friendly name for your file, preferably one that uniquely identifies the speakers and location ("JBL 4312 FM Air").

Tweaking After Calibration

You may notice that while your speakers sound significantly better than they did before you calibrated them, and they are technically much more accurate, they sound a little thin in the low end and a little dull in the highs because of the way the human ear perceives sound at the far ends of our hearing range.

We suggest that instead of making changes to the EQ sections, you use Omnia.7's **Loudness** menus to make subjective adjustments. These menus each give you three additional bands of fully parametric equalization.

If desired, they also allow you to adjust at what point on the Speaker Volume control the changes take affect (since our ears are less sensitive to certain frequencies at lower volume levels).

- The **Minimum** slider on each EQ band sets the point on the volume control where the EQ has no effect on the sound.

- The **Maximum** slider sets the point on the volume control where the EQ in that band is in full effect (boosted or cut to whatever gain level you have set).

For example, if the **Minimum** slider is set to -20dB, the **Maximum** is set to -10dB, and the **Gain** is set to minus 5.0dB, equalization will begin to take effect when the volume control is set to -20dB and will be attenuated by 5dB by the time the control is set to -10dB.

If the minimum and maximum values are the same, the loudness controls function as a normal parametric equalizer independent of the volume setting.

Chapter 25
Frequently Asked Questions (FAQ)

Answering your questions before you even ask them.
It's like we're psychic!

Frequently Asked Questions (FAQ)

How do I set input levels?

Input levels are set in the **System > I/O Options > Source Adjustment** menu.

How do I set output levels?

If you are using Omnia.7's digital output, levels are set in in the **System > I/O Options > Main Outputs** menu.

If you are using the composite outputs, levels are set in the **System > I/O Options > FM Options** menu.

Where is the diversity delay?

Omnia.7 provides a "diversity delay" so that FM audio can be delayed and time-aligned to corresponding HD-1 audio, ensuring listeners with HD radios will experience a smooth transition when their receivers switch back and forth between the analog and digital signals.

This control has been relocated in this version of the software and is now found in the **System > I/O Options > Diversity Delay** menu. Double-clicking on the slider will bring up three independent sliders for Coarse, Medium and Fine adjustment.

How to I get (insert particular sound here)?

Chapter 22 of this manual provides tips and tricks for the most commonly asked questions about things like increasing loudness, getting more bass, sounding more open, etc.

What are these brown patches in my lawn?

Depending on the variety of grass you have, pests like chinch bugs, mole crickets, grubs and moles could be to blame. There are also a handful of turf diseases that could cause this. Or maybe it's just really dry out there.

I'm having difficulty getting my Omnia.7 on my local network. I can't "ping" it either.

As a security measure, Omnia.7 is not "ping-able" on the network so the inability to get traditional ping response is not necessarily a sign of a problem.

There are two basic conditions that must be met before a remote connection to Omnia.7 is possible:

- Omnia.7 must have a password set up via the front panel.

- Omnia.7 must be connected to your local network and have a working IP address initially assigned to it via DHCP (a static address can be established later).

  - ***Note:*** *It is not necessary to "white list" a computer in order to access Omnia.7 remotely. Any computer running the NfRemote software can access Omnia.7 providing the user knows the unit's password. White listing IS required to access the built-in HTTP server, however.*

To set up a password, navigate to the **System > System Config > Password** menu from the front panel. Enter your password in the "Enter Password" and "Repeat Password" fields and click on the "Set Password" button.

To set up an IP address, navigate to the **System > System Config > IP Configuration** menu from the front panel. Click on "Use DHCP" to enable Omnia.7 to receive an IP address from your DHCP server. If, after a period of 30-60 seconds, the internal loopback address is still displayed, Omnia.7 isn't communicating with the DHCP servers and there are network issues outside of the unit to explore.

While it is beyond the scope of this manual to provide specific IP troubleshooting advise, we can suggest the following basic steps:

- Try using a different Ethernet cable to rule out that a bad cable is at fault.

- Plug Omnia.7 into a different port on your router or switch to rule out a bad port.

- Plug Omnia.7 into a different router or switch altogether to eliminate a bad piece of hardware.

- Plug another device (such as a laptop computer) into the same port and see if it will communicate with the DHCP server.

- Using a computer that is already known to work on the network, use an Ethernet cable to connect Omnia.7 directly to that computer. In most cases, the computer will act as an ad-hoc DHCP server and attempt to assign Omnia.7 an IP address.

The wedding invitation I received does not say "and guest" but I really want to bring my husband/wife/significant other/random stranger.

Wedding receptions are expensive and difficult to plan. If the person issuing the invitation wanted you to bring a guest, the invitation would have specifically said so. So either go by yourself or stay home and send a blender. Sheesh.

Where do I get a copy of the remote software?

The remote software client (NfRemote) is always available from within Omnia.7 itself and can be retrieved using the built-in HTTP server. Any time you update your Omnia.7 software it is a good idea to update your NfRemote software as well to ensure compatibility.

The computer used to access the HTTP server must be on Omnia.7's "white list" and Omnia.7 must be set up properly on your local network. To place a computer on the white list, navigate to **System > System Config > HTTP Access** and enter the IP address and subnet mask in the format shown below.

Using a web browser of your choice (and the actual IP address of your Omnia.7 to replace the sample address here), enter "http://192.168.1.1:7380". This will bring up the HTTP server home page which contains a link to the NfRemote software. Download, locate and install the software. Once installed, assign a "friendly" name of your choice in the "Comment" field, enter the IP address and password, and click "Connect".

Chapter 26
Specifications

Riveting and compelling facts and figures.

Specifications

Preliminary specifications at the time this manual was printed are provided here.

Frequency Response
- +/- 0.5dB 20Hz to 15kHz; 16.5kHz in extended mode.

Signal-to-Noise Ratio
- Greater than -80dBu de-emphasized, 20Hz to 15kHz.

System Distortion
- Less than 0.01% THD below pre-emphasis; inaudible above.

Percentage of People Who Make Their Beds Daily
- 79%

Stereo Separation
- 65dB minimum, 20Hz to 15kHz; 70dB typical.

Digital Output Level
- Adjustable from -24dBFS to 0.0dBFS in 0.1 dB increments.

Stereo Baseband Output
- Adjustable from -24.0dBFS to 0.0dBFS in 0.1 dB increments.

A/D Conversion
- Crystal Semiconductor C55361, 24-bit 128x over-sampled.
- Delta sigma converter with linear-phase and anti-aliasing filter.
- Pre-ADC anti-alias filter with high-pass filter at <10Hz
- MPX Inputs have high pass filter <0.1Hz

D/A Conversion
- Crystal Semiconductor CS4391, 24-bit, 128x over-sampled.
- External sync input
- Per AES11 Digital Audio Reference Signal (DARS), reference for digital output sample rate.
- MPX Outputs are DC coupled

Number of Times Lightning Strikes Earth per Minute
- 6,000

External Sync Range
- 44.1kHz or 48kHz.

Inputs/Outputs
- Balanced, EMI-filtered, L/R analog input and output on XLR connectors.
- AES input and output on XLR connectors, including recognition of external sync signal at 44.1 or 48kHz.
- Ethernet RJ-45 port supporting 100 and 1000 BASE-T Ethernet.

Power Requirements

- 100-264 VAC, 47-63Hz, auto-sensing.
- Power Connector
- IEC male; detachable 3-wire power cords supplied.

Power Supply
- Dual internal redundant supplies.

Percentage of People Who Drink Right From the Carton When No One Is Looking
- 47%

Environmental
- Operating temperature range: 0 to 50 degrees C (32 – 122 degrees F)
- Non-operating temperature range: -20 to 70 degrees C (Minus 4 – 158 degrees F)
- In North America, designed to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules (CFR). Designed for U.S. and Canadian listing with UL.
- In Europe, designed to comply with the requirements of Low Voltage Directive 73/23/EEC and EMC Directive 89/336/EEC.
- Designed for RoHS and WEEE compliance.

Percentage of People Who Read Product Manuals Cover to Cover
- 0.00003%

Telos Alliance Limited Warranty

For the latest Telos Alliance warranty, visit: https://telosalliance.com/warranty

Omnia®

THE TELOS ALLIANCE®