Omnia.11

Stereo FM Audio Processor
Installation and Operation Manual
Version 3.0.1 - Revised: August 2016

President's Note: Welcome to Omnia.11!

Cleveland, Ohio
September, 2010

If you love Rock-and-Roll there's a good chance you'll understand the following scenario. Consider how daunting it must have been for the Beatles to follow-up "Sgt. Pepper," or what the next concept was in Pete Townshend's mind after the worldwide acclaim of "Tommy." Personally, I always wonder how Bruce Springsteen contemplates his next project after the completion of many of his masterpieces.

Well processing gang, seems I now understand the predicament! Your overwhelming acceptance of Omnia processors parallels the above scenarios for all of those artists. OK, so maybe there won't be a "processing rock opera", but the popularity of Omnia, as made by you, has put it in rock-star status among broadcastings elite! Humbly....I wish to thank each and every one of you for your dedication and support.

Now, Omnia embarks upon the next phase - or tour - of this wonderful journey. You know, Mr. Springsteen said it perfectly, "One day, we'll look back on this, and it will all seem funny." He's right, as I look back on all this, it's been - and remains - an amazing ride!

Now it's time for us to offer you our follow-up as we present Omnia.11. A lot of anticipation awaits Omnia.11, and our goal was to climb the charts again, with a bullet. By now you're heard or read all of the stuff from the marketing gang. So I'll spare those details. But it is important to note that aside from the effort undertaken to create Omnia.11, there's a tremendous team who deserve recognition for this product. As said in other communiqués, Omnia isn't just "Frank" anymore. Now you get to hear and see the results of that statement. Omnia.11 resides on a whole new firmware platform, which incorporates both DSP and an industrial grade quad-core PC. I believe this is a first in the processing realm. In order to do this, the Omnia team worked extremely hard to assemble a platform that is powerful, flexible, and ready for the future. It's my view that our platform design and firmware selection will create possibilities the 'other' guys are still dreaming about. So in addition to a great sounding processor, you also possess a device that is designed for the ever changing technical landscape we find in broadcasting today.

To that extent, Rob Dye, Bill Mohat, Ed Zmuginsky, Corny Gould, and Mark Manolio are to thank for their creativity. Additionally, there are quite a number of end-users who shared their ideas with us, and we're extremely grateful for the input from everyone.

I've always felt that competitive quality sound is what ultimately sells a processor, not the number of bands or the latest whimsical features we see offered by others. In Malcom Gladwell's book "Outliers," he details numerous stories about how various people reached their level of success. The short form answer is that it takes close to 10,000 hours of work or practice to reach this lofty goal. Pretty insightful stuff! I have no doubt that my algorithmic running mates Rob Dye and Cornelius Gould have long surpassed this milestone. Their efforts, input and insight to the algorithms in Omnia.11 are worth a book unto themselves. Ask Corny about the multitude of hours we spent in our development lab going over algorithm performance and breaking down the barriers to achieve increased performance in what is today Omnia.11.

Hopefully by now you can draw your own conclusion as to which company has not only become the world's leading broadcast processing developer, but also whom all others look to clone. We chuckle when our tech concepts show up in product descriptions of other companies.

In closing, I want to Thank You, once again for your support in us. As you get rolling with Omnia.11, please know we are there 24/7 should you need assistance. As always, we'd love to know your feedback, so please feel free to share. As a friend in the live steam hobby told me about his business, "If you like the product, tell others. If you don't, then tell me."

Rock on!

Frank Foti, President, Omnia Audio

Omnia.11 Quick-Start Setup Guide

We know that you're probably in a hurry to begin using your new Omnia.11. This 3-page Quick-Start Setup Guide below will get you up and running as quickly as possible. Since it covers only the bare minimum needed to get you going, we strongly suggest reading the entire user manual in order to get the most out of your new Omnia.11. The latest version is always available in .pdf format by clicking on the "Manual" link to the right of the Omnia.11 product page here: http://www.telosalliance.com/Omnia/Omnia11

Please refer to the illustrations below to become familiar with the location of the various controls and connectors associated with the installation and then follow the steps in the Physical Installation and User Interface Overview sections before proceeding with the installation.
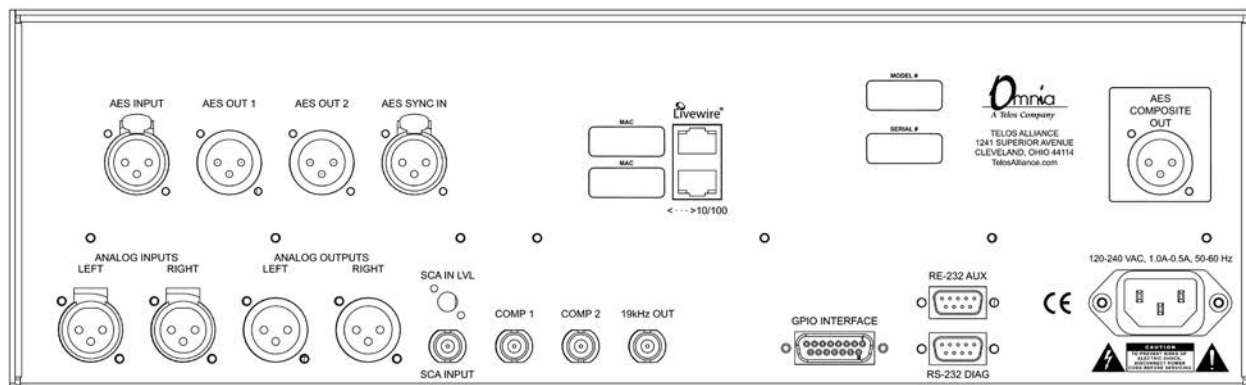
Rear Panel Diagram

Physical Installation:

The Omnia.11 is a large unit so it would be advisable to have the help of an assistant when installing it in the rack. Find the release pin located on the inside top of each handle. Slide and hold this outwards and then pull the handle towards you until you hear a click. Make sure each handle is securely locked into place. Using the handles, install the Omnia.11 in the equipment rack using all four rack screws. Once secured to the rack, slide the release pin toward you and fold the rack handles back to their normal position.

1. Connect the audio inputs that are appropriate for your installation. The Omnia.11 accepts balanced professional line-level analog audio or AES/EBU digital audio on standard XLR connectors. If you have an existing Livewire system, the single Livewire Ethernet connection is all that is needed for audio I/O (except for the composite MPX outputs).
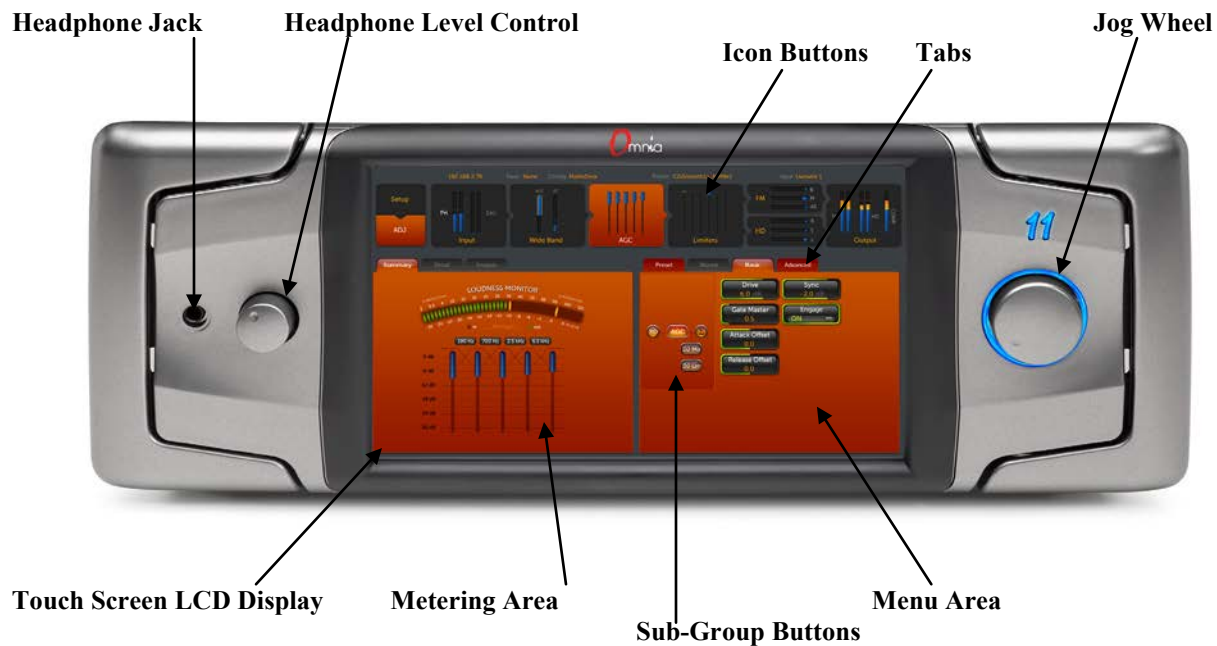
Please note that the two Ethernet jacks are ports on the same internal switch so they both have the same functionality. Either can be used for remote control and Livewire. IMPORTANT NOTE: Be sure that Livewire is disabled in the Setup menu (see Step 4 below) if you are not installing the Omnia in a Livewire system.

2. Connect the outputs that are appropriate for your installation. NOTE: A direct composite MPX connection (BNC analog or Omnia Direct AES composite digital if your exciter or STL supports it) between the Omnia and the FM exciter at the transmitter site is always best! This will allow taking full advantage of the Omnia's superior built-in stereo generator and ensure the best possible overshoot performance and sound quality.)

If you will be using conventional AES/EBU L/R digital audio to feed your STL or FM exciter, be sure any pre-emphasis and limiters (if present) are fully defeated in the exciter. The Omnia must be the only device providing the pre-emphasis so its own de-emphasis on the AES/EBU output being used must also be "Off". Also note that if the STL uses a codec (is not linear), the Omnia must be located at the transmitter site for best performance and sound quality. Please contact Omnia Support if you have any questions.

3. Be sure there is nothing plugged into the rear panel Ethernet jacks at this point and connect AC power to the unit (there is no power switch!). You will see lines of text as the unit boots up, followed by the main GUI touch screen interface as shown below.

Front Panel User Interface Overview:

Headphone Jack **Headphone Level Control** **Icon Buttons** **Tabs** **Jog Wheel**

Touch Screen LCD Display **Metering Area** **Menu Area**

Sub-Group Buttons

The initial GUI ("traditional" orange mode shown) will come up with the Preset list open but locked. For now, touch the **"Setup"** icon button at the top-left corner of the screen. This brings up the Network, Livewire and System setup screens with the **System** screen as the default.

Note here that the **Overall Bypass** switch should always be set to "**OFF"** or no processing will take place! Be careful never to turn this on unless you are running a proof!

Before you begin, be sure your Omnia.11 is running the current software which is shown in the **System** block near the top of the screen. It should read "Version Omnia11: 3.0.x (yyy). You can ignore what's in the parentheses. If the version shown is 1.5 or 1.6, you can update via download from the link under the "Software" heading to the right of the Omnia.11 product page here: https://www.telosalliance.com/Omnia/Omnia11 . If the version shown is 1.4 or lower, please contact Omnia customer support for assistance. Contact information is at the end of this document.

4.   Touch the appropriate icon buttons to setup your network parameters, activate Livewire (only if needed), setup static RDS and change the unit's password (default is "omnia" without the quotes). NOTE: The same password is used for both front panel and remote access.

IMPORTANT NOTE: The Omnia.11 requires 2 free IP addresses on your network, the one that you enter and the one directly above the one that you enter. So be sure that both consecutive IP addresses are free on your network. For more information please see **Network Parameter Setup** in Chapter 3 on Page 15 of the full user manual.

5.   Touch the **"ADJ"** icon button near the top-left of the screen to return to the main screen and then touch **"Input"** to bring up the Input menu and metering. If the **"Basic"** tab is not selected, touch it to select it. From the **"Input Source"** drop-down, select the **Analog, AES/EBU** or **Livewire** input as appropriate for your installation. If your audio source is providing an audio feed you should then see meter activity on the bargraph meters.

6.   While driving the inputs with typical program material at normal operating level, adjust the appropriate **"Master"** Input Gain control until the peak-reading input bargraph meters are reading just "into the yellow" (about −15 to −12 dBFS or so). If the left/right audio levels coming into the Omnia.11 are somewhat unbalanced, you can adjust the **"Right Trim"** control to adjust the level of the right channel alone over a limited range.

7.   Touch the **"Output"** icon button at the top-right of the screen to bring up the Output menu and metering. If the **"Basic"** tab is not selected, touch it to select it. Touch the **"FM Options"** button on the left side of the Menu Area and ensure that the **Pre-Emphasis, Diversity Delay** (if present) and **BS-412** settings are correct for your system and your location.

8.   Now touch the appropriate button above the "FM Options" button to select the group of output controls for the output you will be using. All outputs are active simultaneously. NOTE: If you are using a conventional AES/EBU L/R digital output to feed an FM exciter or linear STL, touch the "AES/EBU" button and be sure the "Output Selection" is set to "FM" and the "De-emphasis" is turned "OFF" for the output being used. For access to the composite MPX stereo generator output level and stereo pilot controls, touch the "Composite" button. Note that these controls simultaneously adjust the Omnia Direct output levels as well. Finally, adjust the appropriate control so that the peak output/modulation level is correct for the equipment that follows the Omnia.11.

9.   Touch the **"FM"** icon button and then touch the **"Preset"** tab to display the list of factory processing presets. If the preset list is locked (grayed-out), touch the "padlock" icon to unlock it. Once unlocked, simply touch the desired preset name in the list and it will be put directly "on the air".

10.   We strongly suggest listening to all the factory presets, regardless of their name, to get a feel for their differences and then select one to start with. Once you have your starting preset selected, touch the **"Quick Setup"** tab and adjust the following controls to set the basic loudness, bass and brightness sound desired.

The following is for the "traditional" (orange) style. For G-Force, please see Appendix D starting on Page 97 of the full user manual.

Start with the **"Auto Sense"** control. Set it all the way down to 0.0 for now. Next, adjust the **"Clipper Drive"** control as low as possible for the loudness needed. This controls the primary loudness vs. distortion tradeoff. Turning it up makes the sound louder (but more distorted) while turning it down makes the sound cleaner but not as loud. The goal is to find the right compromise. Try adjusting it down in 0.5 dB steps until the loudness just falls off a little too much, then bring it back up a notch or two from there. It should always be set as low as possible for the needed level of loudness.

Now turn the **"Auto Sense"** control back up until you see the Auto Sense meter in the metering pane deflecting downward a maximum of about 0.5 to 1dB or so on peaks and then leave it there.

The overall amount of bass is set using the **"Bass Growl"** control. The bass enhancement controls (**"Deep Bass"**, **"Warm Bass"** found here and also **"Phat Bass"** located in the **Basic** tab of the WB/ENH menu) are all dynamic rather than fixed EQ's. Their overall "allowed amount" is controlled by the "**Bass Growl**" control so start by adjusting this to taste. You can go back and set the other bass enhancer controls later. For now the preset defaults for these should be sufficient.

Finally, set the basic brightness of a preset by using the **"Presence"** and **"Treble"** controls. Note that these two controls only boost the brightness. A setting of "0.0" is "flat" or the minimum amount of boost for the particular preset that is currently selected.

The Omnia.11 Quick-Start Setup is now complete! Please read the User Manual to learn all about the features that make the Omnia.11 unique, for additional details on proper installation (Chapter 1), remote control (Appendix C) and for full details on the operation and adjustment of every control function ("traditional" orange mode: Chapters 4 & 5. Optional G-Force mode: Appendix D).

The latest version of the manual is always available in .pdf format by clicking on the "Manual" link to the right of the Omnia.11 product page here: http://www.telosalliance.com/Omnia/Omnia11

If you'd like to contact our Customer Support department, personnel are available in the Cleveland, Ohio, USA office Monday through Friday between 9:00 A.M. and 5:00 P.M., Eastern Time by phone at +1.216.241.7225 , via email to support@telosalliance.com or via the customer support form on our website here:

http://telosalliance.com/contact/

After-hours support is available 24/7 by phone at +1.216.622.0247.

If you are outside the U.S.A. and non-English speaking, please contact the dealer you purchased your Omnia from first.

Thank you for choosing Omnia!

Table of Contents

S A F E T Y   I N S T R U C T I O N S

1. Read All Instructions. **All safety and operating instructions must be read before operating the product.**

2. Retain All Instructions. **All safety and operating instructions must be retained for future reference.**

3. Heed All Warnings. **All warnings on the product and those listed in the operating instructions must be adhered to.**

4. Follow All Instructions. **All operating and product usage instructions must be followed.**

5. Heat. **This product must be situated away from any heat sources such as radiators, heat registers, stoves, or other products (including power amplifiers) that produce heat.**

6. Ventilation. **Slots and openings in the product are provided for ventilation. They ensure reliable operations of the product, keeping it from overheating. These openings must not be blocked nor covered during operation. This product should not be placed into a rack unless proper ventilation is provided through following the manufacturer's installation procedures.**

7. Water and Moisture. **Do not use this product near water – for example; near a bath tub, wash bowl, kitchen sink or laundry tub; in a wet basement; or near a swimming pool or the like.**

8. Attachments. **Do not use any attachments not recommended by the product manufacturer as they may cause hazards.**

9. Power Sources. **This product must be operated from the type of power source indicated on the marking label and in the installation instructions. If you are not sure of the type of power supplied to your facility, consult your local power company.**

10. Grounding and Polarization. **This product is equipped with a polarized AC plug with integral safety ground pin. Do not defeat the safety ground in any manner.**

11. Power Cord Protection. **Power supply cords must be routed so that they are not likely to be walked on nor pinched by items placed upon or against them. Pay particular attention to the cords at AC wall plugs and convenience receptacles, and at the point where the cord connects to the product.**

12. Lightning. **For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the AC wall outlet. This will prevent damage to the product due to lightning and power supply surges.**

13. Overloading. **Do not overload AC wall outlets, extension cords, or integral convenience outlets as this can result in a fire or electric shock hazard.**

14. Object and Liquid Entry. **Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind into the product.**

15. Accessories. **Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious damage to a child or adult, and serious damage to the product. Any mounting of the product needs to follow manufacturer's installation recommendations.**

16. A Product and Cart Combination **should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and the cart combination to overturn.**

17. Servicing. **Refer all servicing of the product to qualified service personnel.**

18. Damage Requiring Service. **Unplug this product from the AC wall outlet and refer servicing to qualified service personnel under the following conditions:**

- **When the AC plug is damaged.**

- **If liquid has been spilled or objects have fallen into the equipment.**

- **If the product has been exposed to rain or moisture.**

- **If the product does not operate normally (following operating instructions).**

- **If the product has been dropped or damaged in any way.**

- **When the product exhibits a distinct change in performance. This indicates a need for service.**

19. Replacement Parts. **When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or that have the same characteristics as the original parts. Unauthorized substitutions may result in fire, electric shock, or other hazards.**

20. Safety Check. **Upon completion of any repairs to this product, ask the service technician to perform safety checks to determine that the product is in safe operating condition.**

21. Cleaning. **Do not use liquid cleaners or aerosol cleaners. Use only a damp cloth for cleaning.**

HAZARD / WARNING LABELS

CAUTION
⚠ RISK OF ELECTRIC SHOCK ⚡
DO NOT OPEN

WARNING: SHOCK HAZARD - DO NOT OPEN
AVIS: RISQUE DE CHOC ELECTRIQUE - NE PAS OUVRIR

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO
NOT REMOVE ANY COVER OR PANEL. NO USER SERVICABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED PERSONNEL.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC
SHOCK, DO NOT EXPOSE THE OMNIA TO RAIN OR MOISTURE.

The **Exclamation Point** symbol, within an equilateral triangle, alerts the user to the presence of important operating and maintenance (servicing) instructions in product literature and instruction manuals.

The **Lightning Flash with Arrowhead** symbol, within an equilateral triangle, alerts the user to the presence of non-insulated dangerous voltages within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

WARNING -- This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions in this manual it may cause interference to radio communications. The device has been formally submitted for testing and found to comply with the limits for a Class B computing device (pursuant to subpart J of Part 15 FCC Rules) and has been designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, and the user and at his expense will be required to take any measures required to correct interference.

CANADA WARNING – This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications. Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limits applicables aux brouillage radioelectrique edicte par le ministere des Communications de Canada.

CE CONFORMANCE – This device complies with the requirements of the EEC Council Directives: 93/68/EEC (CE Marking); 73/23/EEC (Safety – low voltage directive); 89/336/EEC (electromagnetic compatibility). Conformity is declared to those standards: EN50081-1, EN50082-1.

LITHIUM BATTERY CAUTION – There is a danger of explosion if the internal battery is replaced incorrectly or shorted. Replace the battery only with same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

USE OF SHIELDED CABLING – In order to conform to the CE requirements for High Frequency radiation, shielded cables must be used for all audio and data connections.

NOTE: When the unit is operated in an extremely high RF environment, it may be helpful to connect cable shields to the XLR-connector terminal that connects cable shield to chassis ground, not to pin 1. Additionally, a 0.01uF capacitor connected between XLR pin-1 and the chassis terminal may be helpful in some instances.

RoHS COMPLIANCE – The RoHS Directive stands for "the restriction of the use of certain hazardous substances in electrical and electronic equipment". This Directive bans the placing on the European market of new electrical and electronic equipment containing more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants. Omnia.11 FM is in compliance with the EU RoHS Directive.

Manual Update Notification

Audio Processing – a unique art form that we take <u>very</u> seriously!

As part of our dedication to the science of audio processing we will continue to improve and update the Omnia product and its documentation based on our ongoing research, real-world field experience, and the valued input from our many thousands of loyal customers.

We strongly encourage our customers to visit our Omnia website for product enhancement announcements, software updates, updated user manuals, and customer support bulletins.

http://www.telosalliance.com/Omnia/Omnia11

Chapter-1: Installation

Pre-Installation Tasks

Please take a few minutes to read through this chapter before proceeding with the installation of your new Omnia.11 processor.

About This Manual

The latest version of this manual is always available in .pdf format by clicking on the "Manual" link to the right of the Omnia.11 product page here: http://www.telosalliance.com/Omnia/Omnia11

Omnia.11 Components

By now, you've unpacked the shipping carton to gain access to this manual. Now is the time to inspect the Omnia.11 unit and its shipping carton for any signs of shipping damage. Such damage must be reported to your carrier for any claims. The Omnia.11 shipping box includes the following components:

> ➢ Omnia.11 processor.

> ➢ Omnia.11 Operating Manual.

> ➢ Warranty Registration Card. (Please complete the form and return/FAX it to Telos/Omnia)

> ➢ Two IEC Power Cords, one of the USA/Canada style, and one of the Euro style.

Processor Location

We strongly suggest using the Omnia.11's built-in MPX stereo generator (the BNC Composite outputs or Omnia Direct AES composite digital if your transmitter supports it) for the analog FM channel if at all possible in your system. This will generally result in the best, most tightly controlled modulation performance. Plus you'll be able to make use of the advantages available only in the Omnia.11 such as the SSB option, superb pilot and SCA protection performance, composite clipping etc. Remember, analog FM is still analog after all! Using a conventional left/right AES/EBU digital path to a digital exciter can be more convenient and can work well, but it simply moves the location of the stereo generator D/A conversion to the digital exciter over a third-party path which is not likely to have the above advantages or optimized performance of the integrated stereo generator in the Omnia. Sometimes, these exciters also have limiters or clippers built-in to their AES inputs that can actually add overshoot and distortion to the signal!

AC Power Environment

The Omnia.11 subsystem is a DSP-based microcomputer, and therefore requires reasonably clean AC power, just as any modern computer system does. And even though the Omnia.11 power supply is equipped with robust AC transient suppression, we recommend that an "online" style (non-switching type) Uninterruptible Power Supply (UPS) with transient surge suppression be employed.

At transmitter sites there can be heavy transients on the power lines as well as significant surges introduced into the power system by frequent lighting strikes. These are unwelcome power line events and can damage even the most robust equipment. Therefore you should give the AC power environment and installation practices thorough consideration before plugging in the Omnia.11 (or any other microcomputer-based equipment).

Installation & Connections

Rack Mounting & Grounding

The Omnia.11 is a large unit so it would be advisable to have the help of an assistant when installing it in the rack.

The Omnia.11 requires four RU (7" [17.78 cm]) of rack space. Find the release pin located on the inside top of each handle. Slide and hold this outwards and then pull the handle towards you until you hear a click. Make sure each handle is securely locked into place. Then and only then, using the handles, rack mount the unit using all four rack screws! No other two-screw mounting arrangement will secure the unit properly or prevent distortion of the front panel!

Once secured to the rack, slide the release pin for each rack handle toward you and fold the rack handles back to their normal position

Adequate ventilation should be provided, and although not required, it is always good engineering practice to allow one blank rack space immediately above and below the Omnia, especially if equipment generating significant heat is located below the unit. You may install 1RU (1.75") vented or solid rack panels to fill these spaces.

The processor should be installed into a properly grounded 19" equipment rack.

It is a good idea, especially at transmitter sites, to run a separate ground strap or braid from the Omnia.11's chassis to a solid rack or station ground point. Although no separate ground lug is provided, the end of the strap or braid can be clamped under the Omnia's top cover using the Omnia's existing top cover screws.

AC Mains Power

Omnia.11 utilizes an <u>un-switched</u> EMI-filtered IEC power-entry module.

CAUTION
TO PREVENT RISKS OF
ELECTRIC SHOCK,
DISCONNECT POWER
CORD BEFORE SERVICING
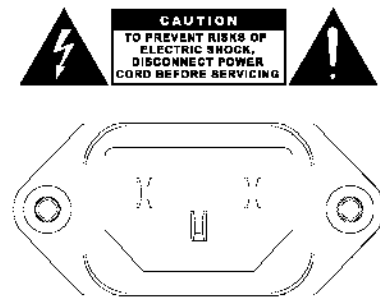
120-240 VAC, 1.0A-0.5A, 50-60 Hz

AC Power Connection

Omnia.11's automatic voltage–sensing, high-efficiency switching power supply allows it to operate on AC mains voltages from 100 to 240 VAC and from source frequencies of either 50 or 60 Hz.

In the USA or Canada, plug the provided IEC type AC power cord into the unit and then into a grounded AC outlet.

Outside of the USA you must use the appropriate power cord that complies with local electrical regulations.

Rear Panel Connections
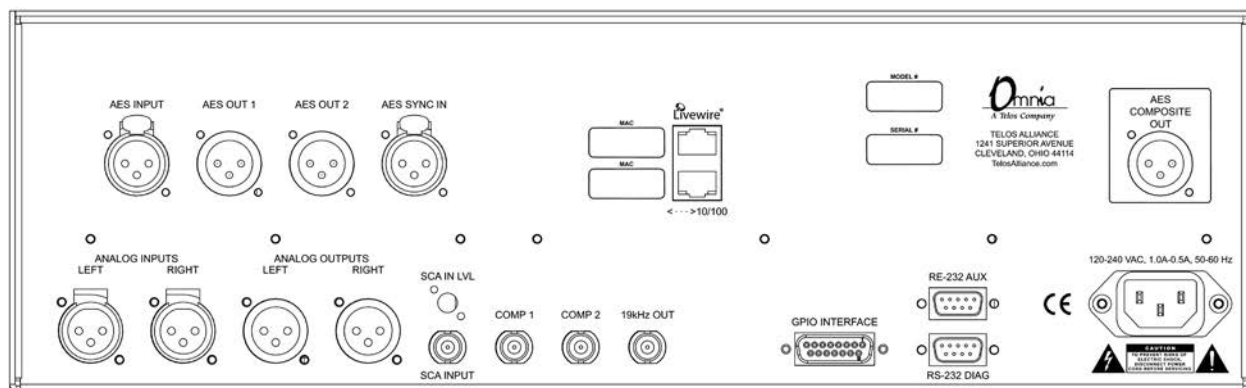
Analog Audio Inputs and Outputs

Balanced XLR-type connectors are provided in the lower left section of the rear panel for the analog audio. Both analog and digital input sources may be connected simultaneously, however, only the input source that has been selected in the Input menu will be active. Analog/Digital/Livewire input source selection is done through the **"Input Source"** software parameter setting in the Input menu.

All outputs are active simultaneously.

The stereo analog inputs are designed for standard +4dBu balanced signals. Pin 2 is Hot.
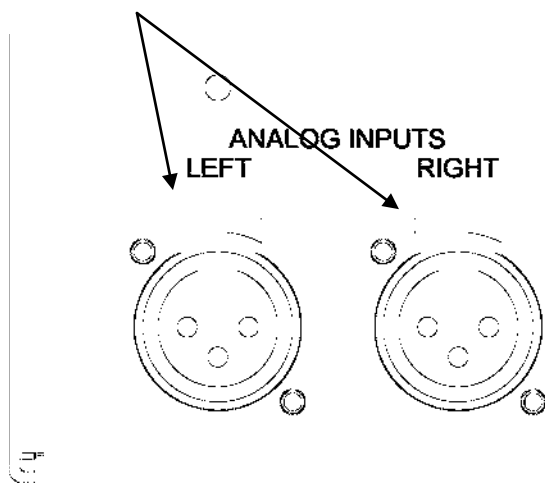
Individual Left and Right analog outputs are available on two male XLR jacks. Pin 2 is Hot.
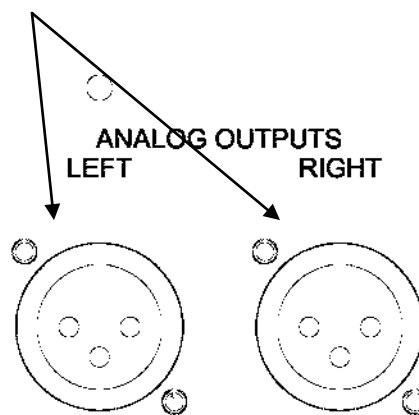
A Note about Relative Phase:

If the relative phase of your installation (including the Omnia.11) differs from that of your existing system, your announcers may feel that they sound "weird" in their headphones. If this occurs, then the relative phase of the processor is 180 degrees from what your air talent is used to. To remedy this, you can either reverse the polarity of both of the analog inputs or simply change the **"Invert Polarity"** setting to **[Both]** in the **Input** menu.

Stereo Generator Connections

Four standard female BNC connectors comprise the Omnia.11's standard analog stereo generator connections. Note: Also see Omnia Direct (AES Composite Out) on the next page.

There are two composite MPX outputs with independent software level controls, one SCA input with level adjust trimpot and one 19 kHz pilot sync output.
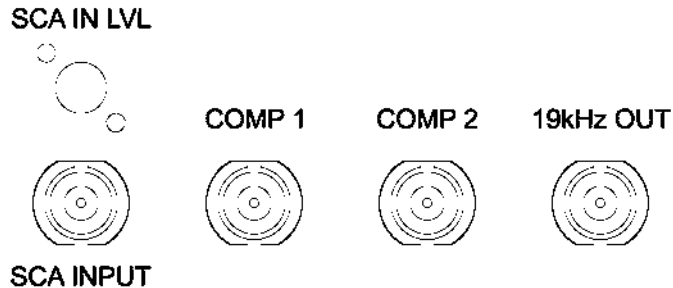
COMP 1 & COMP 2 (Composite Outputs 1 & 2) (BNC)

These two low impedance outputs (Composite 1 and Composite 2) are each capable of driving up to 100 feet of RG-58A/U coax cable. The output levels are individually adjustable so the unit can operate as a "composite DA" to drive a variety of equipment. The output levels and other stereo generator settings are set through software parameters in the **Composite** submenu of the **Output** menu. An internal jumper sets the output impedance to either 5 ohms (the factory setting) or 75 ohms. The default setting is appropriate for the vast majority of exciter connections. However, in the event that a higher source impedance is required, a jumper can be moved (one for each composite output) on the motherboard to change the source impedance to 75 ohms. For reference, JP10 is for Composite #1, and JP9 is for Composite #2.

Jumpers JP7 & JP8 are also available if you need to limit the maximum peak-to-peak output voltage from the composite outputs to 4v p-p instead of the normal 10v p-p. They default to the Normal (10v p-p) setting.

19 kHz OUT (Pilot Sync Output) (BNC)

This TTL-level 19 kHz square wave output can be used as the reference signal for most RDS or SCA generators that operate at 57 kHz or other multiple of the 19 kHz pilot frequency. This Sync output is phase and frequency locked to the stereo pilot. When this signal is used to synchronize an external SCA or RDS generator, this locking assures that no difference frequencies exist which may cause intermodulation between the pilot and the SCA signal.

SCA INPUT (BNC)

Any SCA or RDS signal above 53 kHz can be added to the composite outputs of the Omnia.11 by connecting the signal to the SCA INPUT connector. The SCA signal is mixed in the analog domain directly into both composite outputs. A high-pass filter on the SCA input provides SCA to main-channel crosstalk protection. The SCA injection level can be adjusted using the **SCA IN LVL** control trimpot. See below for details.

SCA IN LVL (SCA Input Level) (trimpot adjustment)

Located just above the SCA Input BNC jack is the SCA IN LVL (SCA Input Level) adjustment control.

Carefully insert a small bladed screwdriver into the hole and adjust the control if needed to set the SCA injection level.

AES/EBU Digital Input, Outputs & AES/EBU External Sync Input

AES INPUT   AES OUT 1   AES OUT 2   AES SYNC IN
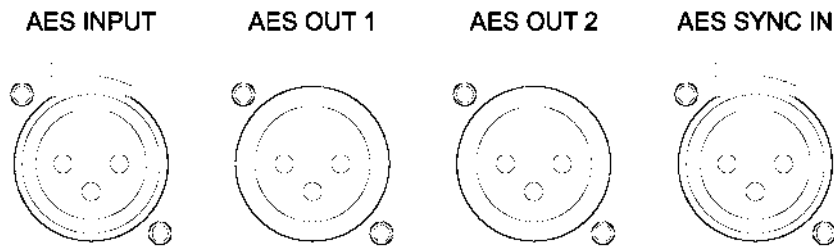
The digital AES/EBU (AES-3) inputs (AES INPUT and AES SYNC IN) use standard balanced 3-pin female XLR connectors. They accept any sampling rate between 32kHz and 96kHz. No user adjustment of the sample rate is necessary on the AES-3 input as a high-quality digital sample rate converter is built in.

There are two AES-3 outputs on standard balanced 3-pin male XLR connectors. These provide either an internally generated output sample rate or can be synced as follows: **OUT 1** can be set to an internally generated 48kHz clock, synced to the AES input signal or synced to an external AES reference signal applied to the **AES SYNC IN** connector. **OUT 2** can be set to an internally generated 48kHz or 44.1 kHz clock or synced to an external AES reference signal applied to the **AES SYNC IN** connector. These options are selectable using the **"Sample Rate"** setting in the **AES/EBU** submenu of the Output menu.

Note: The analog and digital outputs are active simultaneously.

Omnia Direct (AES Composite Out)
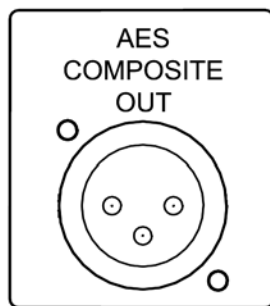
This provides an all-digital 192kHz AES/EBU formatted signal connection from the output of the Omnia.11's stereo MPX generator to compatible FM exciters. Please check with your STL/exciter/transmitter manufacturer to confirm its compatibility with Omnia Direct.

The Composite over AES signal is supplied via a male XLR connector on the rear panel above the AC power entry module.

The important thing to know on the MPX over AES is that the cable you use is really important. Many AES cables won't even pass 192 kHz data beyond a few feet. The best AES cable we've seen so far is the Belden 1800B cable. Many high quality Cat 6 cables will also pass this signal with excellent results.

When deployed, the Omnia Direct output level is set by the Composite #1 output level control. This is in parallel with the BNC analog Composite #1 output. If an additional (analog backup) composite is required, use the composite #2 BNC output & control.

Please note that the Omnia Direct 192kHz signal is currently duplicated and present on both the Left and Right channels of the AES/EBU signal but only the Left channel is officially supported. The Right channel is reserved for future use.

Omnia Direct is present on all new Omnia.11's and those that shipped from the factory starting in early 2014. Omnia Direct can also be retrofitted into existing units at no charge except for shipping. Please contact Omnia Support for an RA number if you wish to send your unit in for the upgrade. You will need to allow 4 to 6 weeks for completion

of the upgrade. Regrettably, we cannot ship loaners out for this upgrade so you will need to make arrangements for backup processing while your unit is out of service.

Ethernet / Livewire Connections

The top RJ-45 10BaseT / 100BaseT Ethernet / Livewire I/O jack can be used simultaneously for both TCP/IP based remote control of your Omnia.11 and audio input/output to your existing Livewire network.

IMPORTANT: If you do not have a Livewire network, please ensure that Livewire is disabled in the Setup menu / Livewire screen. If a change was needed, be sure to touch "APPLY" and reboot the unit for the change to take effect. This must be done since your regular network likely cannot handle the large bandwidth and packet streams generated by Livewire.

Also note that the Omnia.11 requires 2 free IP addresses on your network, the one that you enter (which is used to connect to the unit using a browser for remote control) and the address directly above the one you enter (which is not directly used but must also remain open on your network).

NOTE: The bottom Ethernet jack is not fully implemented in the current software so it has the same functionality as the top jack. We suggest using only the top jack.

Ethernet 10BaseT/100BaseT Remote and Livewire I/O
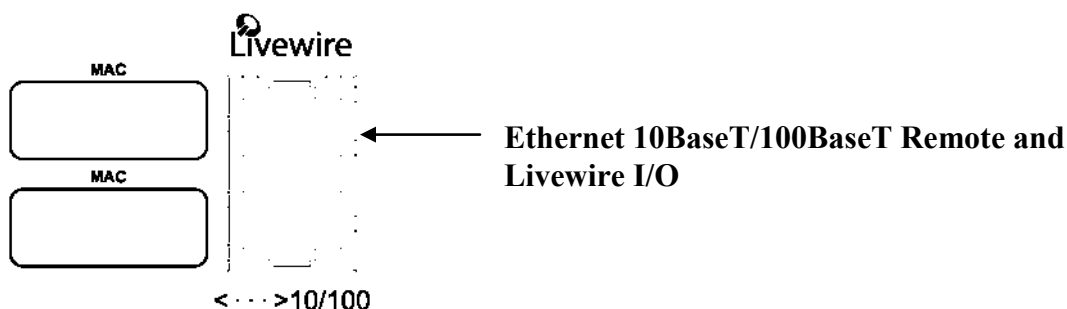
RS-232 Serial Port (DB-9M)* Connections

NOTE: The RS-232 ports are for internal use / future development only.

The DB9-male RS-232 AUX connector is currently provides a "heartbeat" signal on pin 3 whenever the unit is running.

The DB9 Male RS-232 DIAG connector is for internal use only.

RS-232 Serial Ports

*The RS-232 DIAG port is for internal use / future development only.

GPIO Interface Port
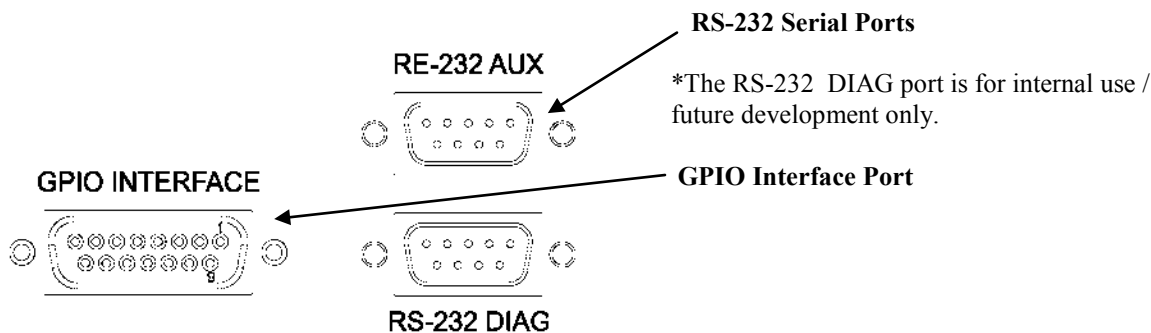
General Purpose Interface (GPI) (DB-15F)

This DB15-female connector serves as a four-input, opto-isolated interface to the Omnia's internal Trigger Script functions*. Four of the pins are "trigger" inputs, one is a bias voltage input, one is a +5V power output, and the remaining three are "ground."

GPI functions are now available for remote input source selection & diversity delay on/off or preset selection. You cannot have both active at once.

To configure the GPI functions, the remote control interface is used. See Page 85 in Appendix C for full information.

Outputs are not currently supported.

Here is the rear panel GPIO connector pinout:
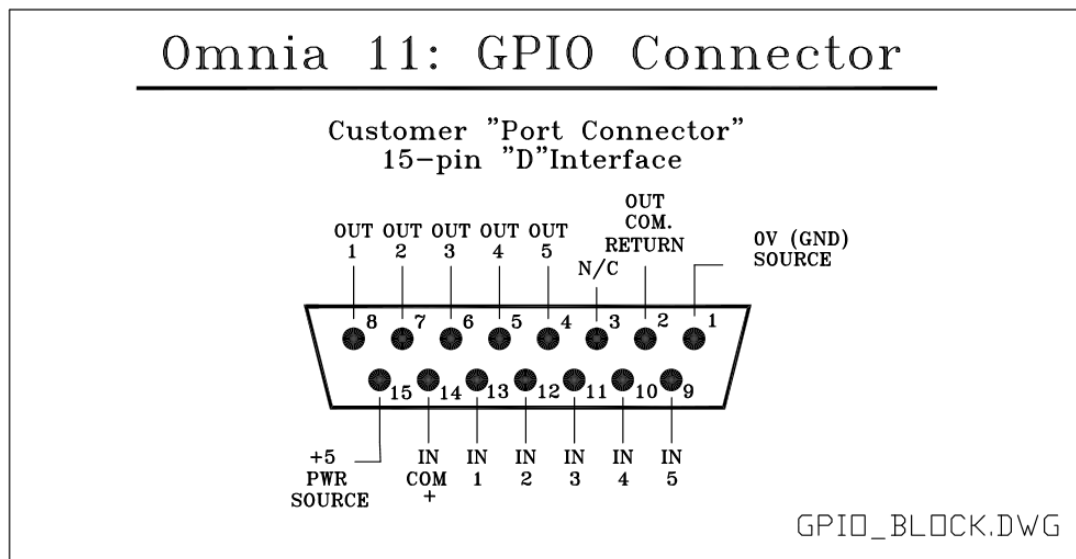
Powering Up

Now you are ready to power up the Omnia.11 for the first time.
Connect AC power to the unit using the appropriate supplied power cable for your location.
 (There is no power switch!)

When the Omnia.11 is first powered on, you will see text-based boot status messages followed by some graphics test screens and finally the main screen as shown below.

This main screen's metering will appear "frozen" for a while as the I/O board finishes booting up. This is normal.

Audio will appear at the analog audio and AES/EBU outputs approximately 1 minute from power-on. Livewire I/O initialization will take a bit longer.
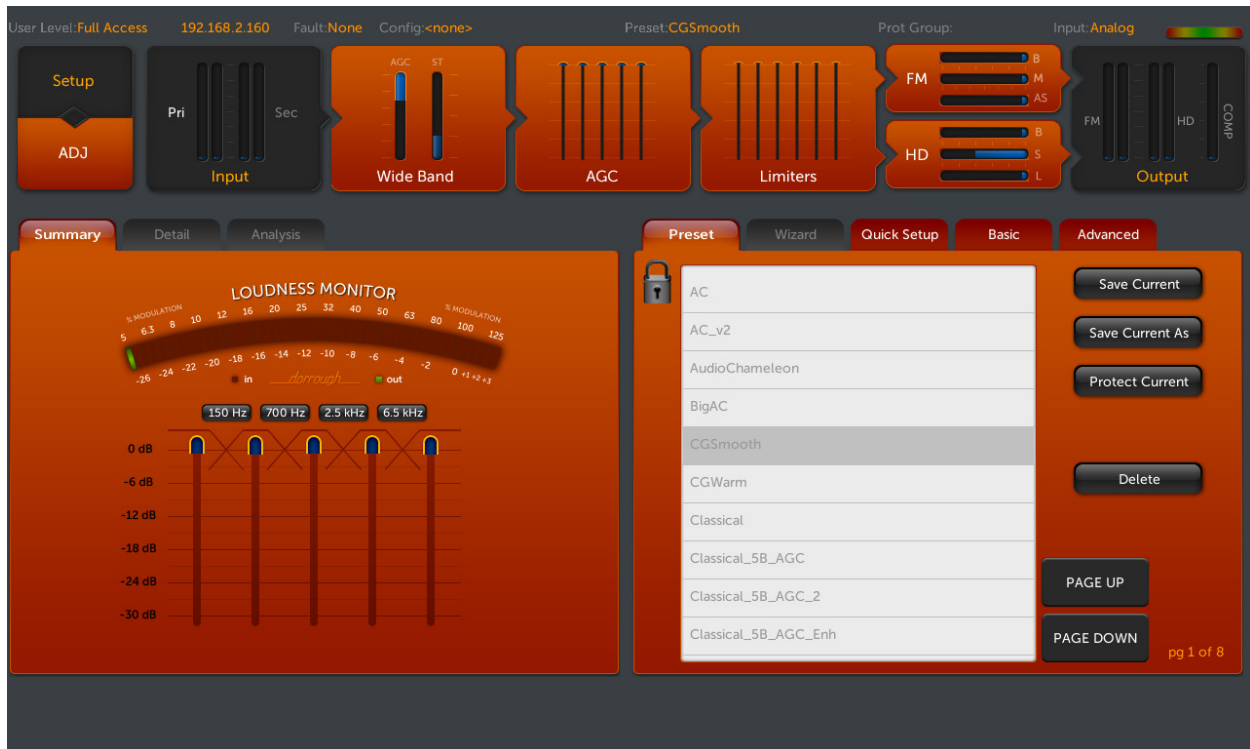
Initial Screen After Bootup: The "Preset" Screen

You will see that the screen defaults to the Preset menu, showing the currently running preset highlighted in the alphabetically arranged preset list. You will also notice that the presets appear "grayed-out". The preset list defaults to locked mode in order to prevent an unintended preset change when bringing the touchscreen out of screensaver mode. To make the preset list active, simply touch the "padlock" icon button in the upper-left corner of the preset list. It will then change to an "open padlock" icon and will unlock the preset list. Now you can simply touch the desired preset to put it on the air. To re-lock the preset list, simply touch the "open padlock" icon button again or you can simply exit the preset list by selecting any other icon button and the list will be re-locked automatically.

The Omnia.11 is now ready for configuration and use.

Please proceed to the next chapter to learn how to use the touch screen graphical user interface and how to configure the Omnia.11 for your system.

Chapter-2: Getting To Know Your Omnia.11

The Omnia.11 User Interface

Now that your Omnia.11 is rack-mounted, connected to a program audio source, and turned on, you're ready to learn how to operate it! This chapter covers the front panel touch screen user interface, your window into the Omnia.11 processor.

The large front panel full-color LCD touch screen along with a jog-wheel, make up the primary Omnia.11 User Interface. Shown below is the "traditional" (orange) processing style. The basics of the interface are similar for the G-Force (blue) style.

Omnia.11 Key Front Panel Features

Headphone Jack   Headphone Level Control   Icon Buttons   Tabs   Jog Wheel

Touch Screen LCD Display   Metering Area   Menu Area
Sub-Group Buttons
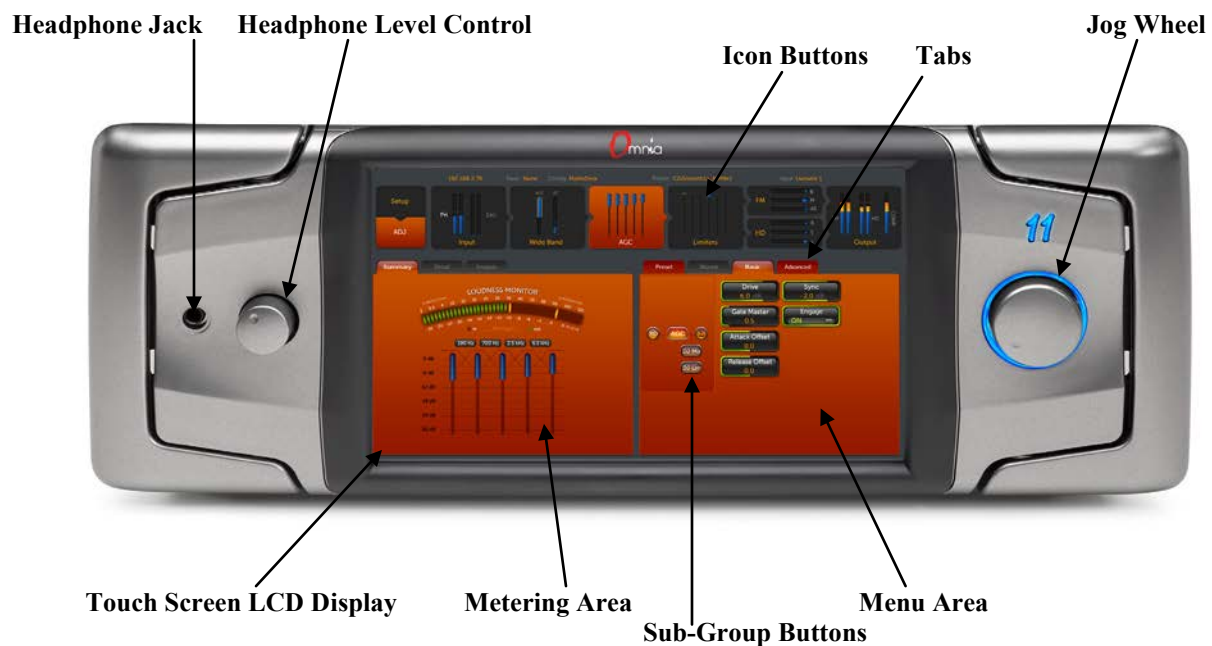
Headphone Level Control

A standard ¼" TRS stereo headphone jack is located at the left side of the front panel and allows the processed audio signal to be monitored. The Headphone volume level control is physically located to the right of the headphone jack. The headphone amplifier itself is a high-headroom design and is driven by its own high quality D/A converter that is independent of the analog XLR outputs. Therefore level changes in either output will not affect the other.

Icon Buttons, Metering Area and Menu Area

Input Screen

The top row of the Omnia.11's screen contains a **Status Bar**. The status bar shows the unit's IP address, fault status, currently selected I/O configuration (if any), currently selected processing preset and the currently selected input.

Just below the status bar are 9 **Icon Buttons**: Setup, ADJ, Input, Wide Band, AGC, Limiters, FM, HD and Output. These are touch screen buttons that are always present and allow you to switch between the various metering/menu screens below them. Some of the icon buttons conveniently contain mini-sized working meters that represent their full-sized metering area countertypes.

You can touch the **Input** Icon Button to display the Input screen as shown above.

Below the icon buttons are the Metering Area to the left and the Menu Area to the right.

The metering area contains full-sized versions of the meters in the icon buttons and the menu area contains the controls used for adjustment. In the Input screen, the two horizontal bargraph meters show digital sample-accurate peak representations of the left and right channel input levels for both the primary and secondary inputs. The **Primary Input** meter corresponds to the input selected with the **Input Source** control in the menu area and the **Secondary Input** meter corresponds to the **Failover Source**.

The Menu Area is arranged in multiple **Tabs** for convenience. Any tabs that are not available or are reserved for future features are grayed-out.

Let's go over setting your primary **Input Source** and adjusting the **Input Level** for that source now.

We will begin with an overview of the user interface.

User Interface Overview:

At the top of both the **Metering Area** and the **Menu Area** are **Tabs** that organize the meters and controls into smaller groups. Touch the tab for the desired group to bring up the meters and controls for that group.

Additionally, sub-groups of controls in a tab (if any) are indicated by small **Subgroup Buttons** on the left side of the **Menu Area**. Touch the desired button to bring up the controls in that sub-group.

There are 4 styles of controls: **Variable** controls, **Off/On** switches, **Drop-Down** lists and **Radio Button** controls. Examples of Variable and Drop-Down controls can be seen in the Input screen picture above while Off/On switches, Subgroup Buttons and Variable Controls can be seen in the Wide Band AGC menu area picture below. Radio Buttons can be found in the Livewire setup menu and the Output menu sub-groups.
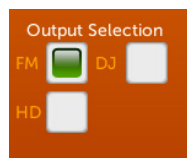
When "off" or not selected, **Radio Buttons** are white. When "on" or selected, Radio Buttons are green. In the picture at left, the "FM" output is selected.
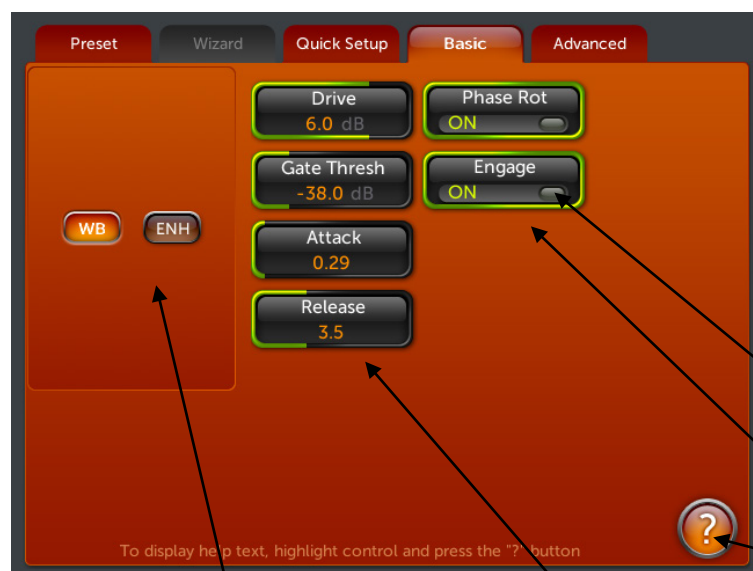
The state of **Off/On** switches (see picture at left of the Wide Band AGC Basic menu area) can be changed either by touching the control over the gray indicator (so as not to change its state) to highlight it and rotating the **Jog Wheel** (counter-clockwise for off and clockwise for on) or simply by touching the left or right half of the control over the "ON" or "OFF" text. Touching the left half of the control will turn it off and touching the right half of the control will turn it on.

Gray Indicator

On/Off Switches

Help Icon

Subgroup Buttons   **Variable Controls**

To select a **Variable Control** in the **Menu Area** for adjustment, touch it to select it (it will be highlighted in an alternate color when selected) then rotate the **Jog Wheel** to adjust it in real time. No additional confirmation touch is needed. **Note: The Jog Wheel's push switch is not yet implemented.**

Drop-Down controls (shown on the previous page) are controls that have more than 2 selections in a drop-down list. These are changed by first touching the control to display the list and then touching the desired selection from the list.

The **Help Icon** when touched will open a dialog box containing help text for the currently selected control.

User Interface Tutorial – Input Source Selection and Peak Input Level Setting

The following exercise is a useful introduction to the user interface. Start from the Input metering/menu screen (as displayed when the unit is first turned on).

If the Input metering/menu screen is not being displayed, touch the **ADJ** icon button in the upper-left corner of the screen and then the **Input** icon button to display it.

➢ Touch the control in the Menu area labeled **Input Source** to bring up the drop-down list of possible input sources.

➢ Analog is the default input source. The other choices are AES/EBU digital, Livewire 1 and Livewire 2. Touch the desired input source name to select it. (Note that the current selection will be highlighted white-on-gray in the list. Even if you will be using the analog inputs, try selecting another input and then switch back to Analog. If you do not wish to change the current selection, simply touch anywhere outside the control in a blank area of the screen to close the drop-down.

➢ Now touch the **Master** input level variable control for the input you just selected above.

➢ Rotate the jog wheel clockwise to increase the input level. Rotate the jog-wheel counter-clockwise to decrease the input level. This control adjusts both channels together in precise 0.5 dB steps. The gain in dB is shown inside the control with the previous setting enclosed in brackets [ ].

➢ Watch the (L)eft and (R)ight channel **Primary Input** horizontal bargraph meters in the Metering Area while adjusting per the following section.

Proper Setting of Input Levels

With normal program audio levels applied, a correct input level setting will result in the **Peak Indicators** on the horizontal L & R bargraph meters regularly reaching between -18 and –12 dBFS or a little higher (just "into the yellow"). This gain setting corresponds to system peak headroom of about 12-18 dB. You may adjust the input level slightly lower for more headroom if you wish. Setting the input level for higher meter indications (less headroom) is strongly discouraged unless there is another level-control device prior to the Omnia.11 that will keep the input levels from reaching the maximum digital level of 0 dBFS. During normal operation, you should never see the red "0" segments light.

Tabs (Unused Tabs are Grayed-Out)

Dorrough Loudness Meter

Primary Input Level Meters

Secondary Input Level Meters

Peak Indicators
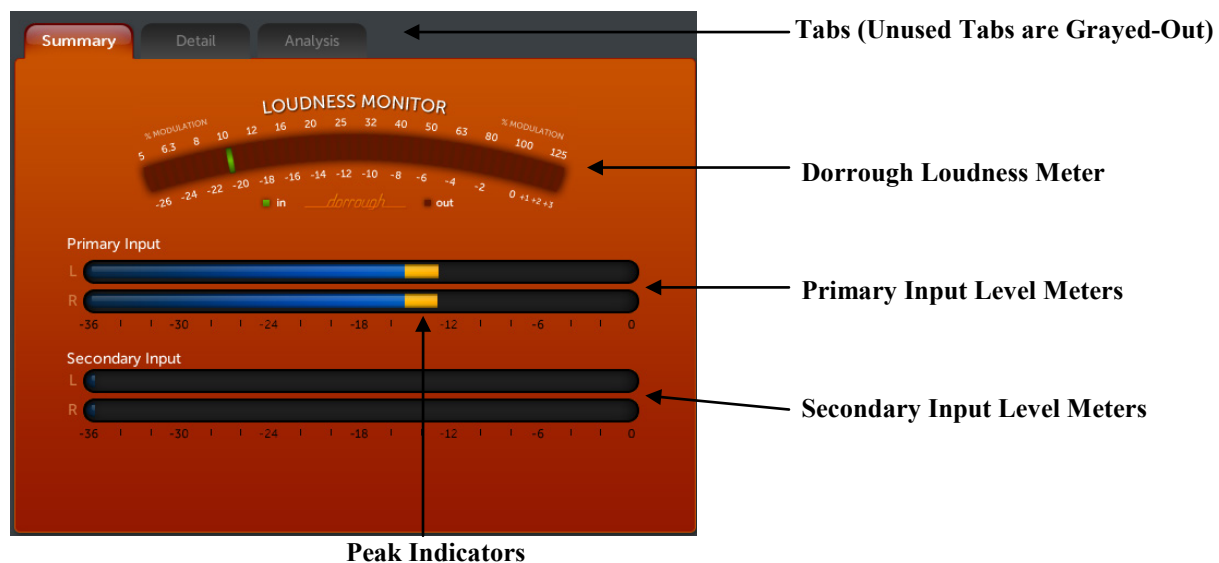
➢ Once the desired Input level setting is reached there is nothing more that needs to be done. No confirmation touch is needed.

➢ If the input source's audio is not well balanced you can touch to highlight and adjust the **Right Trim** control located just below the **Master** you just adjusted. This will adjust the right channel's gain only over a range of + or – 3dB relative to the gain setting of the left channel.

All of the Omnia.11's variable controls and Off/On switches are set in a similar fashion by using the touch screen to highlight the control to be adjusted, then rotating the jog-wheel to adjust the control. All drop-down list controls are adjusted with the touch screen only. **Note:** Altering any processing or gain parameter will instantly be reflected in a change in the Omnia.11's output characteristics because all adjustments occur in real time. Therefore any adjustments you make will be instantly heard as they occur.

Processing Activity Metering (Gain-Reduction Meters)

Touch the **AGC** icon button to bring up the multi-band AGC metering/menu screen. These meters will be used to illustrate typical gain-reduction metering activity.
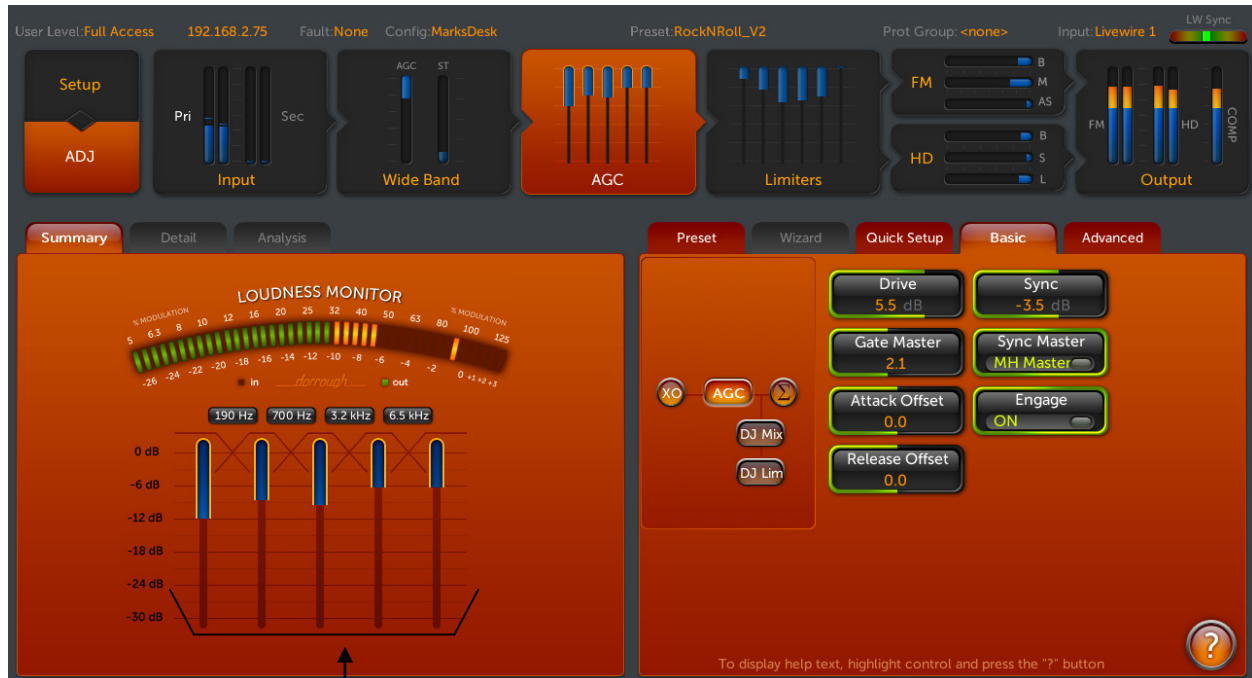
AGC Metering/Menu Screen

AGC Gain-Reduction Meters

The AGC gain-reduction meters in the metering area show the activity of the 5 AGC (automatic gain control) processing bands within the Omnia.11.

The leftmost meter shows the activity in the LO (low) band followed by the ML (mid-low), MH (mid-high), HI (high) and SH (super-high) bands. The Low bands control the bass part of the audio spectrum, the Mid bands the midrange (vocals & instrument fundamentals) and the Hi bands the treble (cymbals & instrument overtones). The 4 currently selected crossover frequencies are also shown near the top of and between the bargraphs.

The amount of gain-reduction occurring in each band is indicated by a solid blue bar that drops downward from the top.

Gating (gain-freezing) of each band is indicated by a bright yellow outline around the blue bar.

The gain-reduction of the AGCs recover to a resting gain setting which coincides with the RTP (Return to Platform) levels set for each band.

The AGC meters operate relatively slowly since the AGC's job is to control overall levels and to provide a gentle dynamic EQ to moderate compression effect, preparing the audio for the peak controlling sections that follow.

The Wideband AGC section meter operates similarly while the Limiter section meters operate faster and with less overall gain-reduction.

All of the details regarding the AGC and Limiter sections are covered in Chapter 5.

Chapter-3: Setting Up for Your System

Setup Mode

Touch the **Setup** icon button icon in the upper-left corner of the screen to enter Setup mode.

There are 3 setup/configuration screens in Setup mode: **Network**, **Livewire** and **System**. Also, the currently set network parameters, Livewire status information and running system software version can be seen inside the 3 icon buttons.

Network Setup

You should see the following Network setup screen. If not, touch the *Network* icon button to display it.

Network Configuration

The Network setup screen (available from the front panel of the unit only) is where you set up the Omnia.11's network parameters for remote control and/or Livewire use, specify the NTP server to use for setting the realtime clock (manual setting is not available) and setup Reverse Remote Configuration (if required).

A static IP address will be required. DHCP is not supported. **NOTE:** A reboot will be required after changing any of the network parameters. The interface will warn you of this when you touch "Apply".

IMPORTANT NOTE: The Omnia.11 requires that 2 IP addresses on the network be open even though only one of them is directly used. The IP address that is entered into the unit (and is used to connect to it with the remote and for Livewire if present) AND the IP address directly above that need to be open and available on the network.

For example: If you enter 192.168.0.125 as the IP Address, both it and 192.168.0.126 need to be open on the network.

Available parameters are:

IP (IP Address)

Accepts data in the form of four octets to describe the Ipv4 network address assigned to the Omnia.11's network interface. The entries have the form of:

[octet] . [octet] . [octet] . [octet] which when entered may appear as a network address such as:

192.168.0.200

Subnet (Subnet Mask)

Accepts data in the form of four octets to describe the Ipv4 network subnet mask of the Omnia.11's network interface. The entries have the form of:

[octet] . [octet] . [octet] . [octet] which when entered may appear as a network address such as:

255.255.255.0

Gateway

Accepts data in the form of four octets to describe the Ipv4 gateway address assigned to the Omnia.11's network interface. The entries have the form of:

[octet] . [octet] . [octet] . [octet] which when entered may appear as a network address such as:

192.168.0.1

To change a setting, touch anywhere inside the white box for the setting you wish to change and the on-screen keyboard will pop-up:
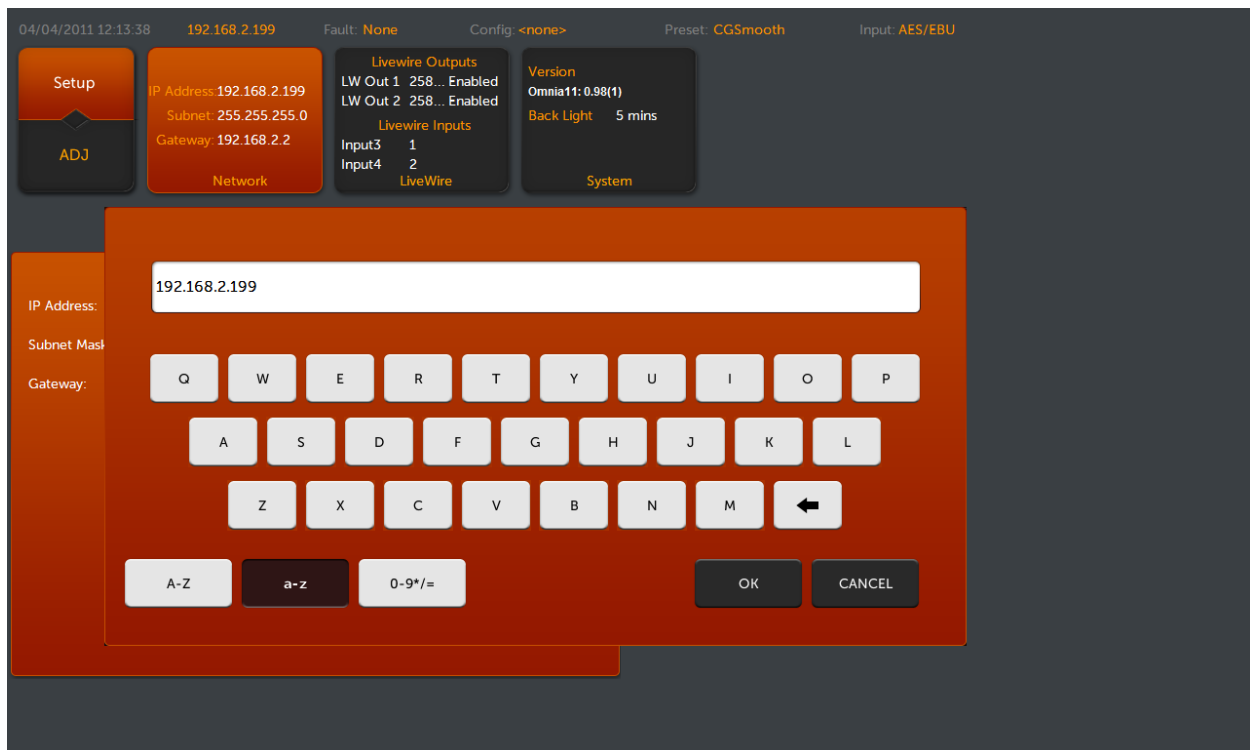
Use the on-screen keyboard to type in the desired addresses. You will need the number entry mode of the keyboard so touch the "**0-9*/=**" button to shift the keyboard to that mode.

Touch just to the right of the current entry at the top of the keyboard to place the cursor at the end of the entry.

From this position, the backspace key [←] can be used to delete the desired number of characters or the entire entry. Note that there is only a backspace key and no Delete key.

Once you have the new entry completed as desired, touch the **OK** key. To cancel without making any changes, touch the **CANCEL** key.

NTP Configuration
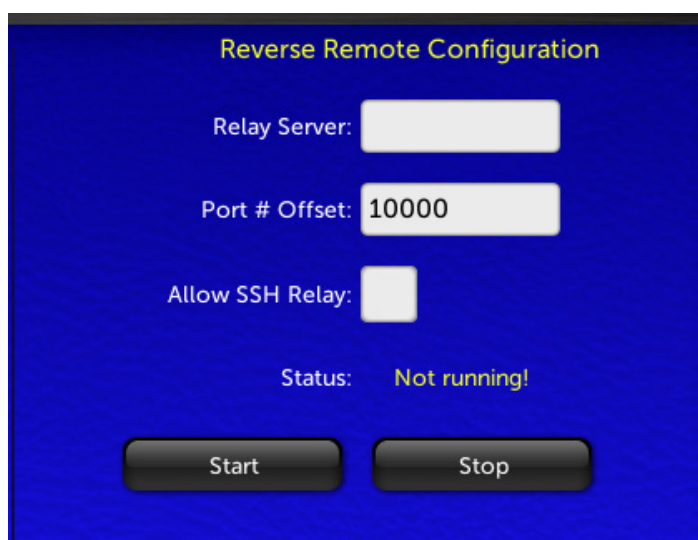
The Omnia.11 real-time clock used for the new "Day Events" feature can be set via NTP only (configured in the Network setup menu) and cannot be set manually.

***Note that network setup can only be done from the front panel of the unit.

Enter the numeric IP address of the desired NTP server in the NTP Server box and choose your time zone from the NTP Time Zone dropdown list. Then touch "APPLY".

Reverse Remote Configuration

Allows you to point the Omnia at a server and make an outbound SSH remote control and diagnostic connection. This can be used to tunnel through a firewall and allow support access. Contact Omnia Support for more information.

Livewire© Setup

Touch the **Livewire** icon button to bring up the Livewire setup screen:

Here you can Enable Livewire and select Livewire input and output channels.

There are 2 stereo Livewire output channels and 2 stereo Livewire input channels available.

Entries are changed as in the Network setup screen by touching the white box to bring up the on-screen keyboard.

To enable or disable Livewire, touch the **Enable** button for the appropriate Livewire output. Livewire is disabled when both Enable buttons are white. The Enable button will turn green when Livewire is enabled for a channel.

Be sure to touch the **Apply** button after making your changes or they will not take effect.
For more information on Livewire, please consult the documentation that came with your Axia or other Livewire gear.

If you do not have a Livewire system and need to use the network interface for remote control, make sure that the 2 Livewire output channels are disabled. If the 2 **Enable** squares are green, touch them to make the squares white then touch "Apply" and the Livewire outputs will be disabled.

When finished, touch the **ADJ** icon button to return to the main metering/menu interface. Or another setup icon button if you wish to continue with setup.

Livewire Sync Indicator

The Livewire Sync indicator can be found in the top-center of the Livewire Setup screen.
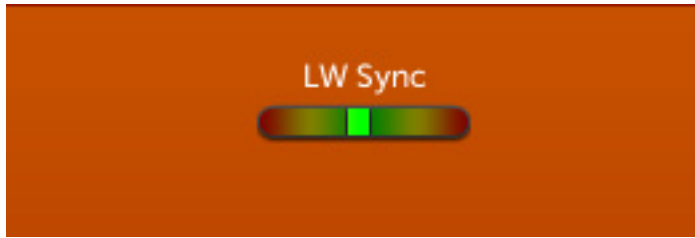
When the Omnia.11 is connected to a Livewire network and at least one of the Livewire outputs is enabled, a green square indicator will appear as in the picture above. While syncing to the network, the green square will be off-center, moving slowly to the center (as shown) once fully synced.

When both Livewire outputs are disabled (as they must be if the unit is on a non-Livewire network), the indicator will appear as in the picture below. Note that if your Omnia.11 is on a Livewire network but you will only be using the Livewire input and won't be using the Livewire outputs, you should still enable at least one of the Livewire outputs so that LW Sync is achieved. Otherwise, audio dropouts can occur.

RDS Setup

Omnia.11 v3.0 adds static built-in RDS to its onboard stereo generator. By "static" we mean that dynamic metadata is not supported. You'll need to enter your PS and RT messages in this front panel screen (only) and these messages will be transmitted continuously.

Your PI code (in Hex) can be automatically generated from your call letters entered into the "Call Sign" box.

Manually enter your desired static PS text (maximum 8 characters) in the "PS" box.

Manually enter your desired static RT text in the "RT" box.

Touch "RDS" for the European RDS standard or "RDBS" for the USA standard.

Enter your alternate frequency list (if any) in the following format: 98.7,100.2,106.4, etc.

To turn the internal RDS generator on, advance the "RDS Level" control above 0.0% (which is OFF). Typically RDS injection level should be 4.0%.

The rest of the switches on the right-hand portion of the screen set the features being transmitted on your station as seen on RDS capable radios. Turn on only the options featured on your station.

***Note that Updating the RDS data from the web page interface will cause the new data to be saved, but will not update the on-air transmission. Only pressing "Apply" on the front panel will update the on-air data.

Security Setup

Introduction

Many Omnia 11 customers require the ability to restrict access to various controls and settings. Different users should have access to different sets of controls based on the password that they have been given. While this is deemed "multi-level" security, the various access modes are not strictly arranged in levels, where each higher level would simply add more privileges to the previous ones. Instead, each level allows access to some set of controls/settings, and the various sets may overlap in different ways.

Definition of Static Security Levels

There are six different access levels available from the **User Level** dropdown:

Access Level	Default Password	Description
Full Access	omnia	Full access to all screens and controls.
IO Edit	omniaio	Read/write to everything in "Input" and "Output" blocks, and the entire "Setup" screen. Allows selection, download and upload of I/O Configs and Presets. Allows bank selection and update. Cannot view or edit processing controls.
Preset Edit	omniapreset	Read/write to everything in all Processing blocks, and the "System" block on the "Setup" screen. Allows selection, download and upload of I/O Configs and Presets. Allows bank selection and update.
Read Only	omniaread	Read only access to everything. Cannot change anything. Cannot select, download or upload Presets or I/O Configs. Cannot select banks or update software.
Preset Select	omniasel	Allows selection of presets. Cannot select I/O Configs. Cannot download or upload Preset or I/O Configs. Cannot select banks or update software.
Lessee Access	omnialessee	Allows access to all controls except composite output levels. Cannot upload I/O Configs.

Five of the six access levels can be enabled or disabled. The "Full Access" level always remains enabled. To disable levels, you must be logged into the "Full Access" level. Navigate to the Security panel of the Setup screen. Under "Change Front Panel Password," select a level other than "Full Access". "Enabled" and "Disabled" radio buttons will appear to the right of the selection. Simply press the desired state.

All passwords are user configurable from the front panel Setup / Security menu or from the Configuration page on the remote webpage interface.

The password for any level can be changed by providing the old password for that level and the new password twice.

Changing Passwords

To change the password, select the desired **User Level.** The default level is "Full Access" with default password: "omnia". To change this, enter the existing password into the "**Old Password**" box, the new password in both the "**New Password**" boxes and then touch the "**Change Password**" button. Be sure to make note of your new password!

NOTE: This same password is also used for remote control access and can be changed from the remote webpage interface as well.

Auto Lock when ON will automatically lock the front panel when the screensaver activates. The password will be required at bootup and whenever exiting screensaver mode.

Lock when touched will lock the front panel immediately, requiring the password to regain access.

Change Level will bring up the unlock keyboard similarly to **Lock** but will not lock the unit immediately, allowing you to change the User Level and input the appropriate password for that level. Touch or click **Cancel** to cancel without making changes.

Preset Protection

Introduction

To *protect* a preset means to encrypt the file in which the preset is stored, so that only Omnia 11 units that have been "authorized" to run the preset can make any use of it. If a unit is not authorized, it cannot put the preset on air, and nobody using the unit can read or modify the preset. Encrypted preset files can be downloaded and distributed, but are unusable to anyone without the correct authorization. These preset authorizations can be created or installed on an Omnia 11. The Omnia.11 remote control webpage interface can also be used to author authorizations for use on other Omnia 11 units.

Protecting Presets

A preset is protected by associating it with a required *authorization*, which has a name and a secret passphrase. The name must consist of only letters, numbers, and the underscore (_), and can be up to 30 characters long. The passphrase can have any characters, and can be longer, if desired. Many presets can be associated with the same authorization, and all of them will be authorized (or de-authorized) on a unit together, as a group (sometimes this may be referred to as a preset authorization group, or protection group). The same authorization can be installed on many units by entering the same name and secret passphrase on all of the units (or it may be installed through the webpages – see below). All presets associated with the authorization will be authorized on all units. Note that both the name and the passphrase must be the same; entering a group with the same name but a different passphrase on another unit will not authorize the presets. Protected presets will always be associated with exactly one authorization; they cannot have more than one, and they must always have one in order to be protected.

Using Preset Protection

To use the protect function on a preset, you first need to create an authorization on your unit. To do this:
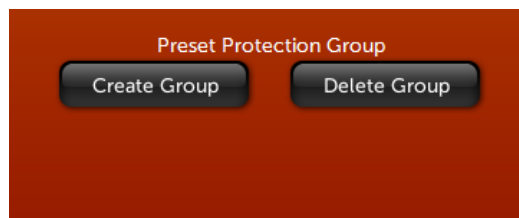
-- Go to the "Setup" menu, "Security" panel
-- Press the "Create Auth" button (under "Preset Authorizations")
-- Enter the name ("Group") and the passphrase ("Password"), and Press "OK"
-- It will take a second or two, and a success message should be displayed (press "OK").

Once this is done, you can return to the "ADJ" screen, processing panel, "Preset" tab. A factory preset cannot be protected, so use "Save Current As" to create a user preset if one does not already exist.

To protect a preset:

-- Select the preset, putting it on-air.
-- Press the "Protect Current" button.
-- Enter the name of the authorization to associate with the preset. The preset will be encrypted based on the passphrase that was entered when the authorization was created. You do not need to enter the passphrase here. The unit was automatically authorized to work with this preset (and any other presets associated with the same authorization) when the authorization was created, above.

The protected preset will now work just like any other preset on this unit. It can be selected, viewed, modified, and saved; but only when logged into a level that has permission to do so. For example, if a user is logged into the I/O Edit level, he will not be able to view or modify the preset. He could select the preset, delete the preset from the unit, or copy the preset using "Save Current As". If the preset is copied, it will retain its protected status and authorization requirement.

The protected preset can also be downloaded from the "File Transfer" web page. The downloaded file will be encrypted. If uploaded to another unit, it will be useless until the authorization is added to that unit as well.

To see what happens when a protected preset is not authorized, you can delete the authorization that was created above:
-- Go to the "Setup" Page, "Security" panel
-- Press the "Delete Auth" button (under "Preset Authorizations")
-- Enter the name ("Group") and the passphrase ("Password"), and Press "OK". The passphrase must be entered here to ensure that nobody accidentally deletes an authorization that they cannot re-create.

-- It will take a second or two, and a success message should be displayed (press "OK").
Now return to the "ADJ" page and try to select the preset. You should get an error: "This machine is not authorized to access this preset." There is no way to view, modify, or save an unauthorized preset. The preset can be deleted.

Managing Authorizations

We have already seen how authorizations can be created and deleted "by hand" locally on one Omnia 11 unit. In many cases, this may be all that is necessary. However, when managing a number of units or distributing presets remotely, other facilities are needed. These facilities are provided on the Omnia 11 webpages.   Log into the Omnia 11 web server and navigate to the "Data Management" page, then click the "Preset Authorization" button to see them.

The front panel capabilities to create and delete authorizations are duplicated here, under the "Create New Authorizations" and "Delete Authorizations" headings. Next is a form, "Upload Authorization(s)", that allows remotely-created authorizations to be uploaded to the unit. If you have a protected preset that requires an authorization from someone else, one way to obtain the authorization would be to ask the preset author for the authorization name and passphrase and enter it manually. This method would require the preset author to divulge the passphrase and require manual entry of the information. To avoid this, the preset author can create an authorization specific to a single Omnia 11 unit. You must first download the Hardware ID file of your unit, using the "Hardware ID" button below the upload form. This ID file is sent to the author, who can then send back an authorization. The upload form is then used to upload the authorization to the unit.

For cases where many Omnia 11 units must all be loaded with the same set of authorizations, an ***authorization key list*** can be used. If someone has provided you with such a file, it can be uploaded using the form under the "Install New Authorization Key List" heading. Doing this will erase all authorizations currently installed on the unit and replace them with the new list. It is intended for bulk management of units. Note also that the key list file is the "universal key" to the protected presets, allowing any Omnia 11 unit to access them. It should be guarded appropriately.

At the bottom of the page is an "Auth Authoring" button. This is useful to those who wish to create and distribute protected presets as well as the authorizations required to use them. Clicking on this button will bring you to a new page.

The first section of this page, "Create Foreign Authorization File", allows you to create the files that are used in the "Upload Authorization(s)" form, as described above. To do this, you must have the Hardware ID file from the unit that you wish to authorize. Enter the authorization name and the correct passphrase, select the ID file, and press "Create". A file will be generated for download to your computer. This file will only work on the Omnia 11 unit with the Hardware ID that was given, and it is not possible to obtain the passphrase from the contents of the file.

The next section allows authorization key lists to be created. While these key list files are encrypted, they do contain the secret passphrases necessary to authorize any Omnia 11 unit to use the presets protected by any authorization in the list. Thus, they should be guarded with similar care as the passphrases. To create a key list file, enter the authorization names on the left pane of the form, pressing enter between each one. Press tab or use the mouse to move to the right side of the form, and enter the corresponding passphrases, pressing enter between each one. Press "Create." A file will be generated for download to your computer.

System Setup

Touch the **System** icon button to bring up the System setup screen:
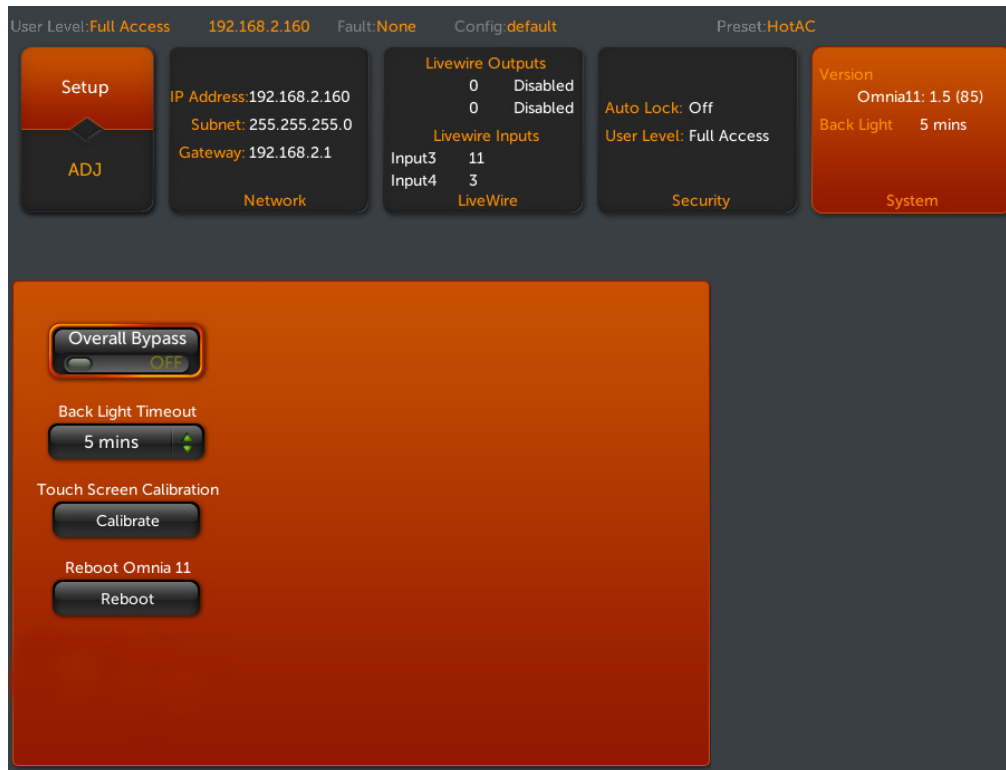
There are 4 controls located here: **Overall Bypass**, **Back Light Timeout, Touch Screen Calibrate** and **Reboot** .

Overall Bypass does just what it says, bypassing all processing sections in the Omnia sending the input directly to the output. Needless to say, this should only be used for system, factory and bench testing. Be careful not to inadvertently turn this on!

Back Light Timeout selects the timeout duration for the LCD backlight. Backlight timeout choices are 5, 10 or 15 minutes (of inactivity).

Touch Screen Calibration: To calibrate the touch screen, touch the **Calibrate** button and follow the on-screen instructions.

You will be asked to touch the center of a target in 9 screen positions. When done, click the **Accept** button in the lower left corner of the screen.

***NOTE: This calibration should only be done if needed. It is very important to touch the targets exactly in their centers using a non-scratching stylus.

Reboot will perform a soft reboot of the system after you confirm "OK" in the box that pops up (you can also "Cancel"). Please note that touching "OK" will take you off the air for about one minute while the Omnia.11 reboots, so be sure you are prepared to do this or have a backup processor online.

Input/Output Configuration and Metering

It is of the utmost importance that the Omnia.11 be properly configured for the system that it will be used in. This will ensure optimum performance of the entire system, maximum quality and loudness over the air.\

Input Configuration

All Input configuration settings can be found in the **Basic** tab on the **Input** screen.
If not there already, touch the **ADJ** icon button (if you are still in the Setup mode) and then the **Input** icon button to display the basic Input screen.

This is where you choose your input source, failover source, set input levels, input mode and overall polarity.

If you have not done so already, the instructions for properly setting the input levels can be found in Chapter 2 on Page 11. Input levels can be adjusted separately for Analog, AES/EBU and Livewire inputs.

The **Input Mode** drop-down control allows you to select from Stereo (the default setting), Mono L (routes the left channel input signal to both the left and right processing channels), Mono R (same as Mono L but uses the right channel input signal), Mono L+R (sums the left and right input channels to mono and applies the summed signal to both channels) and Swap (Stereo but with the left and right channels reversed)

The **Input Polarity** drop-down control allows you to change the polarity of the input audio in several ways. **Both** is typically selected if it sounds "better" to an announcer (monitoring themselves in headphones using the DJ output of the processing) than **None**. One of the two settings should. The goal is to make the relative phase of the headphone feed more in phase with the announcer's hearing of his or her own bone conduction. Once set, this setting should remain the same for all announcers using the same headphone feed.
Using the **L** setting, only the left channel phase is inverted and using the **R** setting, only the right channel phase is inverted. **NOTE:** These settings are present as a convenience to correct 180-degree stereo phase errors in the input audio to the processor or in another device after the processor.

You can choose from among 4 possible stereo input sources for both the primary and secondary sources: Analog, AES/EBU Digital, Livewire 1 and Livewire 2.

The Primary input source is set using the **Input Source** drop-down control.

There are 3 controls for the Input Failover feature, **Failover Source, Failover Time** and **Comparative Fail**.

Input Menu (Basic Tab)

The primary input source is set with the "**Input Source**" control. This is your main input source.

"**Failover Source**" selects which audio input: **Analog**, **AES/EBU, Livewire 1** or **Livewire 2** will serve as the secondary audio input. Note that the audio input that is selected under Input Source (above) will always be the Primary audio input. A source selected under Failover Source will always be the secondary source.

"**Failover Time**" is the amount of time that will elapse after the failure of audio on the primary input source before the unit makes the decision to switch to the secondary (failover) input source.

For instance, if Failover Time is set for 5 seconds and the primary audio source fails, 5 seconds later the unit will switch to the secondary audio input if that input is active. If, at any time, audio is restored on the primary input (for 1 second, continuously), the unit will switch back to the primary audio input. It will remain with the primary input unless another failure is detected.

The "**Comparative Fail**" control in the Basic tab of the Input menu is normally set to "ON", but, in some extremely rare cases, this has caused a failover to occur when it should not. In order for this "spurious failover" to occur several things must be true:

1) The valid program audio (which is on the primary input) must have one channel silent (or very quiet) for more than the failover time. This occurs in some songs by The Who (and probably The Beatles).
2) The secondary input must not have the same program as the primary input. It must have some program that has audio on both channels.

So you can see it is a rare case where this will happen, therefore the default is "ON", where it will catch more failure conditions.

The comparative failover function looks at both the primary and secondary inputs simultaneously. If the secondary input looks "better" than the primary (it has both channels while the primary has only one, or it is a lot louder), then it switches to the secondary. The switch when "ON" takes place after the condition of the secondary being better has persisted for more than the failover time.

The "OFF" mode failover mechanism is "absolute failover", where it is just looking at the absolute level of the primary input. This mechanism will not react to loss of just one channel. There may be cases where single-channel audio for a while is valid, but if the secondary input has both channels driven, it is more likely the valid signal, and the primary is in error.

Recommendation: If you are feeding the same program to both the primary and secondary inputs, leave this set to "ON". If there is a different program on the secondary input, turn it "OFF". (It only makes sense to compare the two inputs if they are supposed to have the same thing to begin with).

Patch Point (Input Menu Advanced Tab)

As of software version 3.0, the Patch Point is now optimally located for use with watermark encoders and Voltair.

There are 2 dropdown controls, two or three switches and one level control located here:

The "**Patch Return Source**" control sets the input the return feed to the clipper comes from. Possible choices are the Analog XLR input jacks, the AES/EBU input, Livewire 1 or Livewire 2.

The "**Patch Send**" control sets which output the send signal from the output of the 6-Band Limiter section routes to. You can select Analog XLR, AES/EBU, Livewire 1 or Livewire 2.

The "**Patch Mode**" control activates (On) or bypasses (Off) the patch point. Unless you are actually using the patch point, be sure this control remains set to **Off** or the audio to all outputs could be silenced.

The "**Patch Tone**" switch turns on a tone to assist in setting unity gain through the patch point. The tone level is fixed at -12dBFS.

"**Patch Out Level**" allows you to attenuate the patch output level if needed. If your preset ends up sending an average level hotter than -12, use this to compensate. It is imperative that the patch point be at unity gain. If the return is too hot, this will cause distortion since the return signal goes directly to the clipper.

Note that if you turn down the Patch Out Level, it brings up the input level automatically by same amount.

Voltair Mode: (G-Force Only)
This is a special mode that optimizes the audio through the link for use with a watermark encoder. When using the insertion point for watermark encoders, it is desirable to use this feature regardless of whether or not a Voltair is actually being used. Benefits are usually gained either way, though it is most effective when a Voltair is in use.

Tip: If your Omnia.11 is located at the studio, the patch point would be a great place to insert your profanity delay. This will allow you to use the Omnia.11's DJ processor to feed the announcer's headphones since it gets its input from a point before the patch point and contains its own low-delay limiters.

It is also the best place to put your ratings encoder system. Please see the addendum starting on Page for full details and configuration information .

Input Metering

There are 2 horizontal stereo input meters below the Dorrough Loudness Monitor in the Summary tab and 6 vertical meters in the Detail tab: (Note: the Analysis tab is not yet implemented so is grayed-out)

Primary Input shows the real-time peak input level of the input selected with the **Input Source** control in the menu area.

Secondary Input will show the real-time peak input level of the input selected as the **Failover Source.**

Please see the **Proper Setting of Input Levels** section on Page 11 for full details on the setting of the input levels.

The **Dorrough Loudness Monitor** shows the average loudness and peak level of the audio at the same time.

Input Metering Screen (Summary Tab)

When you are in the Input menu, the Dorrough meter automatically switches to monitor the Input L+R audio. It defaults to monitoring the FM channel's Output when you are in any of the processing menus or the Output menu.

Since the output monitor point is after the FM clipper and pre-emphasis, you can also choose to add de-emphasis using the Dorrough Meter "**De-emphasis**" control which is located in the **Advanced** tab of the Output menu.

In the Detail tab are vertical level meters for both the Primary and Secondary inputs as well as meters for the Patch Point.

Input Metering Screen (Detail Tab)

Output Configuration

Output metering can be found in both the Summary and Detail tabs in the Metering area. (See **Output Metering** on Page 34 for details)

There are 7 subgroup buttons on the left side of the Menu area in the Basic tab and there are 2 controls in the Advanced tab.

5 of the subgroup buttons group the output controls that are displayed by output type and the bottom 2 access special options for the FM and HD outputs.

To get started, touch the **Output** icon button to display the Output screen and then touch the **Basic** tab in the Menu area if it is not already selected. The controls will be described by group below.

Analog

There are 4 controls in the **Analog Output Level** group:

The Analog Output Level **Master** controls the output level of both the left & right channel analog XLR jacks simultaneously.

Right Trim controls the level of the right channel only over a limited + or – 3dB range to correct left/right balance issues in the following equipment. This is normally set to "0.0 dB".

De-Emphasis controls whether the analog XLR outputs (when set to **FM**) are de-emphasized (ON) or not (OFF).

Output Selection selects the processing channel assigned to the analog output XLR jacks: **FM, HD**, **DJ** or **PP.**

AES/EBU

There are 4 similar controls in each of the **AES Output 1 Level** and **AES Output 2 Level** groups:

Master controls the AES/EBU digital output level of both the left & right channels simultaneously. **Note:** The Master control in the "AES Output 1 Level" group controls the output from the AES out 1 XLR jack only. Similarly, the Master control in the "AES Output 2 Level" group controls the output from the AES out 2 XLR jack only.

Right Trim controls the level of the right channel only over a limited + or – 3dB range to correct left/right balance issues in the following equipment. This is normally set to "0.0 dB".

De-Emphasis controls whether the appropriate **AES OUT** XLR output (when set to **FM**) is de-emphasized (ON) or not (OFF).

Output Selection selects the processing channel assigned to that output: **FM, HD**, **DJ** or **PP.**

Sample Rate: These two drop-down controls select the sample rate for each of the 2 AES/EBU XLR outputs. Possible settings for **AES 1** are **48k** (internal 48 kHz clock), **Input** (syncs to the sample rate on the AES/EBU input jack) or **External** (syncs to the sample rate of an AES/EBU signal applied to the External Sync XLR input jack on the rear panel). Possible settings for **AES 2** are **44.1k** (internal 44.1 kHz clock), **48k** (internal 48 kHz clock) or **External** (syncs to the sample rate of an AES/EBU signal applied to the External Sync XLR input jack on the rear panel). Sync to **Input** is not available for AES 2. If you have AES 1 synced to Input and you also need AES 2 synced to the same source, you will need to bridge the AES 1 output into the External Sync input and set AES 2 Sample Rate to External.

Livewire

There are 4 similar controls each in the **Livewire 1** and **Livewire 2** groups:

Master controls the Livewire digital output level of both the left & right channels simultaneously. **Note:** The Master control in the "Livewire 1 Level" group controls the output level sent to the Livewire 1 channel configured in the Livewire Setup screen. Similarly, the Master control in the "Livewire 2 Level" group controls the output level sent to the Livewire 2 channel configured in the Livewire Setup screen.

Right Trim controls the level of the right channel only over a limited + or – 3dB range to correct left/right balance issues in the following equipment. This is normally set to "0.0 dB".

Livewire Output Submenu (Basic Tab)

De-Emphasis controls whether the appropriate Livewire output (when set to **FM**) is de-emphasized (ON) or not (OFF).

Output Selection selects the processing channel assigned to that output: **FM, HD, DJ or PP** (Patch Point – this will be the output of the 5-Band AGC section).

Note: When using the Patch Point (**PP**), set the appropriate Livewire Master Level for -12 dBFS (the Livewire output you've assigned for patch SEND). All other levels on the Omnia.11 stay the way you had them before the patch point addition.

Headphone

There is but a single control available here: **Output Selection** selects the processing channel assigned to the front panel headphone jack: **FM, HD, DJ or PP.**

Composite

The stereo MPX generator output levels from both of the analog composite output BNC jacks can be adjusted separately using the **Output 1** and **Output 2** variable controls in the **Composite Level** group over a range of 0 to 10 volts in precise 0.05v increments. Note that when deployed, the Omnia Direct AES composite digital output level is set by the Composite #1 output level control. This is in parallel with the BNC analog Composite #1 output. If an additional (analog backup) composite is required, use the composite #2 BNC output & control.

Composite Output Submenu (Basic Tab)

NOTE: Always use typical program material and a calibrated modulation monitor to properly set modulation. To aid quick adjustment, it sometimes helps to advance the **Clipper Drive** control before adjusting the composite outputs. Note that reference line-up tones applied at the Omnia's input cannot be used since the RMS level of a steady state tone does not *crest* at 100% modulation.

Pilot Level sets the 19kHz pilot injection level up to 12.0%, in 0.1% steps, relative to 100% modulation. To defeat the pilot, simply adjust the Pilot Injection control to "0.0" and the pilot will be off.

Pilot Phase This parameter sets the phase relationship between the 19 kHz pilot and the 38 kHz suppressed carrier. The system default is 0.0 degrees. The performance of the DSP based digital stereo generator is theoretically perfect, however should the phase need adjustment in order to offset time domain errors in the overall transmission system, the pilot phase can be adjusted ±32º, in 1º increments. We recommend that a calibrated modulation monitor be used for this adjustment.

Stereo Separation The stereo sub-channel (L-R) level of the Omnia.11's stereo generator can be reduced by 3 dB or 6 dB to suppress multipath that can occur in certain terrain and within certain transmission systems when heavy processing is used. When a setting of **-3 dB** or **-6 dB** is used, the amount of transmitted L-R and thus the perceived stereo effect is also reduced. However in difficult RF signal coverage areas, the amount of perceived multipath is reduced as well, resulting in the perception of a much cleaner overall signal with better penetration and coverage. The Omnia.11 defaults to a setting of **Stereo**, using the full L-R signal for maximum separation. We suggest that you leave it in that mode, but the other settings are available for those who wish to experiment, including a setting of full **Mono.**

Sideband Mode The normal setting for the stereo generator is the **DSB** setting which provides the full double-sideband, suppressed carrier L-R signal.

The special **SSB** setting provides a single-sideband, suppressed carrier L-R signal that can help reduce multipath and provide increased protection to the baseband spectrum. Please check with your local regulatory agency before using this mode since it has not been standardized as of this writing.

For more information please see Frank Foti's white paper, available on our website at:

https://www.telosalliance.com/images/Omnia%20Products/White%20Papers/MPX-SSB-White-Paper.pdf

FM Options

There are 3 groups of controls here **Pre-Emphasis**, **BS-412** and **Diversity Delay**.

Pre-Emphasis For the transmission side of conventional FM broadcasting, some form of high-frequency boost, or pre-emphasis is used. The most commonly used values of pre-emphasis are 50 and 75 μs (microseconds). For North and South America, 75 μs is used. In Europe, Australia and New Zealand, 50 μs is employed. The factory default pre-emphasis setting is *75 μs*. The pre-emphasis selection affects the operation of the audio processing and is applied to the composite (BNC and Omnia Direct), discrete, AES/EBU digital and Livewire **FM** channel outputs. The **HD** channel outputs are never pre-emphasized.

FM Options Submenu (Basic Tab)

The pre-emphasized signal at the Left/Right Analog XLR, AES/EBU digital and Livewire outputs can be restored to flat, if needed (such as for monitoring), by the **De-Emphasis** control in each of the respective output groups.

There are three choices for pre-emphasis in the drop-down control: **Off**, **50 μs** or **75 μs.** Be sure to select the pre-emphasis that is correct for your country.
Note: Normally, the "**Off**" selection under the Pre-emphasis options would not be used in conventional FM transmission applications, but is provided in instances where processing of a flat signal is desired. One example would be when preprocessing prior to a satellite uplink in distributed radio networks.

TU BS-412 Power Limiter

In certain parts of the world, the average multiplex signal power must be controlled to reduce adjacent channel interference. The currently enforced standard falls under the ITU BS-412 regulations. The Omnia.11 FM has a very effective Multiplex Power Limiter that may be enabled to comply with these regulations.

Loudness Loss Warning!
If your country's regulatory agency does not require the use of the ITU BS-412 Multiplex Power Limiter, make certain that the BS-412 "Engage" control is set to "**Off**", or severe loss of loudness will result! For example, when the ITU BS-412 Power Limiter is switched on and set at 0.0dB, there is approximately a FIVE dB loudness loss over the limiter being switched off!

BS-412 Engage: This control enables (**On**) or disables (**Off**) the BS-412 Power Limiter. The default setting is **Off.**

Threshold: When **On** above, this control sets the average multiplex power from -3.0dB up to 9.0dB (in 0.25dB steps) with respect to the original 0.0dB ITU BS-412 standard.

There is also a **BS-412 Drive** control located in the **FM** menu that is activated when this feature is engaged. This adjusts the depth of limiting.

Diversity Delay

The 3 buttons below the numerical diversity delay time display are used to set the precise diversity delay time (typically used for HD Radio installations) that will be applied to any output that is set to the **FM** channel.

To adjust the delay time, start by touching the **sec** button and use the jog wheel (or mouse wheel in the remote) to set the coarse delay time in seconds. Similarly, you can touch the **msec** and **usec** buttons to finely adjust the delay time in milliseconds and microseconds.

To activate the diversity delay, turn the "**Diversity Delay**" switch ON.

SCA IN LVL (Control on Rear Panel)

 The SCA input level control is an analog trimpot and does not appear in the menu. This trimpot is located just above the SCA Input BNC jack on the rear panel. A small flat-blade screwdriver will be needed to adjust it.

Signals input to the SCA jack are simply mixed into both composite outputs through the trimpot.

The gain range is from 0.034 (-29dB) to 1.35 (+2.6dB). At the lowest gain setting, you can feed it a 10V SCA signal and get 8.6% injection on a 3.6V composite output setting. At the highest gain setting, you can feed it a 0.25V SCA signal and get 8.6% injection on a 3.6V composite output setting. (The composite + 9% pilot should be 3.6 V p-p in these cases. The SCA adds to this, making the total higher and the SCA 8.6% of the total).

HD Options

There's a dropdown control and a switch here.
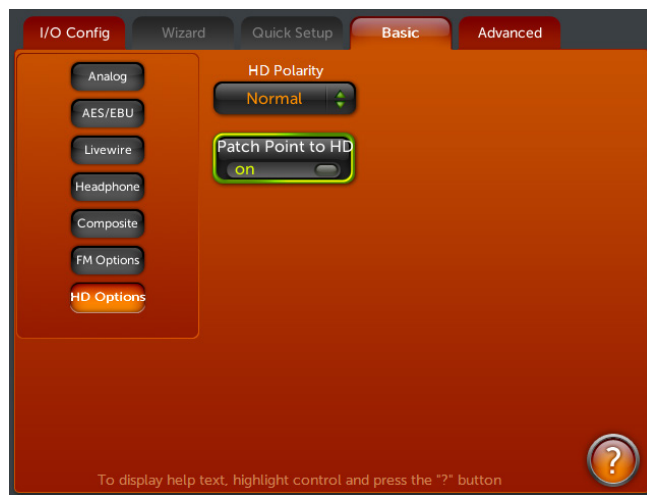
HD Options Submenu (Basic Tab)

Output Menu (Advanced Tab)

There's a switch and a dropdown control here:

The Dorrough Meter **De-Emphasis** switch when ON, sends de-emphasized audio to the Dorrough Loudness Monitor meter. When off, the pre-emphasized audio is sent to the meter.

The **FM Test Tone Mode** dropdown turns on a 400Hz test tone which is fed to the FM output only. You can choose from "L Only", "R Only", "L+R" or "L-R". **NOTE: When selecting any of these options except "Off" the tone will replace the program audio on any FM output instantly!**

Output Metering

Summary Tab
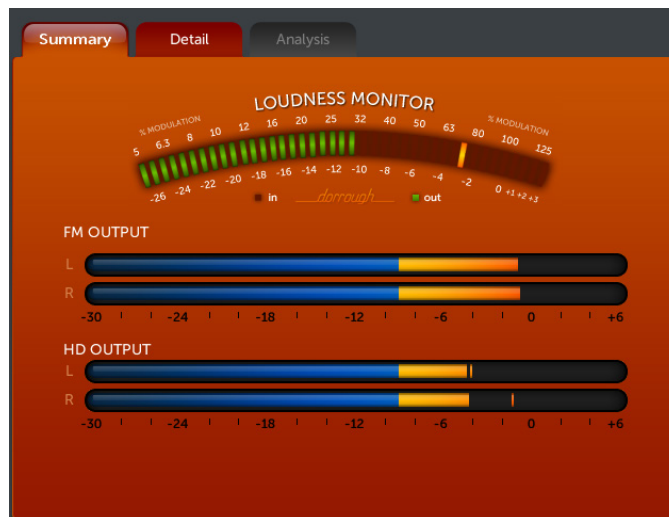
There are 2 stereo output meters below the Dorrough Loudness Monitor in the Summary metering tab:

The **FM OUTPUT** meter shows the real-time peak output level of the "FM" channel *before* the output level controls referenced to the maximum output level of 0 dBFS. The HD OUTPUT meter similarly shows the relative peak output of the HD channel. Normally, these meters will be peaking all the way up near 0dBFS when the channel is active. The FM and HD OUTPUT meters can be used as a quick way to check that the channels are active internally.

Output Metering Screen (Summary Tab)

The **Dorrough Loudness Monitor** shows the average loudness and peak level of the audio at the same time.

When you are in the Input menu, the Dorrough meter automatically switches to monitor the Input L+R audio. It defaults to monitoring the FM channel's Output when you are in any of the processing menus or the Output menu.

Since the output monitor point is after the FM clipper and pre-emphasis, you can also choose to add de-emphasis using the Dorrough Meter "**De-emphasis**" control which is located in the **Advanced** tab of the Output menu.

Detail Tab

There are 5 stereo output meters and a composite meter in the Detail tab:
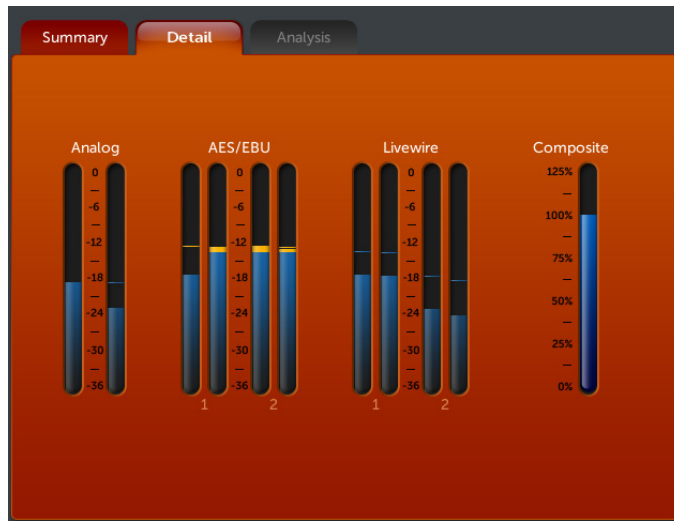
Output Metering Screen (Detail Tab)

The 5 stereo output meters show the real-time <u>peak</u> level of the actual outputs *after* the output level controls in the Menu screen.

Analog Shows the actual <u>peak</u> output level of the Left and Right analog XLR output jacks referenced to a "0" peak level of +22 dBu.

AES/EBU

1 Shows the actual <u>peak</u> output level of the AES 1 XLR output jack referenced to 0 dBFS.

2 Shows the actual <u>peak</u> output level of the AES 2 XLR output jack referenced to 0 dBFS.

Livewire

1 Shows the actual <u>peak</u> output level of the Livewire 1 output referenced to 0 dBFS.
2 Shows the actual <u>peak</u> output level of the Livewire 2 output referenced to 0 dBFS.

Composite shows the relative peak output of the composite MPX signal from the built-in stereo generator *before* the composite output level controls relative to 100% modulation. Normally, this meter will be peaking all the way up near 100%. This can be used as a quick way to check that the stereo generator output channel is active internally.

Chapter-4: Introduction to Omnia.11 Processing
(Orange Mode – See Appendix D for G-Force)

What you have before you is the result of years of intensive research and re-thinking by Team Omnia of what an FM processor should and should NOT be doing to your precious program audio!

Things have changed quite a bit in the years since the previous generation of FM processors was designed.

Newer music is often so pre-processed already that the last thing it needs is more processing! Now it's possible for the processor to be "smart" enough to know whether a program element is pre-processed or not and act accordingly. The Omnia.11 is able to do as little further "damage" as possible to already processed content (such as a song from a modern hyper-compressed CD) while acting more aggressively on more dynamic, less pre-processed material.

New technologies have given us ways to design the processor algorithms much more interactively, allowing us to instantly hear the results of changes. This has led to previously unheard of ways to minimize distortion, particularly IM (Intermodulation) distortion, from ALL sections of the processing.

Omnia.11's new algorithms, especially the G-Force algorithms, allow the processor to output a much more natural and less-fatiguing sound, WITHOUT losing loudness! And WHILE maintaining your consistent sound "signature". These improvements affect ANY format…as the old saying goes: "From Bach to Rock" and everything in between…and beyond!

The Omnia.11 contains processing for both FM analog stereo transmission and coded audio broadcasts of the same program material, such as the HD-1 digital channel or Internet simulcasts.

Please make sure that you have gone through Chapters 1 through 3 and that the Omnia.11 is installed in the rack and connected to a source of primary program audio before continuing with the rest of this chapter.

The Omnia.11 employs a conventional-looking processing layout (topology) that at first glance appears very similar to our own Omnia-6. But that is where the similarity ends.

Each processing section in the Omnia.11 is much "smarter" than any previous processor so some change in conventional thinking about the adjustment of the processing parameters will be needed on your part if you want to delve in deeply while creating your "signature sound".

But it is also entirely possible that once the Omnia.11 is set up properly for your system and the audio levels are properly adjusted, you will find one of our included processing presets "hits the spot" and no further adjustment will be needed!

So the first thing to do, as alluded to above, is to make sure that all of the Input and Output settings are correct for your system and the levels for your selected inputs and outputs are adjusted properly.

Then it will be time to select a preset to start (or stay) with.

We will go over the basics in this chapter and then Chapter 5 will cover every available control and setting, if needed.

NOTE: You may initially feel that your air sound with Omnia.11 is somewhat "less bright" than with your older processor. Given that the Omnia.11 is set up correctly for your system, this is generally because distortion generated in the old processor was actually creating a "false brightness" to the sound. With Omnia.11 you are actually hearing all of the natural treble that is in the program material on the air, quite possibly for the first time!

Where to Begin?

The following is intended for the "traditional" (orange) style processing only. For information about the G-Force (blue) style, please see Appendix D.

We strongly suggest removing or bypassing any other audio processors in the air chain ahead of Omnia.11.

If you are using a front-end AGC such as the Compellor® ahead of your STL, use it only for overload protection and not with any AGC activity. These additional AGC devices can conflict with or reduce the effectiveness of the Omnia.11's new highly effective Wideband AGC.

Once your Omnia.11 is properly installed and passing audio at the proper levels, it is time to select a preset!

Presets

Omnia.11 is equipped with a selection of factory presets that can be used to instantly configure the processing for common applications. The currently loaded preset is displayed in the **Status Bar**, just above the **Limiters** icon button.

IP Address	Fault Indicator	I/O Configuration	Active Preset	Active Input Source
192.168.2.75	Fault: None	Config: MarksDesk	Preset: CGSmooth1a_MM9e1	Input: Livewire 1

Status Bar
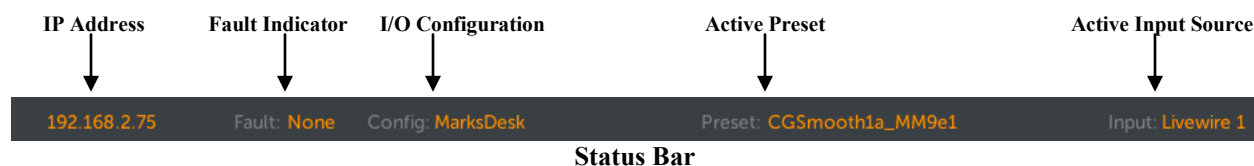
Some of the presets have format-based names. Do not take these names too literally! It is entirely possible that you may like a preset named "Country_Open" (or like it enough to use it as a starting point) for your Smooth Jazz station.

Note: The presets for the "traditional" (orange) style and G-Force (blue) style are not compatible with one another. Each style has their own set of presets even though the names may be the same or similar. Custom presets from previous Omnia.11 1.x versions will only be compatible with the "traditional" (orange) style and may be imported if desired. These presets will NOT import or run on the G-Force style.

The best way to begin is to actually try all of the factory presets, accessible from the **Preset** tab in the Menu Area of any **ADJ** mode screen (except Input or Output). Adjust the controls in the **Quick Setup** tab for each one as described below. After making these basic adjustments for each preset tried, you should be able to settle on one preset and save it with your changes as a user preset. Once saved, you can simply use it as-is or use it as a starting point for further customization (if needed).

10 user presets are shown per screen so use the **PAGE UP** and **PAGE DOWN** buttons to see more available presets. They are arranged in alphabetical order in 2 groups. The factory presets are listed first followed by user presets.

Important Note: When changing between the various presets, allow some time for the newly loaded preset to "settle-in" since there may be some large parameter changes happening depending on the previously selected preset.

You can find a list of all the factory presets, with a short description for each, starting on Page 41.

To instantly put a preset on the air, unlock the preset list by touching the "padlock" icon in the upper-left corner of the list and then simply touch the desired preset's name in the Preset list.
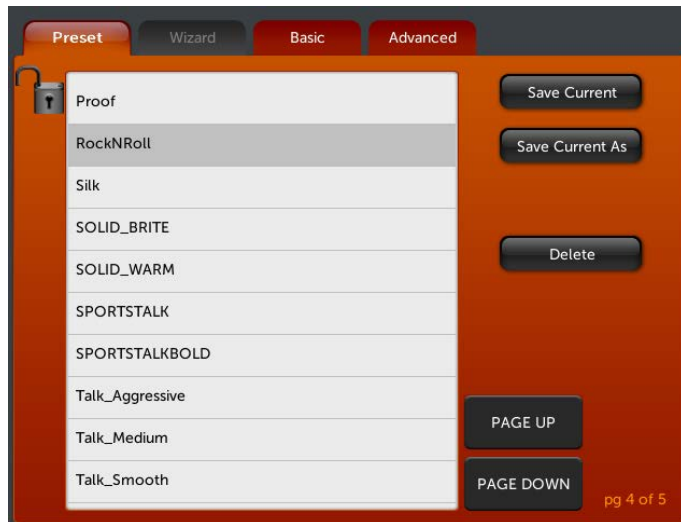
Unlocked Preset Tab

To see more presets, touch the **PAGE UP** or **PAGE DOWN** buttons. The presets are arranged alphabetically in 2 groups. The first group contains the factory presets. The second group contains your user presets and is located below the factory presets.

Start by trying the various factory presets while listening to your typical program material and taking note of their differences. Then try to decide on one to start with and listen to it on as many different types of radios as you can.

Quick Setup Tab

It is important to adjust a few basic controls for each preset that you try. This will adapt them to your ears and your market. These controls are now conveniently grouped together in the **Quick Setup** tab (shown below). The metering pane automatically switches to show the clipper g/r metering when **Quick Setup** is selected.

Clipper Drive and Auto Sense

The first important control to adjust is the **Clipper Drive**. This appears both here in the **Quick Setup** tab and in the Basic tab of the **FM** menu.

Since every air chain and market is different, this control should always be adjusted to as low a setting as possible for the level of loudness needed. You can think of this control as adjusting the primary "loudness vs. distortion" tradeoff.

Quick Setup Tab

We suggest that each time you try a new factory preset, you adjust the Clip Drive as follows: Start by turning the **Auto Sense** control all the way down to 0.0. Adjust the **Clipper Drive** control down in 0.5dB steps until the loudness *just* falls off too much and then bring it up a bit from there. Finally, turn up the **Auto Sense** until about 0.5 to 1.0 dB of activity can be seen on the Auto Sense meter.

That is the correct setting *for you* for the currently selected preset. On some presets, you may need to turn it up instead of down. This is OK too. Adjust it up in the same 0.5db steps until you achieve the loudness required or the sound becomes too distorted, whichever comes first. If the distortion comes first, you probably need to start with a more aggressive preset.

NOTE: If you are turning up the Clip Drive to increase loudness and you reach a point where the loudness and distortion do not seem to be increasing as you would expect, you have likely run into the **Auto Sense** ceiling. Try turning down the **Auto Sense** control a little. This will allow more clipping to take place. For more information about clipper Auto Sense, please see Page 60.

Bass Growl

This is the next control that is important to adjust with each preset that you try. This control is located in both the **Quick Setup** tab and in the **Advanced** tab of the Wide Band / **ENH** menu.

Bass Growl tunes a number of behind-the-scenes parameters at once to tune the Omnia.11 for the desired amount of bass. Higher settings cause the bass enhancers in the **Basic** tab of the **ENH** menu to be more audible more of the time. So after making an adjustment to Bass Growl, go back and revisit your Deep/Phat/Warm bass enhancer settings if needed. Note that the Deep Bass and Warm Bass controls can also be found in the **Quick Setup** tab. The **Phat Bass** control is only found in the ENH / Basic tab. For more information about **Phat Bass**, please see Page 51.

The **Enhancer Mode** switch

Brightness

The last 2 basic controls that are important to adjust for each preset tried are the **Presence** and **Treble** brightness controls.

A setting of "0.0" will add no additional brightness to the selected preset. Turn each up to taste but be careful not to use more than needed since excessive limiter activity or clipping could occur with very high settings. A little goes a long way here!

Saving User Presets

Once you have made changes to any parameter, such as the controls in the **Quick Setup** tab discussed above, it is a good idea to save those changes so they will not be lost. The factory presets cannot be over-written so a new user preset must be created. This is done from the **Preset** tab using the **Save Current As** button.

When you touch **Save Current As** the on-screen keyboard will pop-up. Use the on-screen keyboard to type a name for your new preset and then touch "OK". While up to 20 characters can be shown for each preset in the preset list window, try to keep the preset names short and descriptive if possible.

If you should want to delete a user preset (factory presets cannot be deleted), touch the **Delete** button and a new window opens containing a list of all of the previously saved user presets. 10 user presets are shown per screen so use the **PAGE UP** and **PAGE DOWN** buttons if needed to see more user presets.

When you make new changes to an existing user preset, touch the **Save Current** button to save the new changes.

Help Text

The new context-sensitive help text feature will pop up a box with information about the currently selected control when that control is highlighted and then the "**?**" button in the lower-right hand corner of the menu screen is touched (or clicked in the remote).

Preset Descriptions ("traditional" orange mode)

Presets Designed for 75us Pre-Emphasis (by Cornelius Gould, Frank Foti, Mark Manolio or Ted Alexander unless marked otherwise)

AC
Generic starting point Like a blank canvas without much enhancement. Good to use to build a sound from "scratch".

AC_V2
Same as above but optimized for the latest software features.

AudioChameleon
In the Audio Chameleon presets, the 5-Band AGC has more of an effect on the overall sound. Rather than just a slow dynamic EQ, they work more as smart compressors so are contributing more to the density of the sound.

BigAC
A re-creation of the preset of the same name that was in the original Omnia.11 beta software.

CGSmooth
A very good alternative starting point for just about anything except over-the-top density. This preserves more of the natural dynamics in the program material than say RockNRoll but not as much as Dynamics.

CGWarm
Warmer version of the above.

Classical
This is the "purist" classical preset. There is no multi-band AGC so the WideBand AGC is fed directly to the limiters.

Classical_V2
Same as above but optimized for the latest software features.

Classical_5B_AGC
This adds the 5-Band AGC to the above for some dynamic EQ.

Classical_5B_AGC_2
As above but optimized for the latest software features.

Classical_5B_AGC_Enh
This one adds more of the "movie soundtrack" like sound where the 5-Band AGC and bass enhancers are used to provide a more processed sound. This will be louder than the ones above but not as natural sounding.

Compression_Brite
Provides that "compressed" or "squashed" sound. If you like to "hear the processing" try starting with this!

Cosmic
A high TSL preset, smooth and bright but with plenty of mids. Another one to try that can handle pretty much anything you can throw at it.

Cosmic_V2
Same as above but optimized for the latest software features.

Cosmic_O6
Tuned to emulate the Cosmic preset from the Omnia-6 EXi

Country_Brite
Please note that these Country presets are not just for country music! They have a nice balance of highs and lows while letting up-front vocals through clearly. These could also be a good starting point for scratch-built presets. This one is tuned with more highs for additional sparkle and a bit more of a processed sound.

Country Flat
Similar in texture to Country_Brite but with less enhancement.

Country Open
Allows more of the natural dynamics through.

Country_V2
Good starting point for a country format optimized for the latest software features in v1.4.

Country_V3
Good starting point for a country format optimized for the latest software features in v1.5.

Country_Warm
Similar in texture to Country_Flat but with a warmer texture.

Density
A good place to start if you want to make your own dense-sounding preset.

Dynamics
A high TSL preset that really allows the natural dynamics of the program material to come through. It can be very loud when the program material is very loud. It will also be quieter during softer passages, making for greater impact during the transitions. Try this for Jazz or even if you want to be aggressive with classical. Don't discount it for other formats either. Try this if you can, it takes advantage of many of the Omnia.11's unique qualities.

Dynamics_V2
As above but optimized for the previous software v1.2

Dynamics_V3
As above but optimized for the latest software features in v1.4.

Dynamics_V4
As above but optimized for the latest software features in v1.5.

EastWind
An aggressive general preset with lots of 6-Band limiter action.

Eclectic
A jack-of-all-trades preset. Try it for any format. You may like it!

HitCityRadio
Tuned for the CHR format with lots of deep low-end and high-energy processing.

HitCityRadio_V2
As above but optimized for the latest software features in v1.4.

HitCityRadio_V3
As above but optimized for the latest software features in v1.5.

HOT_AC
HOT_AC_V2 (optimized for v1.4 and later)
HOT_CHR
HOT_Country
HOT_Thunder
These are approximate emulations of the original Omnia.FM.HOT presets.

HotAC
A good starting point for Hot Adult Contemporary formats.

Hot_AC_Punch
A punchier version of the above with more apparent dynamics.

HotMix
Excellent starting point for Rock and Hot AC formats where competitive loudness and brightness are needed.

HotMix_Warm
A warmer version of the above.

LegatoCafe
High TSL preset designed for less listener fatigue. It won't burn a hole in the dial but won't disappear either.

Mars
One of the presets to start with if you like a lot of bass.

Mighty80's
That retro highly-compressed bright 80's sound…but better!

Mighty80's_V2
As above but optimized for the latest software features in v1.4.

Nigel Tufnel
This is the "over-the-top" preset. Nigel Tufnel of Spinal Tap would be proud, but since this is the Omia.11, this one goes to 12!

Nova
This one doesn't have any one particular outstanding direction in sound, but draws from many of the presets qualities so is a "middle-ground" preset with a nice, well-behaved sound.

O11 CHR
Another preset tuned for the CHR format and its variants. This one has more multi-band AGC activity than HitCityRadio.

O11_CHR_V2
Same as above but optimized for the latest software features.

O6 CHR
Approximates the sound of the "CHR" preset in the Omnia-6.

Open_Punchy
Good, general starting preset with good punch and dynamic feel.

PowerCountry
A more aggressive preset for country vs. the original country presets.

PowerHits
A HotAC/CHR-tuned preset that sits between HitCityRadio and PowerMix.

PowerMix
PowerMix is tuned for HotAC formats and their varants. As aggressive, but less bright than the CHR-tuned presets.

PowerMix_V2
Same as above but optimized for the latest software features.

Proof
Factory Test Preset - Don't select this unless you are running tests on your signal or on the bench! This bypasses most of the processing so there is no modulation control at all!

Revibe (from Mark Allen)
An aggressive loud & bright preset for users in markets with a considerable loudness war. Has bass punch to cut through.

RockNRoll
It is an updated version of the RockNRoll preset from the long line of previous Omnias. It has a moderate smile curve and is a great starting point for Rock formats.

Rock_Warm
A warmer version of the above.

RockNRoll_Bold_A
A version of RockNRoll with fuller low end.

RockNRoll_V2
The default preset. Same as RockNRoll above but optimized for software v1.4. A great place to start!

RockNRoll_V3
The default preset. Same as RockNRoll above but optimized for software v1.5. A great place to start!

SOLID
Another preset recovered from the original Omnia.11 beta software. Good, punchy deep bass!

SOLID BRITE
The "SOLID" presets have a classic compressor sound. This one is tipped-up in brightness. Gives you that "wall of sound".

SOLID WARM
As above but more bass and mids for a more natural frequency balance.

Talk_Hot
A more aggressive FM talk preset.

Talk Medium
Nice starting point for FM talk programming.

Talk_NEWS
Full-response talk preset for general FM-Only talk formats.

Talk_NEWS_V2
The as above but with a 75Hz highpass filter to help match your AM talker.

Talk Smooth
Not trying to be in-your-face at all. For a more natural speech presentation.

Talk_SPORTS
A "medium density" setting that slightly rolls off the highest audio frequencies to reduce sibilance and adds a bit of "bottom end" to hosts that may have less deep voices and need a little help.

Talk_SPORTS_BOLD
Similar in tonal balance to SPORTSTALK, but with significant added density to tighten up the local personality and bring out the phone calls.   Also can be a starting point for controlling wide dynamic range play by play.

TedOldies
A preset for rocknroll oldies by our Ted Alexander.

TheHitMachine
Another CHR preset. Like HitCityRadio but with more aggressive multi-band AGC activity. Has a different bass texture than O11_CHR.

TheMatt
Named in honor of the late Matt Connor who helped Frank Foti put the original Omnia.FM on the processing map back in the mid-90's

TheMatt_V2
As above but optimized for the latest software versions.

ThePooh
Has a little more warmth to it than TheMatt above. This is in honor of Jim Somich who was Frank Foti's mentor in radio and audio processing.

TheWarmPreset
This is where to start if you want a really warm, rich, round sound with smooth vocals.

TripleA
Another good general starting preset. Kind of like Cosmic but with less brightness and punchier mids.

UrbanWarm
Lots of warmth and smoothness.

VinylSmooth
Think back to that old turntable. Not too bright with strong mids and moderate bass.

VinylSmoothV2
As above but optimized for the latest software versions.

WarmthDense
A denser, more processed sounding version of TheWarmPreset.

WarmthOpen
A more open version of TheWarmPreset. More natural dynamics come through.

Zeus_Thunder
This is the "over-the-top" preset for bass freaks!

Presets Designed for 50us Pre-Emphasis (by Goran Thomas, David Perreau and Cornelius Gould)

50_AC
Starting preset for Adult Contemporary formats that you can't go wrong with for many other formats. Can also be used as a general purpose preset if your programming is unformatted/varied. Tailored for clean, but 'radio' sound, with consistent bass impact and open high end. Appropriate for long time spent listening and critical audience.

50_AC_BS412
Same as the above, but with revised thresholds and other tweaks to exploit the larger dynamic range available when BS.412 MPX power limitation is used.

50_AC2
A version of the AC preset with a bit more dynamic depth and a bit fuller sound of the bass region. For stations looking for extremely clean sound with a deep and powerful low end.

50_AC2_BS412
Same as the above, but with revised thresholds and other tweaks to exploit the larger dynamic range available when BS.412 MPX power limitation is used.

50_AC3
This is the most aggressive the AC presets for competitive markets. In-your-face sound, with emphasis on loudness, sacrificing a bit of the dynamic range while still maintaining bass depth.

50_AC3_BS412
Same as the above, but with revised thresholds and other tweaks to exploit the larger dynamic range available when BS.412 MPX power limitation is used.

50_AC_Light1
50_AC_Light2
50_AC_Dense1
50_AC_Loud1
These presets can be used for programs with 60's; 70's; 80's and 90's contents. Good for content that has not been heavily mastered! The AGCs run faster to keep the density up.
Light1 and 2 are very natural; Dense1 keeps density with clean final clipping; Loud1 keeps density plus more clipping for loudness.

50_CHR
A preset for (contemporary) hit radio stations suited for modern music production, it packs loudness, power and sparkle in one seductive sound while still allowing DJs to cut through loud and clear.

50_CHR_BS412
Same as the above, but with revised thresholds and other tweaks to exploit the larger dynamic range available when BS.412 MPX power limitation is used.

50_CHR2
Even louder than CHR and tuned for more high end brightness, if you like it bright and sizzling, this is the preset to start with. Despite its loudness, transient and rhythm impact is preserved.

50_CHR2_BS412
Same as the above, but with revised thresholds and other tweaks to exploit the larger dynamic range available when BS.412 MPX power limitation is used.

50_CHR3
Also a louder variation of the CHR preset, but with more emphasis on bass. For markets dominated with heavy low end rather than brightness. Suitable for Urban formats as well, seeking ultimate loudness.

50_CHR3_BS412
Same as the above, but with revised thresholds and other tweaks to exploit the larger dynamic range available when BS.412 MPX power limitation is used.

50_CHR_Dyn01
50_CHR_Loud01
50_CHR_Loud02
These presets can be used for CHR Top 40 programs that use Dance, Pop, Groove, Rnb and some Rap music stuff. This preset has the most compromises, because need to run with many types of music materials...Dyn01 is the most natural with less loudness than the Loud ones.

50_Clean
Designed for public and other radio stations looking for extremely clean and non-fatiguing sound, with a very natural frequency balance. This preset performs less dynamic equalization allowing more original sound texture to come through from cut-to-cut. Transient impact and dynamics is also preserved for maximum fidelity to the source, but loudness is consistent. This is the most 'hi-fi' and cleanest preset of all 50 μs presets.

50_Clean_BS412
Same as the above, but with revised thresholds and other tweaks to exploit the even larger dynamic range available when BS.412 MPX power limitation is used.

50_Dance_Dyn01
50_Dance_Dyn02
50_Dance_Loud01
These preset can be used for dance programs and electro music stuff.
Dyn01 is the more natural, vs Loud01being the louder!

50_POP_Dyn01
50_POP_Dyn02
50_POP_Dense01
50_POP_Loud_01
50_POP_Loud02
These presets can be very useful, because the POP signification is not exactly the same in Europe vs USA. These can be used instead of CHR, for example, because the program director considers that their CHR program is POP. Here they consider that Oasis, GreenDay are pop, but Madonna, David Guetta or Black Eyed Peas are pop too! At the same time David Guetta is considered as dance music, so there is a lot of different type of contents with different balance structure on the sound... Oasis or GreenDay doesn't have high big kick energy vs Madonna, BEP and David Guetta has!!!

This is why there are many different type of POP presets with a lot of compromises on the bass and super high frequency regions.

These are specially adapted for heavy mastering stuff and dense contents with very low dynamics...

Dyn01 & 02 are the most natural.
Dense01 has more loudness created with the AGCs, but without heavy clipping.
Loud is loud!!!!

50_POP_BS412
The BS412 preset is for use with the new MPX Limiter in the 11. This Limiter works very fine now, but some points must be respected like :
- IN setup : peaks must be setup in the input menu to work -12dBFS on the 11's peak Input Level meter.
- MPX out : must be setup and adapted after some time with different contents to be adapted at 75 Khz deviation.

50_PowerHits
A good preset to try for most hit music formats.

50_RnB_Dyn01
50_RnB_Dyn02
50_RnB_Loud01
These are specially adapted for Groove, Rap & RnB programs with hi amounts of deep bass balance inside. Dyn01 and Dyn02 keep the dynamics with less loudness than the Loud01 preset. Dyn01 has les loudness than Dyn02. Dyn01 is the most natural. Loud 01 is louder with less dynamics.

50_RocknRoll
Solid low end, dynamics, sparkling high end and one lush sound - everything is big in Rock 'n' Roll! Due to adaptive nature of Chameleon technology, suits modern and other rock formats as well.

50_RocknRoll_BS412
Same as the above, but with revised thresholds and other tweaks to exploit the larger dynamic range available when BS.412 MPX power limitation is used.

50_Solid
For those preferring a very controlled sound, with minimal transient 'outbursts', this preset keeps everything in-check. Extremely consistent, natural frequency balance, with a bit tight and 'firm' sound it also outlines every little detail.

50_Solid_BS412
Same as the above, but with revised thresholds and other tweaks to exploit the even larger dynamic range available when BS.412 MPX power limitation is used.

50_Talk_Light
50_Talk_Light2
These are for FM talk formats when a more natural sound that is not overly processed sounding is desired.

50_Talk_BS412
A talk format preset for use with the BS412 MPX limiter.

50_Top40
A different take on the CHR-style, Top40 brings different sound texture and cleaner sound while still being very competitive, relying more on compression and a bit more control. May appeal to those preferring the sound of analog processors back in the day, but with the edge of loudness and cleanliness of the modern Omnia DSP algorithms. Give it a try - it may win you over.

50_Top40_BS412
Same as the above, but with revised thresholds and other tweaks to exploit the even larger dynamic range available when BS.412 MPX power limitation is used.

Chapter-5: Detailed Adjustment (Orange Mode)

In this chapter, we provide a detailed list of all of the available user controls in the "traditional" (orange) style that can be used to tailor one of the factory presets into a custom use preset for your "signature sound". For G-Force information, please see Appendix D.

Generally, the controls are set up so that increasing any setting will lead to more aggressive processing. For example, a higher drive setting adds more gain into the dynamics section and a higher attack or release setting means a faster time constant (more compressed sound) etc.

Depending on the type of control adjusted and its range, the changes you make can affect the sound in subtle or extreme ways. Our advice is to make a limited number of changes at a time, make those changes in small increments, and then listen to the results for a period of time before making any further adjustments. Keep in mind that should you get "lost" you can always go back to where you started by simply recalling the factory preset that you started with. The factory presets cannot be overwritten.

Recommended "Tried and True" Adjustment Procedure

1. Make sure that the Omnia.11's Input and Output settings are correct for your system. (See Chapter 3, Page 23: Input & Output Configuration)

2. Once on the air and configured properly for your system, start with a degree of processing that is similar to that currently used by your station (using the preset you selected on Page 38) and then, if desired, become more aggressive. A careful approach is less likely to draw hasty, or even negative, opinions.

3. Be sure to have a clear objective in mind before beginning! Some examples would be 1) to try to increase loudness while maintaining as much quality as possible, 2) to adjust the frequency balance to obtain a certain consistent sound "signature" (more bass, less bass, more mids etc.), 3) to reduce listening fatigue and create a more open, cleaner sound that can be listened to comfortably for longer periods of time. See the following section for some common step-by-step how-to's, including these 3 examples.

4. Listen for a while, then adjust, and listen for a while again. Try to avoid the temptation to continuously "fiddle" with adjustments, just moments after getting the system on the air. Remember that you should evaluate the operation over time, not moment to moment!

5. While making changes to the system, we recommend that you do not make hasty or radical changes. Also, do not make too many different adjustments all at once. If too many parameters are changed at one time, it is hard to determine which change made the difference you may hear. That can be frustrating, whether the change made your station sound better or worse. Take your time. In order for you to become comfortable with your new sound, you should learn the limits of each control. We suggest making changes in increments of no more than +0.5 dB or - 1 dB, or in 1 or 2 step increments. Try turning different functions on and off. Working this way, you will be able to get a better feel for the sound that the Omnia.11 is capable of producing on your station and with your programming.

6. Use the "sleep on it method:" Spend time adjusting and then listening, and when the system gets to a point where it sounds good, **stop!** While making changes to processing, there does come a time when the ears become less and less sensitive to the adjustments you're performing. Ears tire, and that's why spreading the adjustment period over a number of days is recommended. If what you've done still sounds good after you have "slept on it," stop adjusting. If you're not quite there yet, continue with small iterations until you're satisfied. If you are homing in on your goals, you'll find that each day the discrepancies become smaller and you're making fewer adjustments.

7. When you get it where you like it, ***stop and enjoy!***

FAQ - Some Common How-To's:

1) How do I try to increase loudness while maintaining as much quality as possible?

First, make sure that the input levels are set properly and that there is enough drive to the WideBand AGC. At normal program levels, the WB AGC gain-reduction meter should indicate between 12-15dB. (also see 4) below) Then be sure to start with a factory preset that is aggressive enough for your needs. If the one you have selected has all the attributes you are looking for but just needs a little more loudness, you should probably first try adjusting the Clip Drive and Auto Sense per the instructions on Page 39. Also, turning up the overall Limiter Drive can give you a loudness boost if they are running fairly lightly in the preset you have selected.

2) How do I adjust the frequency balance to obtain a certain consistent sound "signature" (more bass, less bass, more mids etc.)?

This is handled mostly by the bass enhancers in the WB menu, the parametric EQ in the Limiter menu Basic tab and the 5-Band AGC section. The bass enhancers work primarily on bass-shy material so their effect may not be audible as you turn them up if the program material already has enough bass in it. Using a higher Bass Growl setting in the Advanced tab will generally make the bass enhancers more audible. See Page 52 for full details. The parametric EQ should be audible most of the time although the limiters may "undo" some of what you do there. See Page 60 for full details. Overall frequency "shaping" is done using the 5-Band AGC. Since it works on average levels over 5 frequency bands, it acts like a "dynamic" EQ. So if you want more bass, for example, when levels are lower, you can boost the lower bands in the XO. This will act like a "loudness contour" bass boost. Similarly, you can contour the mids and highs with the XO controls as well so that is generally the place to start. Adjusting the output levels of each band in the Mixer will apply a fixed amount of equalization over the frequency range of that band. Note that boosting or cutting here will have a direct effect on the corresponding limiter band.

3) How do I reduce listening fatigue and create a more open, cleaner sound that can be listened to comfortably for longer periods of time?

Try backing-off the overall Limiter Drive. Too much limiter activity can cause the program material to sound more "squashed" and "tight". Backing-off on the limiters allowing them to work only on peaks will provide a more open sound. After adjusting the limiter drive, re-adjust the Clip Drive per the instructions on Page 39 since you may be able to use more clipping when the limiters are not working as hard. Some of the more aggressive presets will not respond well to these adjustments and just be aggressive all the time. At that point, it is time to start with another lighter sounding preset.

4) How do I make the processor bring up the volume of quiet song intros more?

This function is handled mostly by the WideBand AGC. Try increasing the Release setting in the Basic tab and/or set the Window setting closer to 0 in the Advanced tab. Also ensure that your input levels are set properly and that there is enough drive to the WideBand AGC. At normal program levels, the WB AGC gain-reduction meter should indicate between 12-15dB. Note that it is normal for the yellow gate indicator to be on most of the time. As long as the Gate Threshold control is not set too high, the WB AGC will still bring up low level passages. Normally the Gate Threshold is set to about -36dB. Also try a lower Pause Threshold control in the Advanced tab.

In closing, starting with the right preset is really the most important thing. Always pick the one to start with that is closest to the sound you are looking for, despite its name. Then you can fine-tune it using the information in the rest of this chapter.

Block Diagram

If you look closely at the Icon Buttons at the top of the Omnia.11's screen, you will see that they form a block diagram or flow chart of the processing path your audio takes through the fully digital, DSP based processing stages within the Omnia.11:
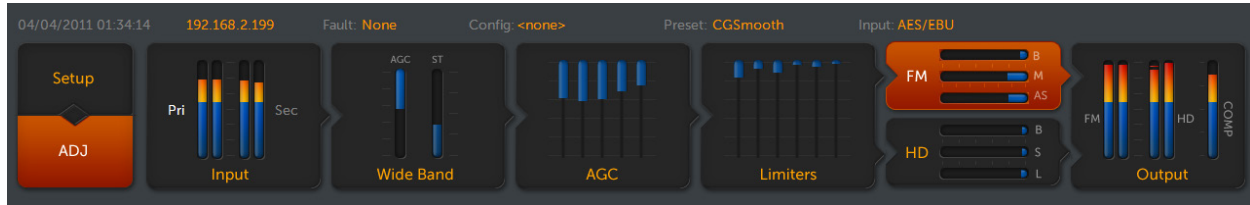
Icon Buttons

The audio starts at the Input section where input sources are selected and levels are set. The audio then goes to the first processing stage, the Wide Band AGC (automatic gain control). Next up is a 5-Band AGC section, a 6-Band peak Limiter section with its own crossover and the final, separate peak control sections for the FM and HD channels. Lastly is the Output section where the channels are routed to their selected output jacks and levels are set.

Wide Band

The Wide Band AGC section is the first processing section the audio "sees" as it passes from the Input section.

The job of the Wide Band AGC is to act as a very smart "hand on the pot", ensuring that quiet intros (for example) do not get "lost" or that loud program sections do not over-drive the following 5-Band AGC section.

Adjustments here can be found in both the **Basic** and **Advanced** tabs and are discussed fully in the next section.

First, a few important notes about the WB AGC in the Omnia.11 since it is different than what has come before:

We designed the AGC with very active programming in mind.

Make sure your input levels on the processor are set properly (per the instructions earlier in this guide) and are hitting up to around -15 dB on the Input Meters (just into the yellow) when your incoming program levels are normal. (For analog boards this would be "0dB" or "0VU" and for digital boards this would be when the metering on the Omnia.11 is matching what your digital console is showing on its metering).

In other words, with normal program audio playing, if the analog console's meters are bouncing up to 0VU (or the digital console's meters are hitting -15 dBFS), the Omnia.11's Input meters should show about -15dB. If they are, you're good to go!

As for the AGC, you can drive it very heavily if you want. It won't care. It will not change its sound characteristics no matter how heavily it is being driven (up to -30 dB). In other words there is no "sweet spot" to get the best sound. On the "normal" program levels described above, it should generally average around -12 to -18 dB or so on the WB AGC vertical gain-reduction meter (described in the **Wideband AGC Metering** section below).

Using higher compression ratios (a **Ratio** setting in the **Advanced** tab of 7:1 or higher) will minimize any level variation coming from the studio. The trade-off is a more "closed in" sound when using the highest settings. Some programmers desire this effect for CHR programming, so it's just a matter of programming taste.

Medium ratios of about 4:1 or 5:1 preserve a bit more of the natural dynamics in the source material while still "riding the gain" very well. A ratio of 2:1 is used primarily to provide maximum preservation of natural dynamics on very wide dynamic range program material such as Classical.

The **Window** function (also in the **Advanced** tab) provides a "dead band" area for the wideband AGC. If you set it at -2 dB for example, you're telling the wideband AGC that if the source material is within 2 dB of the target level, do nothing. This will allow 2 dB of natural level variation in the audio, which is nice for keeping the Omnia.11 from over-processing already dense material.

The lower you set the number (say, from -2 dB to -6 dB), the more variation in programming levels you're allowing through...and the more "relaxed" the audio sounds. See the Basic and Advanced tab sections below for more details.

Wide Band AGC Metering (Summary Tab)

Touch the **Wide Band** icon button to enter the metering and menu screens for the Wideband AGC.

The WB AGC meter indicates gain-reduction from the top down in dB. The Stereo Enhance meter indicates the amount of activity in the stereo enhancer from the bottom up.

Gating activity is indicated by a bright yellow outline (Gate Indicator) around the blue gain-reduction meter. The gate indicator will show more gating activity than you may be used to in conventional processors, but this is normal! The Omnia.11's "smart" windowed gating algorithm will control levels over a wide 30dB+ range and can choose to do nothing when appropriate as well as increasing or reducing gain.
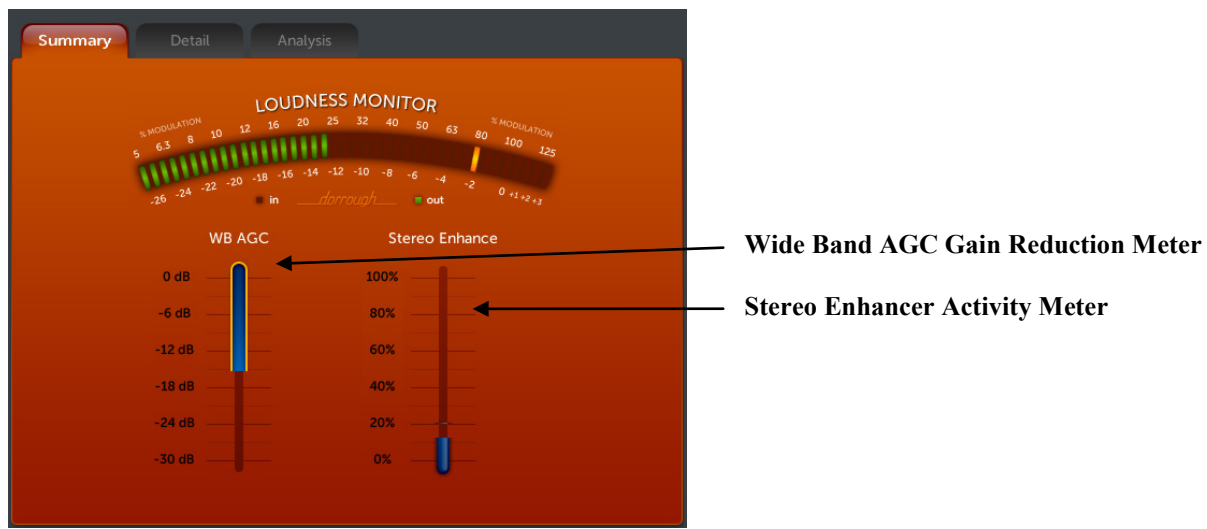
WB AGC Metering Screen (Summary Tab)

Wide Band AGC (WB) (Basic Tab)

The **Basic** tab here includes not only the adjustments for the WB AGC but also for the Omnia.11's Bass and Stereo Enhancement functions.

Touch the **WB** submenu button and then the **Basic** tab to access the basic controls for the Wide Band AGC.

There are 4 variable controls and 2 switches located in the WB AGC Basic tab menu area:

WB AGC Menu (Basic Tab)

Drive controls the amount of drive to the WB AGC stage over a + or – 12 dB range. Increasing the drive causes deeper gain reduction to be achieved. This allows quieter passages in the input audio to be raised further than if lesser drive was used. By default, if your input levels are correctly set, there will nominally be about 12-18dB of WB AGC gain reduction with normal "0VU" program audio playing from your console or automation system.

Gate Thresh (Gate Threshold): When the input audio falls below a certain level, the gain control action of the AGC stage is "frozen" by the gate. The level at which this freeze, or hold takes place is controlled by the setting of the Gate Threshold control. Higher settings cause the gate to activate at higher audio levels, causing more overall gating. In most applications this control should be adjusted between about -30dB and -40dB to cause gating action to occur when the input audio falls about that much below nominal. The action of gate also prevents noise rush up during periods of no (or quieter) audio or during pauses in speech.

NOTE: Gating activity is indicated by a bright yellow outline around the blue gain-reduction meter and may show more gating activity than you may be used to on conventional processors. In fact, it may look like the WB AGC is gated most of the time. This is normal! It is due to the Omnia.11's new smart windowed gating algorithms. (see **Window** and **Pause Threshold** in the Advanced tab section on the next page for more info)

Don't worry! This WB AGC will intelligently ride gain for you over a wider range with less side-effects than ever before, keeping the following processing sections nicely in the "sweet spot".

Attack: The attack control adjusts how fast the AGC responds to sudden increases in audio level, and higher numbers equate to faster response times. Faster attack times reduce the transient nature of the input audio, while slower attack times improve it.   Omnia.11's WB AGC is designed to work effectively with slow attack times. In fact, be careful about using extremely fast attack times because these may cause sudden downward level shifts on peaks during dynamic program material, dulling the natural transient nature of the program material. These peaks are best controlled later in the Omnia.11's Limiter section.

Release: The release control adjusts how fast the AGC recovers from periods of more gain reduction when the input audio levels fall. Faster release times (higher numbers) result in quieter sections of the program material being brought up faster. Try not to set the release too fast though, since that can cause the loss of the program material's natural dynamic "feel".

Phase Rot (Phase Rotator): The phase rotator improves waveform symmetry for program material that is highly asymmetrical in nature. Examples of such programming are the human voice, and sources with non-sinusoidal waveforms such as certain string and wind instruments, as well as certain sounds created by electronic synthesizers. By removing waveform asymmetry from the input program material, cleaner processing results because any limiting that occurs is able to work equally on both positive and negative excursions of the audio waveform. We recommend that this be turned on unless you have phase rotation enabled in your microphone processors.

Engage enables (ON) or bypasses (OFF) the WB AGC section.

Wide Band AGC (WB) (Advanced Tab)

Touch the **WB** submenu button and then the **Advanced** tab to display the advanced controls for the Omnia.11's Wideband AGC section. There are 6 variable controls and 1 drop-down control located in the WB AGC Advanced tab menu area:

WB AGC Menu (Advanced Tab)

Window: At a setting of "0.0" the Wideband AGC acts like a "regular" AGC where the gain is always either increasing or decreasing.

Lower settings turn the window function on and open up a "zone" within which the gain can rest and actually do nothing!

When the window setting is on, the audio can drop by the dB value of the selected setting before the AGC reacts.

This can greatly help preserve natural program dynamics without compromising overall gain-riding ability. Try settings of -3 to -6dB to start.

RTP Level: RTP stands for Return to Platform. What RTP does is return the gain of the AGC to the selected amount of gain reduction or "platform level" in the absence of audio. This control adjusts the "resting" or "platform" gain reduction level the AGC will return to when audio pauses or stops (while gated).

The primary purpose of RTP is to prevent the AGC gate from increasing the gain unnecessarily or holding the gain too low during pauses in audio, which could result in an increase in noise level or unexpected sudden increase in level when the audio returns.

RTP Speed controls how fast the adjustment to the platform level (set with the **RTP Level** control above) takes place – i.e., how long it takes the AGC to move to the target RTP gain reduction level. Range is from "0" (off) to 11 (fast).
Note: For maximum gain-riding range, we suggest a Wide Band **RTP Speed** setting of "0.0" for most popular music formats which effectively disables RTP. Use higher settings if you have consistent board operators and don't mind that quieter program sections remain quieter.

Pause Threshold activates and changes the characteristics of the dual platform "smart" moment-to-moment gate function. A setting of 0.0 turns off the smart gating, reverting it to conventional gate behavior. Settings other than 0.0 activate the smart gating function and higher settings allow the smart gating to be more aggressive.
Note: Middle-range settings can completely eliminate any perceived "pumping" effect during shorter quiet sections without compromising overall longer-tem gain-riding ability.

Makeup Gain sets the amount of gain to be filled in during quieter, softer program passages. The range is "0.0" (off) to "11" (maximum). This function is also program dependent, and it interacts somewhat with the main Attack and Release time constants. As the attack/release times are modified, the system also scales the *Make-Up Gain* time constants. Use *less* makeup gain for processing more faithful to the source material; use *more* makeup gain for greater loudness and "density" (a more "compressed sound).

Filter Freq (High-pass Filter Frequency): This drop-down control adjusts the cutoff frequency of the built-in high-pass (lo-cut) filter. Available settings are "Out" (not recommended), "20 Hz", "30 Hz" and "40 Hz". A setting of at least "20 Hz" is suggested for most formats to keep sub-sonic signals from affecting the processing performance.

Ratio: This variable control adjusts the overall compression ratio of the Wideband AGC. Available settings range from 2:1 to 10:1. Lower ratios will let more dynamics through to the following multi-band AGC section and are preferred for most applications. A good starting point for most popular music formats is 4:1 or 5:1. This will provide very smooth, smart, hand-on-the-pot level control. The 2:1 ratio is very gentle and may be preferable for classical music or jazz to preserve more of the natural dynamics. Higher ratios (7:1 and above) are useful primarily for talk programming or anywhere there is a desire to have tighter control over very dynamic program material and/or a more processed sound. **NOTE:** Higher ratios can cause the WB AGC to "overreact" on denser program material such as modern popular music, especially with faster attack times and slower release times, so use with caution. Keep in mind that there is another 5-Band AGC section that follows, so more gentle control at this stage is normally preferred.

ENH (Basic Tab)

Touch the **ENH (Enhance)** submenu button to display the controls for the Omnia.11's bass and stereo enhancement functions. There are 5 variable controls located here along with one switch.:

Enhancers Menu (Basic Tab)

Deep Bass: This controls the amount of deep bass enhancement. The deep bass range includes kick drum and low toms as well as low organ pedal notes, bass synthesizer and the lower notes on the bass guitar. A setting of "0.0" effectively turns bass enhancement off. The smart bass enhancer will add bass to bass-shy material without "overdoing it" on material that already has enough bass.

Phat Bass: This control adds additional bass enhancement that can give your station a "phatter" sound, especially on radios with small speakers that lack actual deep bass. This is a brand new Phat Bass algorithm that fattens things up without muddiness.

Warm Bass: This control helps compensate for program material that is naturally lacking in upper-bass fullness. Like the other bass enhance controls above, this one is "smart" as well, but be judicious about applying too much. A little can give nice, subtle warmth to voices and other program material that may otherwise sound too thin.

Important Note: These three controls are not simple equalizers. They are program-dependant so are able to enhance bass-shy material without over-enhancing program material that already has enough bass. If you find that your program material is still bass-shy even at high settings, go into the Advanced tab and turn up the **Bass Growl** control. (see the next page for more information about Bass Growl).

Stereo Enh (Stereo Enhance): This controls how much of the Omnia's built-in stereo enhancement effect is applied. The Omnia.11 contains an intelligent DSP-based stereo enhancement tool that enhances the stereo sound field without causing unnatural "hole in the middle" imaging or exaggerated multipath. Program audio previously lacking in stereo width will have noticeably increased ambiance and dimension when the **Stereo Enh** is active. Vocals will stay up-front and the sonic details of musical instruments will be heard with an apparent slight loudness increase.

The **Stereo Enh** control has a range of "0.0" (OFF) to 11 and the amount of dynamic width expansion can be observed on the rightmost vertical bargraph marked "ST" in the Meter Area. The system should be initially auditioned using light amounts of stereo enhancement, with an initial setting of 4 to 6 recommended as a starting

point. The overall stereo sound field will appear wider and be much more consistent sounding between program sources. The smart Stereo EXP algorithm turns off when a mono program source is present.

Stereo Enh Density adjusts the speed of the stereo enhancer's activity. A setting of 11 was the default for this control in software version 1.03 and earlier. Lower settings allow a subtler effect, working more on the ambience in the recording.

ENH (Advanced Tab)

The 3 controls in the **Advanced** tab allow some more control over the bass enhancement effect.

Bass Thump tunes a number of behind-the-scenes parameters to bring out the "kick" or "thump" in the bass. Higher settings result in "punchier" bass where lower settings maintain a "smoother" or "rounder" bass. Be careful not to use too high of a setting here since some undesired bass "clickiness" may occur at higher settings.

Bass Growl tunes a number of behind-the-scenes parameters at once to tune the Omnia.11 for the desired amount of bass. Higher settings cause the bass enhancers in the Basic tab to be more audible more of the time.

Enhancers Menu (Advanced Tab)

The **Solar Plexus** control switch activates a sub-harmonic bass enhancement effect. This replaces the original "Bass Thunder", providing greater flexibility over the older enhancer. Unlike other attempts at this that use simple frequency dividers that provide phony sounding "one note" bass, the sub-harmonic enhancement here is locked to the original bass musically, in both frequency and level.

The Solar Plexus level control sets the mix level of the created sub-harmonic bass. At a setting of 0.0, the minimum setting, the effect is hardly noticeable. We suggest adjusting in small increments. 1.0 can have quite an audible effect on some material.

Note: When using the Solar Plexus effect, we suggest setting the high-pass **Filter Freq** setting in the Wide Band / Advanced tab to 30 Hz. With lower filter settings, sub-sonics in the program material can cause a kind of "fluttering" distortion on vocals and other program material in the presence range.

When adjusting **Solar Plexus,** be sure to use speakers or headphones with good low bass response to avoid "overdoing it" with too much energy in the lowest octaves. It is normal for most formats to use a setting under about 1.5dB.

Subharmonic Bal(ance), when ON, gives a wider range to the Solar Plexus effect. Be careful when using this because too much bass boost can cause distortion in voices and instrumentation while extremely strong bass is also present. A setting of "Off" emulates the effect of the old "Bass Thunder" effect.

Deep Bass Slope Normally this is set to 12dB/Octave. You can use the alternative 24dB/Octave setting for particularly loud presets when higher settings of the **Bass Growl** control are being used and more of the lower "kick" drum bass and less of the "rounder" bass is desired. It also alters the characteristics of the Warm Bass as well.

AGC

The 5-Band AGC section works on the *average* level of the program material and can act both as a dynamic equalizer and as a compressor/leveler depending on settings and the dynamics in the program material itself.

There are 3 submenu control groups in the 5-Band AGC section, XO, AGC and Mixer:

The output of the Wide Band AGC section feeds the 5-Band AGC section through a crossover.

There are 5 variable controls in the Basic tab for the AGC crossover and 2 drop-down controls in the Advanced tab.

AGC Crossover (Basic Tab)

Each of the 5 AGC bands (LO, ML, MH HI and SH) has a **Drive** control.

Each of these controls the input level to the respective band over a range of + or – 12dB and, therefore, how far it will be driven into gain reduction. Higher settings increase the amount of "compression" in the band.

AGC Crossover Menu (Basic Tab)

## AGC Crossover (Advanced Tab)

The 2 drop-down controls in the Advanced tab allow you to modify the crossover frequency points of the MH (ML to MH) and LO (LO to ML) AGC bands. The MH to HI and HI to SH crossover points are not adjustable.

The available MH crossover settings are 3.2 kHz and 2.5 kHz.

The available LO crossover settings are 190 Hz or 150 Hz.

AGC Crossover Screen (Advanced Tab)
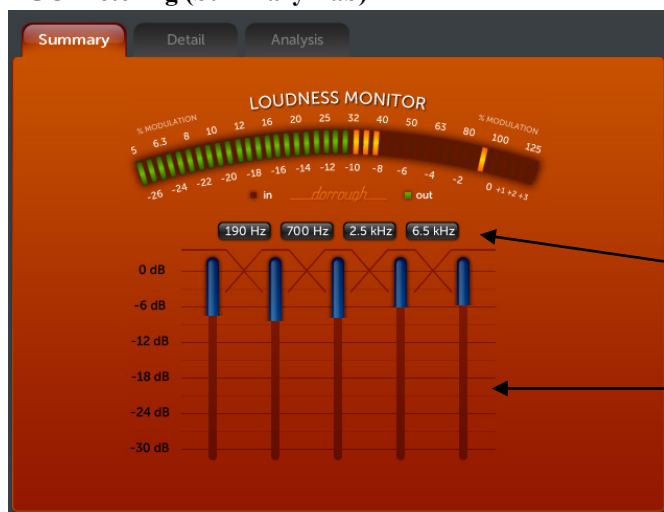
AGC Metering (Summary Tab)

The 5 gain reduction meters show AGC activity from the top down in dB and the AGC crossover frequencies in use are shown just above the gain reduction meters. Gating is indicated by bright yellow outlines around the blue gain-reduction meters.

Crossover Frequencies

5-Band AGC Gain Reduction Meters

AGC Metering Screen (Summary Tab)

AGC (Basic Tab)

There are 5 variable controls here and switches to set the master band for the sync function and to bypass the 5-Band AGC section if desired. The variable controls here are all "global". That is, they affect all 5 bands of the AGC simultaneously and equally. There are also 2 submenu buttons to access the controls for the low-latency DJ monitor feature.

Multi-Band AGC Menu (Basic Tab)

The first global control is an overall **Drive** control. It sets the input level to the AGC section, allowing you to adjust the amount of gain reduction in the entire 5-Band AGC section at once. Increase this control for more compression and dynamic EQ effect.

Next are overall controls for **Gate Master, Attack Offset, Release Offset and Sync**. These are described in detail below. These parameters (except for **Sync**) can also be individually adjusted for each band in the Advanced tab.

Attack Offset (Attack Time Offset): This global control "trims" the overall attack time of all 5 AGC bands relative to the individual Attack settings in the Advanced tab. Higher settings (above 0.0) scale the attack of all 5 bands faster while lower settings (below 0.0) scale them slower.

Faster attack times reduce the transient nature of the input audio, while slower attack times improve it. Extremely slow attack times must be used with caution because the following limiter stage may be forced to work too hard or be overloaded. Extremely fast attack times must also be used with caution because they may make the audio sound too compressed and lifeless, losing too much of its natural dynamic character.

Release Offset (Overall Release Time): This global control "trims" the overall release time of all 5 AGC bands relative to the individual Release settings in the Advanced tab. Higher settings (above 0.0) scale the release of all 5 bands faster while lower settings (below 0.0) scale them slower.

The release control adjusts how fast the AGC recovers from periods of more gain reduction when the input audio levels fall. Faster release times (higher numbers) result in a more dense sound.
Even though the Omnia uses program controlled release algorithms, setting the control for extremely fast release times can result in 'pumping'. Extremely slow release times can result in loss of loudness and frequency balance issues when the program levels drop.

Gate Master (Overall Gate Threshold): When the input audio falls below a certain level, the gain control action of the AGC stage is "frozen" by the gate. If the audio remains below the threshold level for a time, the RTP feature takes effect (see below). The level at which this freeze, or hold takes place is controlled by the setting of the Gate Threshold control. Higher numbers cause the gate to activate at higher audio levels.

In most applications this control should be adjusted between about 0.5 and 1.5. The action of gate also prevents noise rush up during periods of no audio or during pauses in speech. Lower settings will also allow more dynamic EQ activity (depending also on the **Sync** setting).

Sync: This controls the amount of adjacent band syncing in the 5-Band AGC, relative to the middle (MH) band. A setting of "0.0 dB" provides maximum sync between the bands. At this setting, almost no dynamic EQ effect will take place. A setting of "-2.0 dB" will allow 2 dB more "independence" in the immediately adjacent band and 4 dB in the second-adjacent bands. Use lower settings (along with lower settings of the **Gate Thresh** controls) to get more dynamic EQ effect. Use higher settings to preserve the frequency balance of the original program material. Also, please note that on presets where the AGC's are operating faster, a lower Sync setting will generally be needed.

The new **Sync Master** control in the Basic tab of the AGC menu allows you to select whether AGC Band 2 (the ML band) or Band 3 (the MH band) will be the master band the other bands reference to when using the Sync feature.

Select "ML Master" when you want the overall brightness to match closer to the source.

Select "MH Master" if you want things to be brighter overall.

If the Sync control in the Basic tab of the AGC menu is turned down, these controls will have less effect. (And virtually no effect at all if Sync is set to -12)

If you would like to bypass the 5-Band AGC section, switch off the **Engage** switch.

Low-Delay DJ Monitor Output

The low-latency DJ monitor output features an analog input to output delay of only about 8ms, (this is actually slightly less than the Omnia.6EX) so it is perfect for DJ headphone monitoring. It also has a nicely compressed sound that DJ's will like. (The normal main output's latency is 36.5ms, too much for headphone monitoring.)

NOTE: If you are running G-Force with Perfect Declipper and using the DJ output to feed your announcer headphones, Perfect Declipper will need to be turned OFF because it introduces additional delay right at the input, affecting all of the Omnia.11's outputs including the DJ output.

If your station is using a profanity delay ahead of the Omnia, it may be able to be placed in the Omnia.11's Patch Point (see Page 25) If so, the DJ section will still be pre-delay. If that is not a practical option in your facility, a separate processor such as our Omnia ONE Studio Pro can be used on your pre-delay feed to give the DJ's a comfortably processed headphone feed.

The DJ output has its own crossover and 3-Band processing. The DJ output can be routed to any of the Omnia.11's outputs in the Output menu.

There are 2 submenus containing the controls for the DJ section. These are discussed on the next page.

DJ Mix(er) (Basic Tab)

DJ Mix: The 5 variable controls here allow you to get a customized mix of the 5-Band AGC sections' output to feed the special DJ processing section. Each band defaults to a "middle" setting of 0.0dB so your changes will be offsets in + or – dB.

You can use these controls like a 5-Band equalizer to tailor the sound applied to the DJ 3-Band processing section.

These controls will not affect the main processing path.

DJ Lim(iter) (Basic Tab)

DJ Lim:, an **Output Master** level control and **Density** management controls for each of the 3 bands.

The **Density** controls set the aggressiveness of the DJ processor, higher settings giving a more processed and compressed sound and lower settings giving a more open sound. There are Density controls for each of the 3 bands and an overall master setting that adjusts all 3 bands at once.
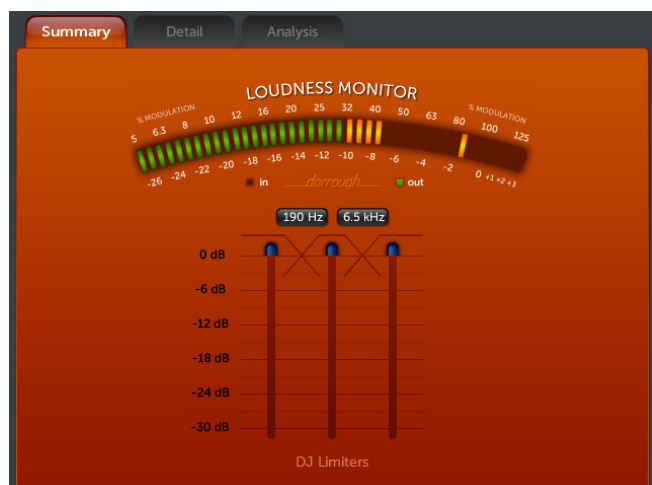
DJ Limiter Meterng

Gain-reduction metering for the 3-Band DJ limiter is now available in the meter panel.

60

AGC (Advanced Tab)

6 Sub-Group controls for each AGC band become available in the Advanced tab.

Multi-Band AGC Menu (Advanced Tab)

The **Gate_Thresh** control allows you to adjust the gate threshold of each band individually.

RTP Level, RTP Speed and Makeup Gain controls do not appear in the Basic tab and must be set individually for each band.

RTP Level: RTP stands for Return to Platform. What RTP does is return the gain of the AGC to the selected amount of gain reduction or "platform level" in the absence of audio. This control adjusts the "resting" or "platform" gain reduction level the AGC will return to when audio pauses or stops (while gated).

The primary purpose of RTP is to prevent the AGC gate from increasing the gain unnecessarily or holding the gain too low during pauses in audio, which could result in an increase in noise level or unexpected sudden increase in level when the audio returns.

RTP Speed controls how fast the adjustment to the platform level (set with the **RTP Level** control above) takes place – i.e., how long it takes the AGC to move to the target RTP gain reduction level. Range is from "0" (slow) to 11 (fast).

Makeup Gain: Sets the amount of gain to be "filled in" during quieter, softer program passages. The range is "0.0" (off) to "11" (maximum). This function is also program dependent, and it interacts somewhat with the main Attack and Release time constants. As the attack/release times are modified, the system also scales the *Make-Up Gain* time constants. Use *less* makeup gain for processing more faithful to the source material; use *more* makeup gain for greater loudness and "density" (a more "compressed sound).

The **Attack** and **Release** controls in each band sub-group are allow you to set the timing parameters individually for any desired band.

AGC Mixer   **(Basic Tab)**

The output of each of the 5 AGC bands is then summed together in a mixer.
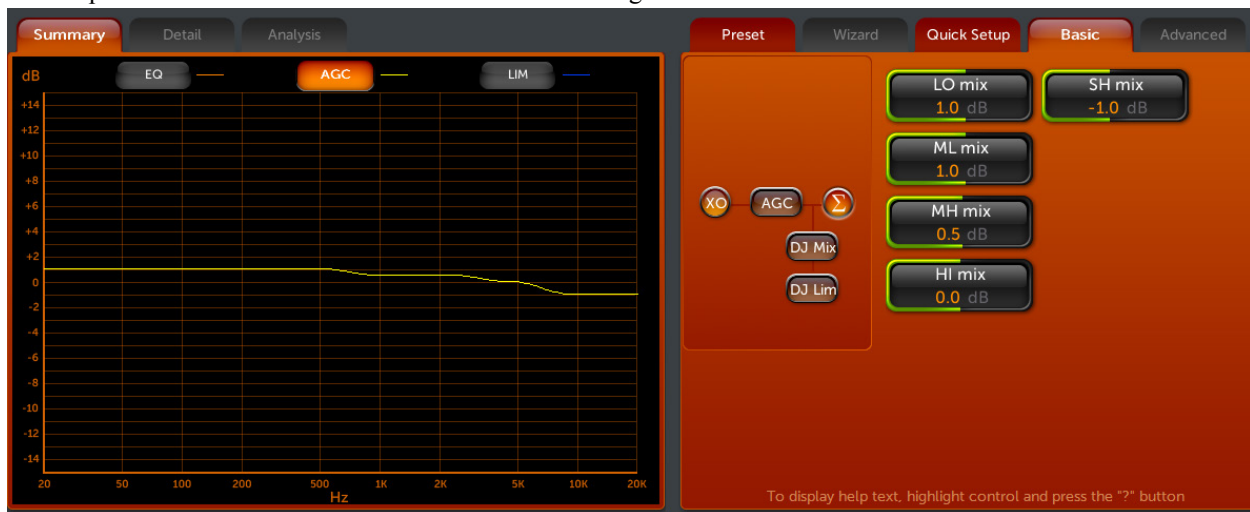
AGC Mixer (Basic Tab)

There are 5 variable controls (LO mix, ML mix, MH mix, HI mix and SH mix) in the Basic tab for the Mixer that set the output level of each of the 5 AGC bands over a + or – 12dB range. You can see your settings on the accompanying graph. There are no Advanced tab controls for the mixer.

These controls can be used to set up some frequency balance contours (EQ) but be careful not to use extreme settings.

The output of the AGC mixer feeds the crossover of the Limiter section directly.

Limiters

The 6-Band Limiter section has 4 control groups:

   Crossover, EQ, AGC and Mixer

The limiters differ from the AGCs in that the limiters work only on the *peaks* of the audio signal instead of the *average*.

There are 6 variable controls in the Basic tab and 2 drop-down controls in the Advanced tab.

Limiters Crossover **(Basic Tab)**

The output of the 5-Band AGC mixer feeds the 6-Band Limiter section through its own crossover.

Each of the 6 Limiter bands (LO, ML, MH HI and SH) has a **Drive** control.

Each of these controls the input level to the respective limiter band over a range of + or – 12dB and, therefore, how far it will be driven into gain reduction. Higher settings increase the amount of "density" in the band.

Limiters Crossover Menu (Basic Tab)

You may have noticed that there are actually 2 ways to control levels that are getting to the limiters: the AGC Mixer and the Limiters Crossover. Please use care that similar bands are not boosted or cut too much in either or both of those sections.

Limiters Crossover **(Advanced Tab)**

The 2 drop-down controls in the Limiters crossover Advanced tab allow you to modify the crossover frequency points of the LO (LO to ML) and SL (SL to LO) limiter bands. The ML to MH, MH to HI and HI to SH crossover points are not adjustable.
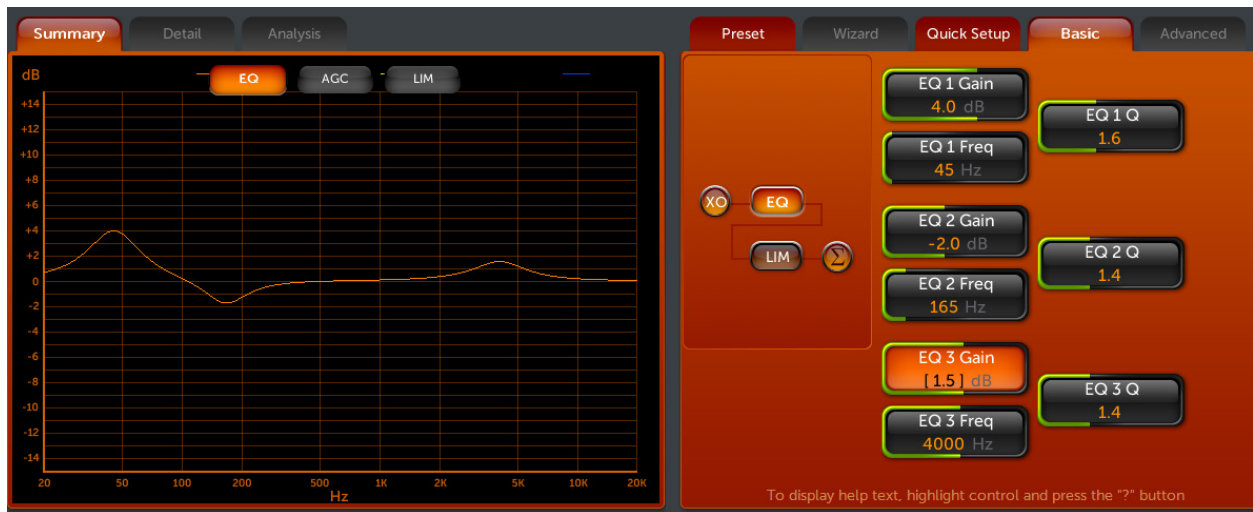
The available LO crossover settings are 320 Hz and 420 Hz.

The available SL crossover settings are 200 Hz, 175 Hz or 110 Hz.

Limiters Crossover Menu (Advanced Tab)

Parametric EQ Section

There are 3 bands of "cut/boost" style parametric EQ available here each with 3 controls: **Gain**, **Freq**(uency) and **Q**.

Parametric EQ (Basic Tab)

The **Gain** controls adjust the amount of cut or boost to be applied over a +/- 12dB range.

The **Freq** controls adjust the center frequency of the cut/boost. The Lo frequency range is 30-300 Hz in 5Hz steps, the Mid frequency range is 400 to 1200 Hz in 50Hz steps and the Hi frequency range is 2000 to 15000 Hz in 100 Hz steps.

The **Q** controls adjust the bandwidth of the applied boost/cut relative to the selected center frequency. A range of 0.1 to 4.0 is available with 0.1 being the broadest setting (affecting about 6 octaves) and 4.0 being the narrowest setting (affecting about 1/3 of an octave).

Limiters Metering (Summary Tab)
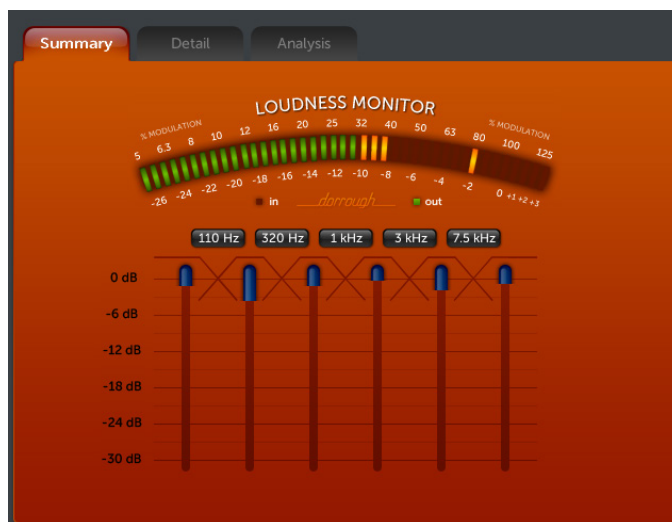
Limiters Metering Screen (Summary Tab)

Similarly to the AGC gain reduction meters, the 6 limiter band gain reduction meters show the amount of limiter activity from the top down in dB and the crossover frequencies in use are shown just above the meters. Likewise, gating activity is indicated by a bright yellow outline around each gain-reduction meter.

Unlike the AGCs though, these meters will be moving faster because the limiter section works on peaks instead of the average levels like the AGCs.

Limiters **(Basic Tab)**

There are 4 variable controls in the Limiters menu area and all of them are "global". That is, they affect all 6 limiter bands simultaneously and equally.

Limiters Menu (Basic Tab)

The first global control is an overall **Drive** control that allows you to adjust the amount of gain reduction in the entire 6-Band Limiter section at once. This is (conveniently) just like changing the value of each control in the limiters crossover **(XO)** by the same amount.

Next are **Attack Time Offset, Release Time Offset** and **Gate Threshold Offset** controls. These can adjust all 6 bands simultaneously relative to the individual control settings in the Advanced tab. Descriptions of the Attack, Release and Gate functions are described in detail in the Advanced tab section below.

Limiters **(Advanced Tab)**

Sub-Group controls for each AGC band become available in the Advanced tab:

Limiters Menu (Advanced Tab)

Lim Thresh (Limiter Threshold): This adjusts the threshold where audio peak limiting occurs over a + or – 6dB range in 0.5dB steps for each band. Lower settings will increase the amount of limiting and decrease the level going to the following final limiter/clipper stage.

Conversely, higher settings will raise the limit threshold, causing less limiting but feeding more level into the following final limiter/clipper stage.

Care is needed when adjusting this control because higher settings will cause less limiting to occur, and the resulting uncontrolled peak energy will go to the following final limiter/clipper stages instead. Thus, with this control you can artistically trade off dynamic limiting against brick wall final limiting/clipping, as each has its own "sound."

As the limiter threshold is lowered, (made more negative) the peak output level of the limiter is reduced. The signal in that band won't hit the clipper as hard, and you'll notice more action on the limiter bargraph for that band. In fact, instead of reducing the output of one of the audio bands in the Final Mixer section, you could instead "dynamically reduce" the level in that band (which also increases density in that band) by lowering the limiter threshold. This can be useful on the higher bands to dynamically reduce vocal sibilance, for example.

When adjustments are made to limiter thresholds, start by making adjustments in single 0.5dB increments. Reducing the threshold too much can cause the system to create an effect that "sucks out" the frequencies in that band. Conversely, the opposite (raising the threshold) will create an exaggerated effect by over-enhancing certain frequency ranges, as well as causing increased distortion, since excessive levels from that band will reach the following clipper stage.

Usually, the limiter thresholds are adjusted as a "fine polish" on the final sound. If you are unsure about how to use the **Lim**it **Thresh**olds, then we recommend that they be left at their well-researched factory settings

SL to LO Sync appears only in the **SL** sub-group. This controls how much the gain reduction of the SL band limiter's "slower" component is synchronized to the LO band limiter's "slower" component. A setting of "-12.0 dB" (all the way "down") turns the synchronization off. Higher settings will allow the SL band's gain-reduction to track the LO band's over the dB range of the control setting. This is useful to avoid the buildup of low frequency room noise or rumble in the input audio when the limiters are being used fairly hard. With less limiter activity, this will have less effect since you will see mostly the limiter's "fast" component working.

Attack (Attack Time): The attack control adjusts how fast the limiter's "faster" component responds to sudden increases in audio level, and higher numbers equate to faster response times. Faster attack times reduce the transient nature of the input audio, while slower attack times improve it. Extremely slow attack times must be used with caution because the following clipper stage may be forced to work too hard, causing excessive distortion. Extremely fast attack times must also be used with caution because they may make the audio sound too compressed and lifeless, losing too much of its natural dynamic character.

Release (Release Time): The release control adjusts how fast the limiter's "slower" component recovers from periods of more gain reduction. Faster release times (higher numbers) result in a more dense sound. Setting the control for extremely fast release times can result in increased distortion or 'pumping'. Extremely slow release times can result in loss of loudness and frequency balance issues when the program levels drop.

Gate (Gate Threshold): When the input audio falls below a certain level, the gain control action of the limiter stage is "frozen" by the gate. The level at which this freeze, or hold takes place is controlled by the setting of the Gate Threshold control. Higher numbers cause the gate to activate at higher audio levels, causing increased overall gating activity.

It is normal to see much less gating activity in the limiters, unlike the AGCs since the limiters operate much faster and average levels are already controlled before reaching the limiter section. You will see more limiter gating activity when hitting the limiters harder, especially on dynamic material such as speech where they will help keep things sounding natural.

Limiters Mixer **(Basic Tab)**

This is the final mixer that sums the 6 limiter bands and sends the peak limited audio to the final FM pre-emphasis and limiter/clipper stages.
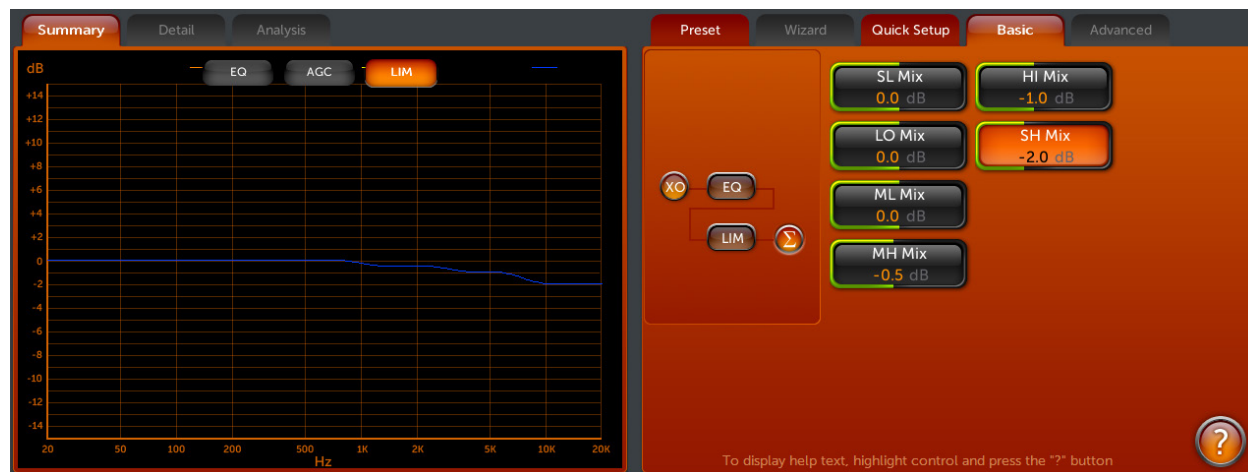
Limiters Mixer Menu (Basic Tab)

Care should be used when adjusting this section, as too much level from any particular band could cause an excessive amount of clipping distortion to that range of frequencies.

Adjusting all 6 controls an equal amount is virtually the same as adjusting the clipper **Drive** control in the FM menu.

If your desire is to provide some custom "EQ" to the sound, it is better to perform that function using the **XO** controls instead of the **Mixer** controls.

Like the **Lim**iter **Thresh**old controls, the final **Mixer** is mainly for minor "fine polish" to the overall sound. Adjustments in this section must be done with extreme care.

FM

FM Final Limiter (Clipper) (Basic Tab)

Clipper Menu (Basic Tab)

The Ultra LoIMD main clipper is the Omnia.11's final limiting stage for the analog FM channel. Here is where the Omnia.11's loudness *and* quality advantage is most evident! This new extremely powerful new algorithm utilizes a great amount of DSP power and is designed to reduce clipper-induced IM distortion to the bare minimum across the entire audio bandwidth, providing new, previously unheard of levels of clarity and loudness with minimal side-effects.

Touch the **FM** icon button to access the 5 variable controls located here: Clipper **Drive**, **Auto Sense**, **Comp Clip Drive**, **Voice Quality** and **BS-412 Drive**.

The clipper **Drive** control (which also appears in the **Quick** Setup tab as **Clipper** Drive) adjusts the depth of clipping of the pre-emphasized audio in precise 0.1dB steps over a +/-6 dB range. This is the primary control over the "loudness vs. distortion" tradeoff. It is advisable to make minor changes, primarily as the 'loudness fine tuner'. Be careful! There is a lot of available power here!

Note: If this control is grayed-out, go to the **FM Options** submenu of the Output menu and ensure that the **BS-412** control is turned off.

We suggest that each time you try a new factory preset, you adjust the Clip Drive as follows: Start by turning the **Auto** Sense control all the way down to 0.0. Then adjust the clipper **Drive** control down in 0.5dB steps until the loudness *just* falls off too much, then bring it up a bit from there. That is the correct setting *for you* for the currently selected preset. On some presets, you may need to turn it up instead of down. This is OK too. Adjust it up in the same 0.5db steps until you achieve the loudness required or the sound becomes too distorted, whichever comes first. If the distortion comes first, you probably need to start with a more aggressive preset.

Finally, turn up the **Auto Sense** until about 0.5 to 1.0 dB of activity can be seen on the Auto Sense meter.

NOTE: If you are turning up the Clip Drive to increase loudness and you reach a point where the loudness and distortion do not seem to be increasing as you would expect, you have likely run into the **Auto Sense** ceiling. Try turning down the **Auto Sense** control a little. (See below) This will allow more clipping to take place.

More about **Auto Sense:** This special algorithm senses the "duty cycle" of the clipper by watching for excessive clipper activity that may cause distortion. A setting of "0.0" turns Auto Sense off. Higher settings will automatically detect excessive clipping and reduce the clipper drive when needed.

Hint: It can be helpful, especially when tuning the processing for maximum loudness, to initially set **Auto Sense** down to "0.0", adjust the clipper **Drive** to the lowest possible setting that provides the loudness needed, then finally turn the **Auto Sense** control up until the Auto Sense meter just starts to deflect (about 1dB on peaks). **NOTE:** Try experimenting with the balance between Clipper Drive and Auto Sense for your best loudness vs. distortion compromise. Try not to let the Auto Sense average gain-reduction exceed about 2dB though. Short-term peaks above that are fine.

The **Voice Quality** control adjusts how much the Omnia.11 will reduce the clipping automatically when mono voice transmission is detected. This really helps to keep voices clean and full yet still loud and punchy. A setting of "0.0" effectively turns this feature off. Typical settings will usually be in the "-0.5 to -1.0" dB range. If you cannot get certain voices clean even when using this feature, that voice may be very asymmetrical. Make sure that the **Phase Rotator** switch in the **Wide Band** AGC (WB) menu is turned on or that phase rotation is enabled in your microphone processing, if available.

NOTE: For optimum performance of this feature, make sure the left and right channels feeding the Omnia.11 are very well balanced.

Comp Clip Drive: This controls the drive to the DSP-based composite clipper in the Stereo Generator in dB. A setting of 0.0dB is the same as the clipper being "off ". This clipper operates on the entire baseband signal up to 53 kHz, except for the 19 kHz pilot. No matter how hard you drive the composite clipper, you cannot clip the stereo pilot. Embedded within the composite clipper is a newly designed phase linear low pass filter for superb SCA protection. This filter removes clipping harmonics and prevents them from affecting the SCA and RDS region.

Please use the composite clipper sparingly. We suggest no more than about 0.5dB and you may find that none is needed at all with the Omnia.11!

BS-412 Drive: This control will be grayed-out unless the BS-412 Power Limiter feature is turned on in the **FM Options** submenu of the Output menu. When that feature is engaged, the clipper **Drive** control will be grayed-out instead and this control will adjust the amount of drive to the BS-412 limiter over a range of -12.0 to +6.0dB in 0.5dB increments. More information about the BS-412 power limiter can be found on Page 32.

FM Final Limiter (Clipper) (Advanced Tab)

There are 1 switch and 2 variable controls in the FM Advanced tab.

Clipper Menu (Advanced Tab)

Bass Style: This switch chooses between 2 available processing styles, Dynamic and Fixed, for the Omnia.11's Bass Clipper. The bass clipper is a special filtered and fully anti-aliased clipper stage just for the bass frequencies. Its job is to keep the bass out of the main clipper as much as possible, reducing distortion while maintaining or increasing bass intensity and quality.

Dynamic: This mode observes the set threshold but will automatically "let the bass out" if only bass is present, increasing the impact of solo bass and kick drum while ensuring that it stays clean.

Fixed: The bass clipper threshold mode is fixed so solo bass or kick drum will not be enhanced.

Bass Clip Threshold: This sets the threshold level of the Bass Clipper over a range of + or – 6dB. Negative threshold settings indicate the maximum amount that the bass clipper will pull the bass out of the main clipper to help prevent distortion.

Bass Clip Smooth: This control adds a smoothing filter to the bass clipper that can make it sound less harsh on some material. The default setting is all the way up (11.0). The control setting can be reduced if you prefer your bass to sound "harder" and less smooth, similar to the Omnia-6's bass clipper's "Tight" setting.

FM Channel Clipper Metering

Clipper Metering (Summary Tab)

The FM channel's metering shows you the activity for the Bass Clipper, Main Clipper and Auto Sense.

These are gain-reduction meters similar to those in the Limiter section and read from the top down.

Note the reduced range of the Auto Sense meter which is 6dB instead of the 30 dB of the Bass and Main clip meters.

HD

HD Final Limiter

The Omnia.11's HD channel shares the same processing as the FM channel up through the 6-Band Limiter stage. The HD channel gets its own final mixer, bass enhancer and final limiter plus Omnia's exclusive Sensus® technology for minimizing codec artifacts at lower bitrates.

**HD Channel Limiters Mixer** **(Basic Tab)**

Shown at left is the final mixer that sums the 6 limiter bands and sends the peak limited audio to the HD final limiter stage.

Care should be used when adjusting this section, as too much level from any particular band could cause an excessive amount of final limiter activity to that range of frequencies.

That said, you can use these controls carefully to optimize the overall frequency balance for the HD channel, especially if the FM channel is set up aggressively.

Adjusting all 6 controls an equal amount is virtually the same as adjusting the final limiter's **Drive** control.

HD Limiters Mixer Menu (Basic Tab)

HD Channel Metering
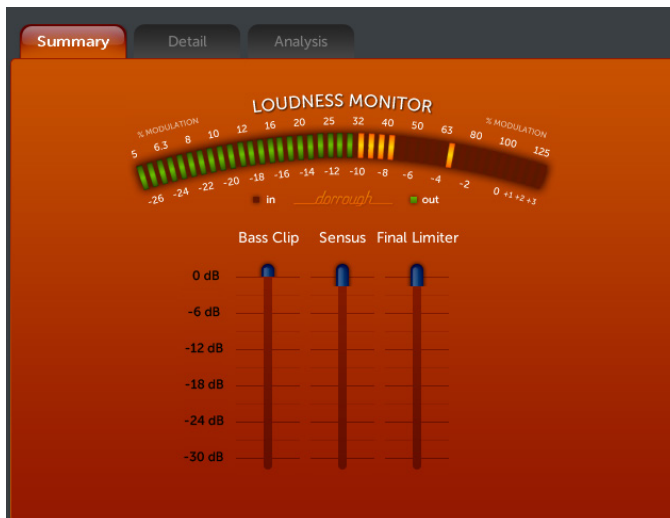
The HD channel's metering shows you the activity in the Bass Clipper, Sensus codec conditioner and Final Limiter.

These are gain-reduction meters similar to those in the Limiter section and read from the top down.

HD Metering (SummaryTab)

HD Channel Bass Enhancer (Basic Tab)

Touch the **Bass** button to display the controls for the HD channel's bass enhancement functions. There are 2 variable controls located here:
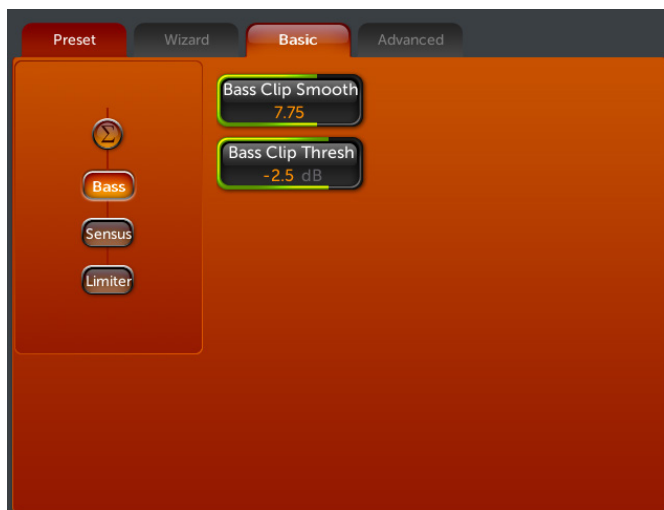
HD Bass Enhance (Basic Tab)

Bass Clip Smooth: This control adds a smoothing filter to the bass clipper that can make it sound less harsh on some material.

Bass Clip Threshold: This sets the threshold level of the Bass Clipper over a range of + or – 6dB. Negative threshold settings indicate the maximum amount that the bass clipper will pull the bass out of the main clipper to help prevent distortion.

There are no controls in the **Advanced** tab for the **Bass** section.

HD Channel Limiter (Basic Tab)

The HD channel employs an advanced look-ahead limiter to provide absolute precision peak control. This limiter has been designed to minimize processing side-effects like IM distortion, which are usually associated with limiters of this type. This allows this limiter to sound extremely transparent.

This type of peak controller is used here instead of a clipper because it does not generate the same high levels of harmonic distortion as a Clipper does. This distortion would cause added difficulties in a coded audio system because the harmonics generated from the clipping action create added artifacts and workload in the encoder. These are especially annoying at high frequencies.

There are tradeoffs in how each of these peak controllers sound when they are set to produce added loudness. When a clipper is pushed, the audio may sound *edgier*. This is from the added harmonic content. In contrast, the look-ahead limiter will sound *busier,* or denser, when more limiting is applied.

Touch the **Limiter** button to display the controls for the HD channel's limiter. There are 2 variable controls here:

HD Final Limiter Menu (Basic Tab)
Sensus® (Basic Tab)

The *Drive* control controls the depth of final limiting. The amount of gain-reduction occurring in the final limiter can be monitored on the metering bargraph screen. Note, however, that this meter cannot show extremely fast action in the limiter, so your ear must be the final judge.

Release: The release time control for the final limiter adjusts its overall release time profile. Lower numbers are slower overall and higher numbers are faster. Faster release times will result in more loudness but sound more "squashed".

There are 2 variable controls in the Sensus menu:

Sensus Level: Sets the amount of codec conditioning to be applied to the audio. Increasing the setting adds more SENSUS® control. Extreme settings -- those high enough to cause noticeable dulling of the program material -- are unnecessary and will not further improve the audio quality through the codec.

Sensus Freq(uency): This sets the range where the SENSUS® function begins its magic. For example, a setting of 5kHz will program the SENSUS® algorithm to focus on frequencies of 5kHz and higher. You should start with the 13kHz setting, and then select lower frequency settings until any coding artifacts are tamed. There are 8 available adjustment frequencies between 13kHz and 1kHz.

Sensus® Menu (Basic Tab)

What is Sensus®?

First we will present some important information about our unique *Sensus®* technology that will allow you to maximize the audio quality and minimize the audible artifacts of the codec process:

Overview

Until now, digital signal processing has been a more precise numeric implementation of well-known analog methods. Even relatively recently designed digital audio processors couldn't veer too far from the comparatively simplistic concepts that analog dynamics processing had utilized… until now!

Our new *Sensus®* technology takes digital dynamics processing into a completely new frontier. Instead of the two-dimensional static processing architecture of the past, *Sensus®* enables the audio processor to modify its own architecture in real time and in response to ever-changing program content.

Simply stated, *Sensus®* has the ability to "sense" what must be done to a signal in order to best tailor it for the following codec. As program content changes, it "rearranges the algorithms" to accomplish this goal. The uniqueness of the *Sensus®* technology makes it highly suitable not only for codec pre-conditioning (or provisioning), but also for a range of other highly specialized signal processing challenges. The following is a discussion of how *Sensus®* technology can be applied to a coded audio environment.

Codec Provisioning

The codec is now a common denominator in the world of audio and broadcasting. Digital broadcasting (HDTV, HD-Radio[R], DAB, DRM), podcasting, webcasting, cellcasting, and downloadable music files all employ a form of codec-based data compression in order to minimize the bandwidth required to transmit data. The necessarily low bitrates utilized by these mediums presents a tough challenge for any audio processor used prior to a codec.
Traditional dynamics processors were designed to fulfill the requirements of a medium where the functions were generally *static.* That is, they were well suited to the rather simplistic peak control and bandwidth limiting methods that were required for analog broadcasting, as well as for the signal normalization techniques used in recording and mastering. Audio codecs on the other hand are moving targets - each codec algorithm has its own set of artifacts. So not only does the sonic quality vary depending on the algorithm and bitrate used, but more importantly they vary in their ability to mask their own coding action. This is why we call it a 'moving target', and is why conventional audio processors fall short in a coded

audio environment and can actually make coding artifacts worse due to their inability to adapt appropriately to the changing operation of the codec as the program content changes.

Prior art in audio dynamics processing could only address *some* of the challenges of provisioning audio for coding. This hurdle existed because the codec adapts to the incoming program (so as to generate the least amount of output data representing the input audio) causing the sonic artifacts generated by the process to continually change. Unless the audio processor can predict these changing characteristics of the codec, it can't possibly create output audio that is perfectly tailored for the coding process.

Conventional processors utilize rather simplistic high frequency limiters and fixed low pass filtering that does not change with the program material. When these less intelligent processors feed a codec the audio might sound acceptable one moment and offensive the next. Because they cannot "know" what the codec will do next, the result is over-compensated, dull and lifeless audio… audio that *still* contains objectionable codec-generated artifacts!

HD Radio®

The advent of HD Radio[R] has introduced the capability to transmit multiple program streams, or "Multicast", within a single 96kbps digital broadcast data channel. To facilitate this, multicast relies on the use of codecs with comparatively low bitrates. A broadcaster can choose to transmit a number of multicast channels and select the bitrate for each one. However, the more multicast channels there are, the lower the bitrate each channel must have in order for them to all fit within the total available bandwidth.
To achieve maximum sound quality, *the kind that attracts and holds listeners*, those channels will need specialized dynamics processing capable of creating great sound *regardless* of program content and bitrate. They will need *Sensus®*.

With *Sensus®*, the innovative algorithm, it is now possible to have consistently high audio quality with a minimum of codec-induced artifacts. *Sensus®* creates highly listenable audio lacking the dull, muffled, 'swirley' sound usually associated with codecs operated at extremely low bitrates.

So… what's so smart about Sensus®?

The fact is, *Sensus®* is smart. In real time it predicts program content that will be troublesome for the codec, and by modifying it's own algorithms can make appropriate changes to the program material before it ever reaches the codec![1] The result is consistently high audio quality through a codec-based system, even at very low (18kbps – 21kbps) bitrates.

The human voice is very difficult to code at low bitrates without quality and intelligibility suffering. But Omnia.11 with *Sensus®* can generate clean, smooth, crystal clear audio that's consistently great sounding no matter what the codec or bitrate is.

--- Important Note ---
[1] It is *extremely* important (especially for bitrates below 96kbps) not to directly audition the HD output of the Omnia.11 for audio quality without the audio being first routed through a codec!

Why? The processed HD output has been 'pre-corrected' for the characteristics of the following codec and because of this the audio may contain strange sounding artifacts that will imitate the 'inverse' of what that codec will do. Because of this the audio exiting the Omnia.11 may be unpleasant to listen to and will certainly be inferior to that which will exit the codec later on. In other words, what you hear at the output will bear no relationship to the audio quality that will be achieved *after* the audio has passed through the coding process!

Need a corollary to this?

It's like trying to taste a pizza while still in the grocery store staring at the raw ingredients that haven't been purchased yet!

Appendix A: Performance Specifications

Omnia.11 FM

All specifications are subject to change without notice.

Note: Discrete I/O measurements have been made in "Bypass" mode. FM composite measurements have been made using the "Proof" preset.

General Audio Specifications

Frequency Response: Complies with the standard 50 or 75 microsecond pre-emphasis curve within ± 0.5 dB, 30 Hz to 15 kHz. The analog left/right outputs and AES/EBU Digital outputs can be configured for flat or pre-emphasized output.

System Distortion: Less than 0.01% THD, 20 Hz – 7.5 kHz. Second harmonic distortion above 7.5 kHz is not audible in the FM system.

*Signal-Noise Ratio: > -80 dB de-emphasized, 20 Hz –- 15 kHz bandwidth, referenced to 100% modulation).

*The measured noise floor will depend upon the settings of the Input and Output Gain controls and is primarily governed by dynamic range of the Crystal Semiconductor CS5361 A/D Converter which is specified as >110 dB. The dynamic range of the internal digital signal processing chain is >144 dB.

Stereo Separation: Greater than 65 dB, 20 Hz –- 15 kHz; 70 dB typical.

Crosstalk: > -70 dB, 20 Hz -- 15 kHz.

System Latency: 36ms. "FM" channel, as measured from the analog inputs through the composite MPX output.

Composite Outputs: Source Impedance: 5 ohms or 75 ohms, jumper-selectable. Single-ended and floating over chassis ground.
Output Level: 0V to 10V in 0.05V steps, software adjustable.
D/A Conversion: Texas Instruments/Burr Brown PCM1798, 24-bit sigma-delta converter.
Configuration: Two electrically independent outputs. Software based   level adjustment.
Load Impedance: 50 ohms or greater load is suggested.
Pilot Level: Adjustable from 4.0% to 12.0% in 0.1% steps and OFF.
Pilot Stability: 19 kHz, ± 0.5 Hz.
Signal-to-Noise Ratio: -85 dB typical, 75 µS de-emphasized, 15 kHz bandwidth, referenced to 100% modulation).
Distortion: < 0.02% THD 20 Hz – 15 kHz bandwidth, 75 µS de-emphasized, referenced to 100% modulation.
Stereo Separation: > 65 dB, 30 Hz – 15 kHz.
Linear Crosstalk: > -80 dB, main to sub or sub to main channel (referenced to 100% modulation).
Non-linear Crosstalk: > -80 dB, main to sub or sub to main channel (referenced to 100% modulation).
38 kHz Suppression: > 70 dB (referenced to 100% modulation).
76 kHz Suppression: > 80 dB (referenced to 100% modulation).
 Pilot Protection: > -65 dB relative to 9% pilot injection, ± 1 kHz.
57 kHz (RDS/RBDS) Protection: better than -50 dB.

Connectors:	Two EMI suppressed female BNC, floating over chassis ground. Maximum Load Capacitance: 5nF (at 10 ohms source impedance). Maximum cable length: 100 feet/30 meters RG-58A/U.
Analog Audio Input:	Left/Right Stereo. Electronically balanced. Input impedance 10k ohms resistive. Maximum Input Level: +22 dBu. Nominal Input Level: +4dBu.
A/D Conversion:	Crystal Semiconductor CS5361, 24 bit 128x over-sampled delta sigma converter with linear-phase anti-aliasing filter. Pre-ADC anti-alias filter with high-pass filter at <10 Hz.
Connectors:	Two, EMI-suppressed XLR-female. Pin 1 chassis ground, Pin 2 "Hot".
Analog Audio Output:	Left/Right Stereo. Electronically balanced. Output Impedance 20 ohms. Minimum load Impedance: 600 ohms. Output Level adjustable from -2 dBu to +22dBu peak in 0.1dB steps.
D/A Conversion:	Crystal Semiconductor CS4391, 24 bit, 128x oversampled.
Connectors:	Two, EMI-suppressed XLR-male. Pin 1 chassis ground, Pin 2 "Hot".
Digital Audio Input:	Configuration: Stereo per AES/EBU standard, CS8420 Digital Audio Transceiver with 24 bit resolution, software selection of stereo, mono from left, mono from right or mono from sum. Automatically accepts and locks to input sample rates between 30 and 108 kHz.
Connector:	XLR-female, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating – AES3 standard 110 ohm impedance.
Digital Audio Output #1:	Stereo per AES3 standard. Output can be configured in software for flat or pre-emphasized response at 50 or 75 microseconds. Digital Sample Rates: Output sample rates software selectable for 48kHz, Sync to Input or Sync to External.
Connector:	XLR-male, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating. Standard AES3 specified 110 ohm source impedance. Digital Output Level: -22.0 to 0.0 dBFS software adjustable.
Digital Audio Output #2:	Stereo per AES3 standard. Output can be configured in software for flat or pre-emphasized response at 50 or 75 microseconds. Digital Sample Rates: Output sample rates hardware jumper selectable for 44.1kHz, 48kHz or Sync to External.
Connector:	XLR-male, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating. Standard AES3 specified 110 ohm source impedance. Digital Output Level: -22.0 to 0.0 dBFS software adjustable.
External Sync Input:	External Sync: Output sample rate can be synchronized to the signal present on the AES/EBU input, or to an AES3 signal applied to the Ext. Sync input connector. (Does not accept Word Clock inputs)

External Sync Range: Accepts sample rates from 32kHz to 96 kHz. Used for synchronization of the Digital Output signal to an external reference. Automatically accepts sample rates between 32 and 96 kHz. Connector: XLR-female, EMI-suppressed. Pin 1 chassis ground, Pin 2-3 transformer isolated, balanced, and floating. Standard AES3 specified balanced 110 ohm input impedance.

External Sync Range: Automatically accepts sample rates between 32kHz and 96kHz.

Connector: XLR-female, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating – AES3 standard 110 ohm impedance.

Remote Control: Via Ethernet. TCP/IP control via built-in Java (TM) based remote control program integrated into web page interface. All software is served from the built-in web server to any standard web browser; there is nothing to install on the user's computer. Ports Used: The normal http port 80 and TCP ports 93, 4545 & 4546.

Connectors: Ethernet - Industry standard EMI-suppressed RJ-45 connector.

GPI Interface: (Support not yet available)

Connector: EMI suppressed DB-15 female connector.

Power Requirements: Voltage: 100-250 VAC, 47-63 Hz, Typical: 65W RMS, Max: 90W RMS.

Power Connector: EMI suppressed IEC male. Detachable 3-wire power cords supplied for US and European use.

Power Supply: Internal. Overvoltage and short circuit protected. Meets EN55022, EN55011 Level B Conducted Emissions. EN61000-4-2, -3, -4, -5, -6 level 3 immunity compliant. Full international safety approval. CE marked.

Environmental: Operating Temperature: 32 to 122 deg. F / 0 to 50 deg. C for all operating voltage ranges. Humidity: 0-95% RH, non-condensing.

Dimensions: 19" wide x 7" high x 20" deep (48 cm wide x 18 cm high x 51 cm deep) including connectors. Unit requires four EIA rack spaces for mounting.

Shipping Weight: 36 lbs. / 16.3 kg

Telos/Omnia Research and Development is constantly working to improve the quality of our products. Actual specifications are subject to change or improvement without notice.

Appendix B: Troubleshooting/Service/Warranty

Operational problems with the Omnia.11 can sometimes be diagnosed using **Factory Diagnostics** log available in the **Configuration Menu** of the webpage remote control interface. See Page 89 for details.

Electrical and mechanical safety note!

When the Omnia is operated with its chassis top cover removed, you are exposed to potentially lethal voltages.

Before attempting to make voltage measurements, be forewarned that the power supply heat sinks are connected to the AC power line. Avoid these areas whenever the AC power cable is attached to the Omnia. Never attempt to make measurements when the power supply's safety cover is removed.

When reinstalling the top cover, make certain that all thirty screws are replaced, and that they are tightened to a snug fit. Operating the unit with its cover removed or without all of the retaining screws will void your warranty and may compromise the ability of the Omnia to operate in high RF environments.

Troubleshooting FAQ

1. The unit is totally dead. What should I check first?

First double-check that the unit is receiving AC Line power. Check the line cord and its connection at both ends. Is the line cord plugged into an outlet that has AC power? Are the blue "11" and the ring around the jog wheel illuminated? If yes, the unit has power. Is the LCD screen blank, scrambled, or not illuminated? Symptoms like these might indicate a power supply problem. If you wish to examine the power supply, be aware that there are two power supplies in the Omnia.11 and they are of the *switching* type. Therefore, they require a load in order to start up and operate properly. Voltages measured when the power supply is not connected to the Omnia's circuitry will not be correct. Please contact Omnia Support for help.

2. The unit has power, but there is no audio. What should I check?

The first thing to verify is normal front panel jog-wheel operation. Verification of front panel operation helps narrow down where the problem is. Look at the metering display. If there is input audio but no output audio indications, try removing power from the unit, waiting 20-30 seconds, then restoring power. If that doesn't bring the operation back to normal, then a hardware failure of some sort may have occurred. If you get output levels on the Output meters but have no output audio, verify that the outputs are connected correctly. An analog output connected to a digital device, or a digital output connected to an analog device won't pass audio! Note that all outputs are active simultaneously. Connect the appropriate test generator to the output cables to verify analog/digital audio is making it to the next device.

Is audio present on the Input meters? If not, ensure that the correct **Input Source** is selected in the Input menu and that the signal is present on the cables connected to the Omnia's inputs.

If input audio is present, the next condition to check is to see if the failure has caused the processing to cease. Using program material, check to see if the processing bargraphs are operating. If they are, then it's a good indication that the system's host processor is working.

At this point, it would be a good idea to see if the loss of audio is confined to only one output port, e.g. the discrete left/right outputs one or both of the composite MPX outputs or the digital AES/EBU or Livewire outputs. Check the signal at each of these locations. If one of the output sections is not operating, then it can be localized to that specific section.

Note: The discrete left/right outputs are operated from their own specialized Digital to Analog converters. Therefore, it's possible for one type of output to fail without affecting the other. Likewise, a failure in the AES/EBU driver section could result in the digital output being dead, while the rest of the system is operational.

3. If my unit fails to boot up normally, can I try the compact flash software card (CF card) from another Omnia.11 that is booting normally?

No. Once a card is booted for the first time, it assumes a unique hardware key for that unit and can then be used only in that unit. If you need a new card, you will need one that has not been used in any other Omnia.11 unit. Please contact Omnia Support for assistance.

Obtaining Service

- Before contacting Omnia Customer Support, please have the serial number of the unit (located on a small barcode sticker on the rear panel in this format: 0279xyyyy) and a description of the symptoms/problems ready for the technician.

- All units being returned to for service MUST have a Return Authorization (RA) number assigned to them first. Units that are returned without a RA number will experience delays in service.

- Return the Omnia in its original shipping carton if possible. For best treatment, shipping the Omnia in its original factory box protects it as well as possible. Damage caused by improper packaging is not covered under your warranty!

Note: To ensure prompt service, the Return Authorization (RA) number must be written prominently on or near the shipping label on the box!

Via the World Wide Web

The Omnia Web site has a wide variety of information that may be useful for product support, applications information, software updates, etc. The URL is: http://www.telosalliance.com/

Via E-Mail

The customer service e-mail address for Omnia is: **support@telosalliance.com**.

Via Phone

Customer Support personnel are available in the Cleveland, Ohio, USA office Monday through Friday by phone at +1.216.241.7225 or via email between 9:00 A.M. and 5:00 P.M., Eastern Time.

After hours support is available 24/7 by phone at +1.216.622.0247 or via email.

If you are outside the U.S.A. and non-English speaking, please contact the dealer you purchased your Omnia from first.

Shipping Information: *   Telos / Omnia

1241 Superior Avenue East

Cleveland, Ohio 44114   USA

ATTN: To the RA number obtained from Omnia Customer Service

Note: To ensure prompt service, the Return Authorization number must be written prominently on or near the shipping label on the box.

Warranty

Telos Alliance Limited Warranty

This Warranty covers "the Products," which are defined as the various audio equipment, parts, software and accessories manufactured, sold and/or distributed by or on behalf of TLS Corp. and its affiliated companies, collectively doing business as The Telos Alliance (hereinafter "**Telos**").

With the exception of software-only items, the Products are warranted to be free from defects in material and workmanship for a period of five (5) years from the date of receipt of such Product by the end-user (such date of receipt the "**Receipt Date**"). Software-only items are warranted to be free from defects in material and workmanship for a period of 90 days from the Receipt Date. Telos will repair or replace (in its discretion) defective Products returned to Telos within the warranty period, subject to the provisions and limitations set forth herein.

This warranty will be void if the Product: (i) has been subjected, directly or indirectly, to Acts of God, including (without limitation) lightning strikes or resultant power surges; (ii) has been improperly installed or misused, including (without limitation) the failure to use telephone and power line surge protection devices; (iii) has been damaged by accident or neglect. As with all sensitive electronic equipment, to help prevent damage and or loss of data, we strongly recommend the use of an uninterruptible power supply (UPS) with all of our Products. Telos products are to be used with registered protective interface devices which satisfy regulatory requirements in their country of use.

This Warranty is void if the associated equipment was purchased or otherwise obtained through sales channels not authorized by Telos.

EXCEPT FOR THE ABOVE-STATED EXPRESS WARRANTY, TELOS MAKES NO WARRANTIES, EXPRESS OR IMPLIED (INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE).

In no event will Telos, its directors, officers, employees, agents, owners, consultants or advisors (its "**Affiliates**"), or authorized dealers or their respective Affiliates, be liable for incidental or consequential damages, or for loss, damage, or expense directly or indirectly arising from the use of any Product or the inability to use any Product either separately or in combination with other equipment or materials, or from any other cause.

In order to invoke this Warranty, the Product must be registered via Telos' website (found at: http://telosalliance.com/legal/warranty) at time of receipt by end-user and notice of a warranty claim must be received by Telos within the above stated warranty period and warranty coverage must be authorized by Telos. Contact may be made via email: support@telosalliance.com or via telephone: (+1) 216-241-7225. If Telos authorizes the performance of warranty service, the defective Product must be delivered to: Telos, 1241 Superior Avenue, Cleveland, Ohio 44114 or other company repair center as may be specified by Telos at the time of claim.

Shipping Costs and Warranty Service:

If the date the customer's notice of warranty claim is received by Telos (such date the "**Warranty Claim Notice Date**") is within the first 90 days following the Receipt Date, Telos will pay the costs of shipping such warranted Product to and from the end user's location, and the cost of repair or replacement of such warranted Product.

If the Warranty Claim Notice Date occurs after the first 90 days following the Receipt Date and before the end of the second (2nd) year, the customer will pay the freight to return the warranted Product to Telos. Telos will then, at its sole discretion, repair or replace the warranted Product and return it to the end user at Telos' expense.

If the Warranty Claim Notice Date occurs between the end of the second (2nd) year following the Receipt Date and the completion of the fifth (5th) year, the customer will pay the costs of shipping such warranted Product to and from the end user's location. Telos will then, in its sole discretion, repair or replace the warranted Product at Telos' expense. Telos also reserves the right, if it is not economically justifiable to repair the warranted Product, to offer a replacement product of comparable performance and condition direct to the customer at a discounted price, accepting the failed warranted Product as a trade-in.

The end user will in all cases be responsible for all duties and taxes associated with the shipment, return and servicing of the warranted Product.

No distributor, dealer, or reseller of Telos products is authorized under any circumstances to extend, expand or otherwise modify in any way the warranty provided by Telos, and any attempt to do so is null and void and shall not be effective as against Telos or its Affiliates.

Out of warranty units returned to the factory for repair may be subject to a $500 evaluation fee, which fee must be prepaid prior to shipping the unit to Telos. If no repairs are required, the $500 fee will be retained by Telos as an evaluation charge. If repairs are required, the $500 fee will be applied to the total cost of the repair.

Appendix C: Remote Control and Software Update Procedure

Remote Control
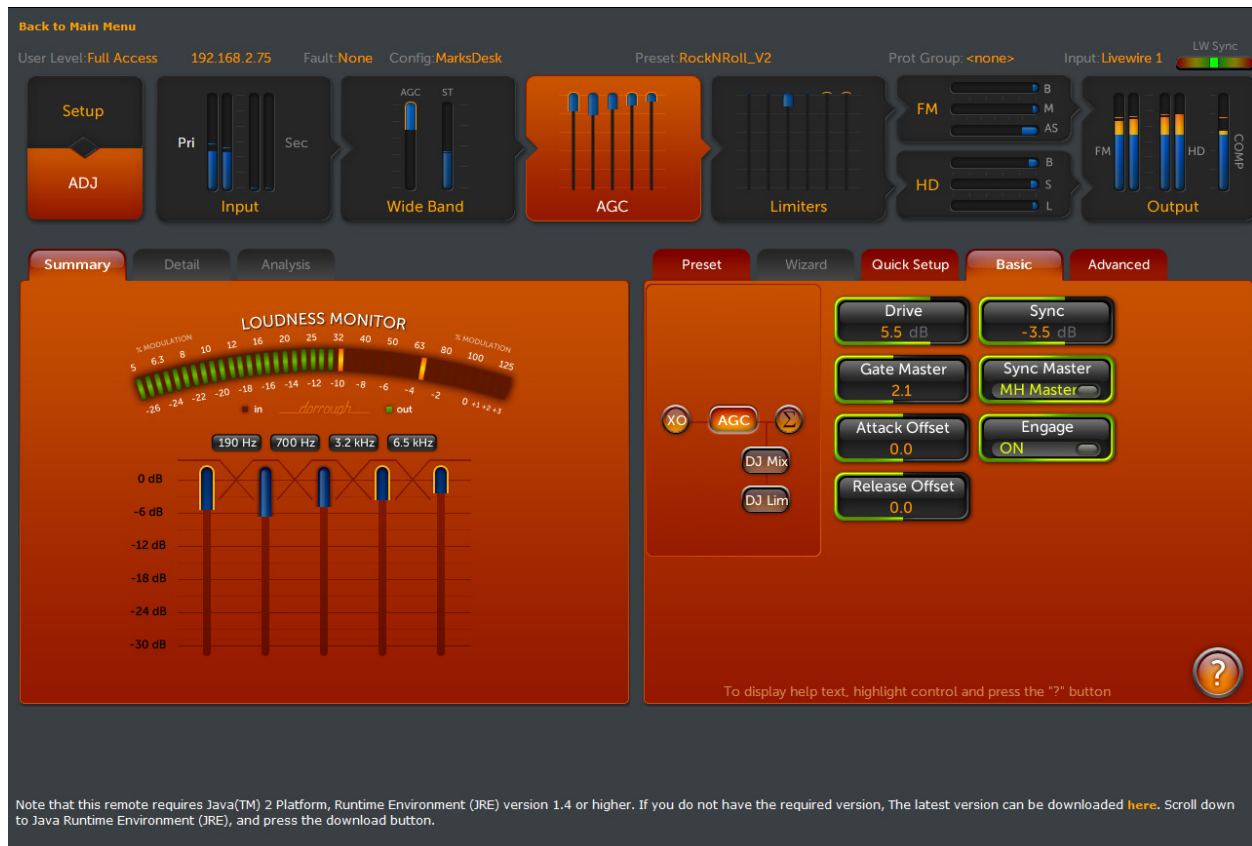
 The above screenshot shows the Processing screen of the Omnia.11's built-in remote control applet or the new standalone remote app when running the "traditional" (orange) style processing. This is a Java applet that requires the Java Runtime Environment (JRE) from Sun Microsystems, version 8 or higher, to be installed on your computer. Once JRE is installed, the Remote Control applet is accessed through the Omnia.11's built-in web page interface via TCP/IP using any standard Web browser that supports Java (pretty much limited to Mozilla Firefox as of this writing).

Because of this, version 3.0 now also features a standalone Java application that can be downloaded directly from the Omnia.11. See Page 85 for details.
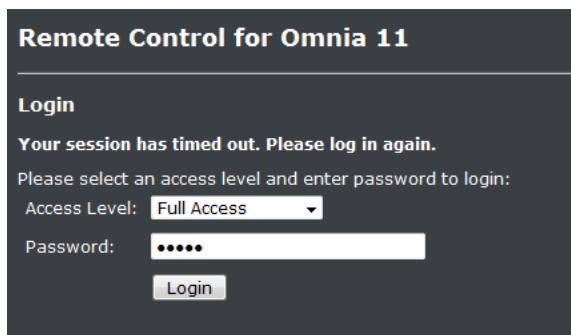
The latest version of JRE (for Windows, Solaris, Linux and Apple Mac OS) is available here:

http://www.java.com/en/download/manual.jsp

Note: The remote uses the following network ports that will need to be opened/forwarded through any routers that may be present in the network: The normal http port 80, port 93, port 4545 & port 4546.

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Once Java is installed on your computer, using a Web browser, connect to the IP address of your Omnia.11 as follows: (see Network Parameter Setup on Page 15 if you need to enter the network parameters into the Omnia.11)

1. Open a standard Web Browser on your computer and connect to the Omnia.11 by entering: http://xxx.xxx.x.xxx/ in the browser's address bar where the x's in the example above are replaced with the Omnia.11's IP address. Once connected you should see the Login screen:

2. Enter the Password (the default is "**omnia**" – all lower case) and click on the "**Login**" button. (Or simply press "Enter")

The following Main Menu screen should appear:
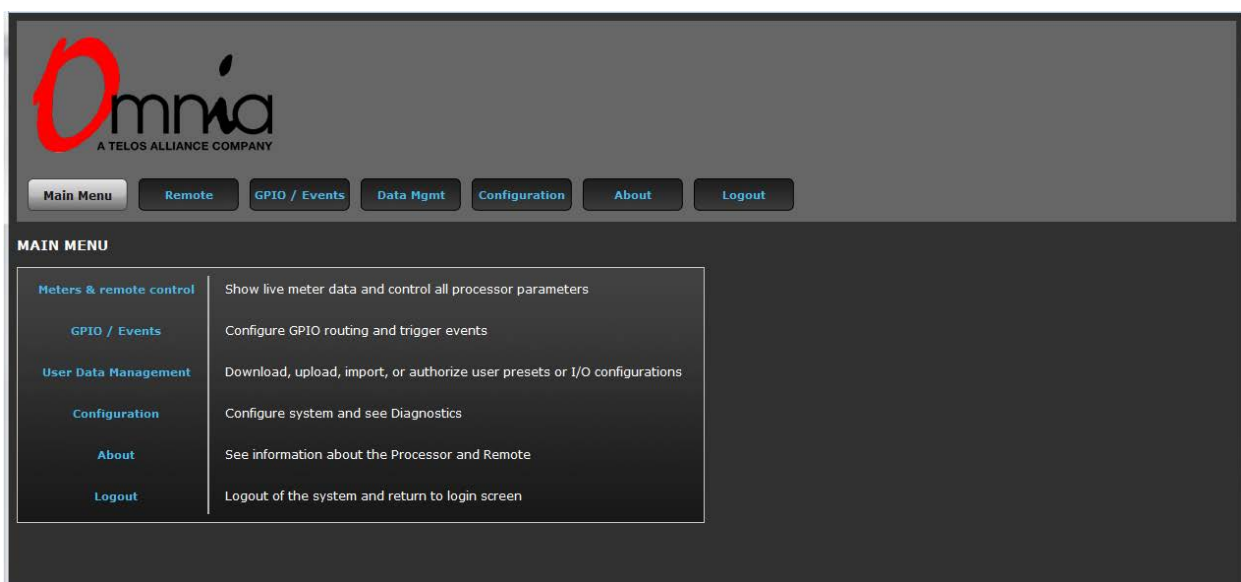
There are 7 buttons across the top menu bar and 6 of those are duplicated below in the Main Menu.

The top menu bar will remain visible when in the **GPIO/Events, Data Mgmt, Configuration** and **About** screens.

You can select **Meters & Remote Control (Remote)** to open the processing screen Java applet, **GPIO/Events** to program remote input routing / diversity delay on/off or preset selection, **User Data Management (Data Mgmt)** to save & load processing and I/O configuration presets to & from your computer, **Configuration** to change the current password, perform software updates , switch software banks, activate new features and run diagnostics, **About** to view system and support information and **Logout** to logout and return to the login screen.

The **Main Menu** button in the top menu bar is used to get back to this screen from the others, if needed.

NOTE: After a few minutes of use, and only when attempting to switch to another screen or menu, you may be asked to re-enter the password (as a security measure) before the remote app switches to your selection.

Click on the "**Remote**" link option from the top menu or "**Meters & remote control**" from the Main Menu.
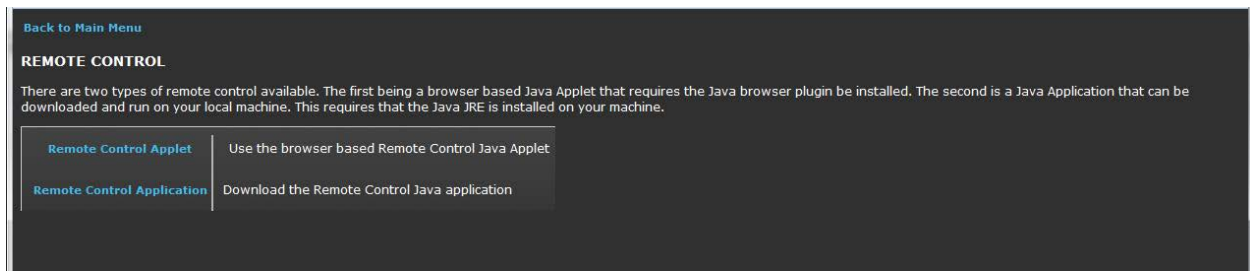
As of version 3.0, there are now two options here. If you are running a Java compatible web browser such as Firefox, you can click on "Remote Control Applet" and run the remote control in a browser window.

The other option "Remote Control Application" allows you to download the standalone remote Java application directly from the Omnia.11! This application still needs the latest Java Runtime SE installed on your computer but does not require a web browser.

When using the web browser applet, you may need to select "Always and Remember" from a Java security prompt and then you should see the Java logo followed by the main Remote Control screen should appear with the Preset tab open as the default:

Note: The remote uses the following network ports that will need to be opened/forwarded through any routers that may be present in the network: The normal http port 80, port 93, port 4545 & port 4546.

At the top-left there is a clickable yellow text link: **Back to Main Menu** that is used to exit from this remote control screen to the remote's main menu.

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At the bottom there is a reminder that Java Runtime Environment must be installed on your computer in order to see the remote metering and control screen. This reminder will be all you see if Java is not properly installed on your computer.

If audio is present on the inputs, you should see the meters moving along with the audio. A small amount of flickering is normal as the meter information is updated but if it is excessive or the meters are not moving smoothly, check your network connection and/or update your video card drivers or settings.

If you are connecting from behind a router / firewall, be sure to forward the TCP ports used for the control and metering data to the Omnia's local IP address.

The factory defaults are Ports 4545 & 4546, respectively.

Of note here is that the Java remote screen looks exactly like the front panel of the unit and works similarly, with some exceptions and additions.

Normally, the mouse is used to select buttons and controls and the Up & Down arrows on your computer's keyboard are used to adjust controls. The mouse wheel (on mice so equipped) can also be used to adjust the controls.

To select a control to adjust, first click on the desired Icon Button at the top of the screen and then click on a desired Tab or button if needed and finally on an adjustment control. It will then highlight in a brighter orange color indicating it is ready for adjustment with either the mouse wheel or arrow keys.

Please note that on smaller monitors or laptops you may not be able to see the entire screen at once. If that is the case, scroll bars will appear to the right and at the bottom of the screen. This is normal.

Virtually everything you can do from the front panel, you can also do with the remote except for Network setup and the Backlight & Calibrate controls in the System setup menu that are specific to the front panel's touch screen.

Your computer's keyboard can be used to enter text whenever the on-screen keyboard pops up.

The standalone app when first run looks like this on a PC:

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Click on the "Connect" menu in the top-left hand corner and select "New Connection":
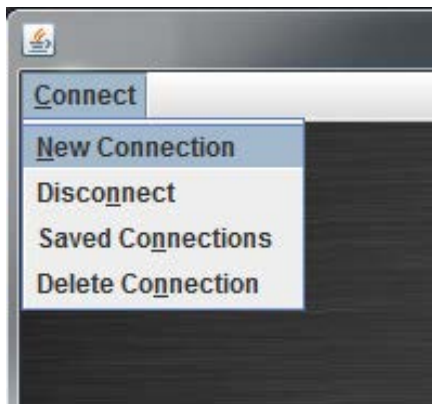
You should see the below dialog box:

If you would like to save this connection for future use, click on "Save Connection" and then type a connection name into the "Connection Name" box. Now enter the Omnia.11's IP address and select the desired user level from the "User Level:" dropdown. Enter the appropriate password for the selected user level and click "OK". The other options can remain at the defaults in most installations.

GPIO/Events

Omnia 11: GPIO Connector

Customer "Port Connector"
15-pin "D"Interface
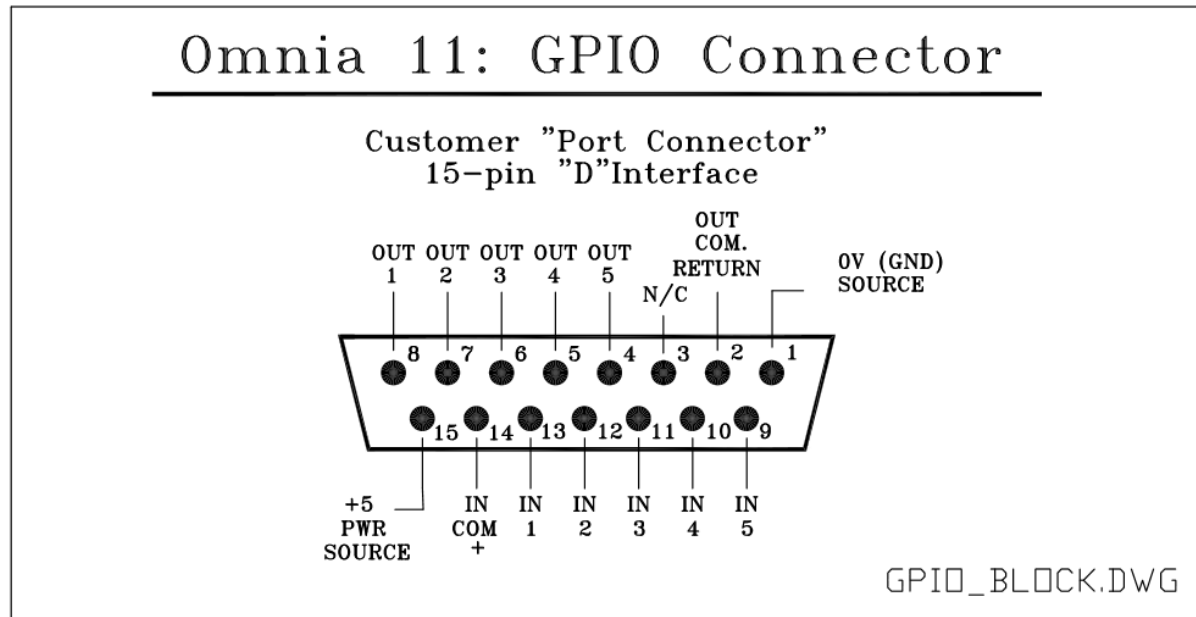
Note that this pinout diagram along with diagrams for recommended input and output circuits are available from the remote interface by clicking the links at the top of the page.

There are two options for wiring up the connector.

#1 - Using the internal +5v & ground connections. Note that you will need to add jumpers between Pins 1&2 and between Pins 14&15 on the GPIO connector.

#2 - Fully isolating the ground planes & 5v power rail from transients (such as the EMP pulse of a lighting hit). You should use an external 5v power supply & its ground reference in place of the above jumpers.
Click the included link: Recommended Input Circuits" for a diagram showing both options.

The pins have internal pull-up resistors, so there is normally no need to select + 5 Volts for a high unless a change is needed to "High" from the default state.

The outputs are not currently supported.

Input Source Select and Diversity Delay On/Off

When you select "Input Select / Div Delay" and click the "Apply" button, those functions are made active and the following screen appears:

REAR PANEL GPIO CONNECTOR DIAGRAMS

Connector Pinout
Recommended Input Circuits
Recommended Output Circuits

REAR PANEL GPI FUNCTION

The rear panel GPI connector can be configured for two different modes, input routing / diversity delay and preset selection. See below to choose and for descriptions of modes

GPI Function   ○ Disabled
                ○ Preset Selection
                ● Input Select / Div Delay

[Apply]

INPUT SELECT / DIVERSITY DELAY

While configured for input routing / diversity dealy the pins have the following function.

IN 1 and IN 2 select the primary input from amongst Analog, AES or Livewire. IN 1 acts indpendently to select either the analog input on a falling edge or the AES input on the rising edge:

Lxxxx = analog input
Hxxxx = aes input

IN 2 acts to select the LiveWire input on a falling edge. On a rising edge the state of IN 1 is examined to select one of the other inputs:

xLxxx = livewire input
LHxxx = analog input
HHxxx = aes input

If IN 1 and IN 2 have simultaneous transitions, IN 2 take precedence. So LLxxx and HLxxx switch to LiveWire.

IN 3 is the manual failover trigger:

xxLxx = trigger a manual failover. This will cause the secondary input to be selected and the switchback logic to be activated.
xxHxx = manually clear a failover. This will cause the primary input to be selected and normal failover logic to be activated.

IN 4 controls the diversity delay function of the O11:

xxxLx = Defeat the delay, taking it out of the FM path.
xxxHx = Normal delay operation (as determined by delay setting).

The inputs need "latching" contacts and work in conjunction with the front panel & remote. Whichever "event" that has occurred most recently will be the one that is currently "on air." So, if someone chooses Analog on the front panel and then, after that, there is a rising edge (change from low to high) on "IN 1", AES will be selected and put on air. The front panel (and remote, if connected) will update to reflect this, so they would show AES. If Analog is then selected, on the remote for example, then analog will be back on air. Whoever makes the last change to that control "wins". The thing to remember is that nothing ever permanently holds a control at a certain setting. All any action ever does is make changes to settings.

When the GPI **changes** level, it causes a **change** in the setting of the input. It does not set the input permanently to a given setting, but just changes it a single time. Once that change has taken place other sources (FP, Remote or LiveWire GPIO commands) are free to change it again.

As an example; for Input Source Selection:

Grounding (changing to "Low") "IN 1" (Pin 13) will select the analog input. This will need to be maintained to keep analog selected since removing the ground will cause a change to "High" (due to the built-in pull-up resistor) and change the input source to AES.

Please note that "IN 3" does not act the same way as IN 1 & 2 do if "Failover Time" is set to anything but 0.0. Then IN 3 becomes a manual failover "trigger" where the hi to lo transition creates a forced failover. Once that happens, the failback logic is activated. When it detects that the primary input is OK, it switches back to the primary.

Preset Selection

When you select "Preset Selection" and click "Apply" that function is made active and the following screen appears:

Similarly to the above, these also work on latching changes (events) between low and high (GND and +5v).

Here you can select the preset to be loaded when up to 10 events take place.

Simply select the preset from the dropdown list for each desired input you want to use and then apply the proper change to the appropriate pin on the GPIO connector.

Day Events

Day events can be used to automatically select a Preset, I/O Config, or both at a specified time on a given day or days. The event will repeat weekly on all days that are checked.

To add another day event, click the "Add Event" button. Once your day events are as you like them, click "Apply" to activate them.

Individual day events can be deleted by clicking the "Delete" button to the right of each day event line.

Note that the Omnia.11 realtime clock is NTP only and cannot be set manually. See Network Setup on Pgs. 15-17for NTP setup details. Note that Network Setup can only be done from the front panel of the unit.

Data Mgmt

The Data Management menu allows you to save and load User Presets and I/O Configurations to and from your computer.

From the top menu in the Remote screen, click "Data Mgmt" or from the Main Menu, click the "User Data Management" option.

Preset File Transfer

Shown below is the top half of the File Transfer screen, which is used for saving and loading user processing presets to and from your computer.
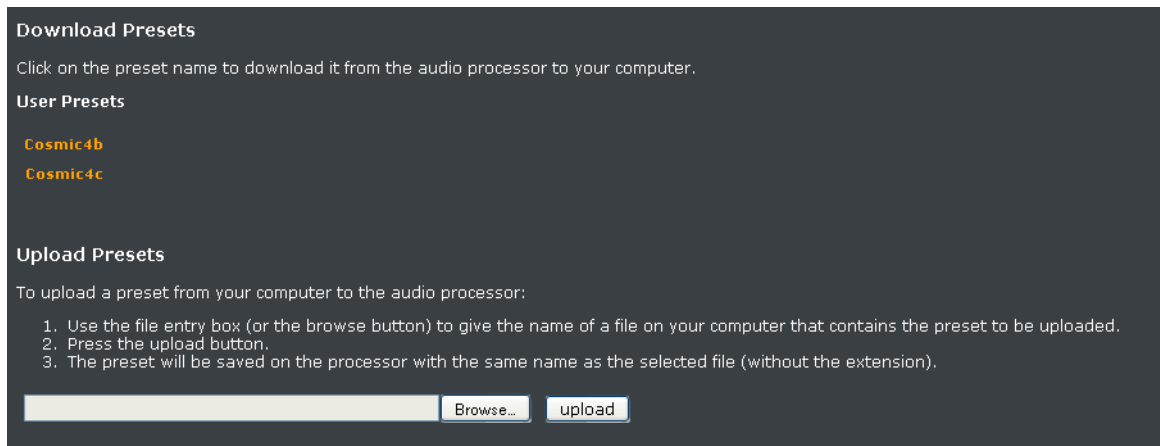
Any user presets on the Omnia.11 will show up as buttons under **User Presets** in the **Download Presets** section. 2 user presets are shown in the example screenshot above.

NOTE: The factory presets will not show up here and cannot be downloaded to your computer.
To download and save a user preset to your computer, simply click on a preset name and your browser's "File Download" box should pop up.

Click the "**Save**" button; choose the desired folder to save the preset in from the "**Save As**" dialog (this may vary with the OS) and click "**Save**" to save the file or "**Cancel**" to abort.

Presets are saved as small, text-based files with the ".opr" extension.
To upload a previously saved user preset to the Omnia.11, use the file entry box (or the browse button) to enter the path to the preset file name to be uploaded and press the "**Upload**" button.

The preset will be saved to the Omnia.11 with the same name as the selected file, minus the .opr extension.
Note that uploaded presets will be placed in the Omnia.11's preset list but will not go directly on the air.

Manage Presets / Preset Import

This will bring up a screen with 3 special import preset boxes used to import presets you may have that were created on older software versions 1.03, 1.1 or 1.2 through 1.6. Instructions are provided on the Import Presets screen.

Manage Presets / Preset Authorization

This will bring up the Preset Authorization Group Management screen where authorization groups can be added or deleted. For full information please see the Preset Security section starting on Page 22.

I/O Configuration File Transfer

Similarly, I/O configurations can be saved to or loaded from your computer.

Shown below is the bottom half of the "File Transfer" screen, which is used for saving and loading I/O configuration files to and from your computer.

I/O Configuration download and upload operations work similarly to the Preset download and upload operations described above with the exception that the filename extension for I/O configurations is ".oic".

Configuration

The Configuration menu allows you to change the Omnia.11's front panel / remote access password, update the unit's firmware, activate new features, access factory diagnostics, reboot the processor, reset the metering and reset the calibration values for the front panel touch screen.

Change Current Password

Here you can change the password (default: "omnia") for front panel touch screen and remote control access (which are one and the same). To do so, enter your old password in the "**Old password**" box and then the new password in both of the "**New password**" boxes and then click the "**Change**" button.

Software Bank Selection and Update

This screen is where you can select between 2 software banks and where software updates are performed over a normal Ethernet remote control session using a file downloaded from the Omnia website. New update files are always loaded into the software bank that is not currently running. Please note that a reboot into the bank where the new software is loaded will be required in order for the new version to take effect. This can take several minutes so be sure to plan accordingly.
As shipped from the factory, the same version will be present in both software banks.

To load a new software update file obtained from the omniaaudio.com website, click the yellow "**Update**" link inside the button which should be available for the bank that is currently not running.

You should see this message warning you that current settings may be lost during the update and that a reboot will be required to run the new software you are about to upload to the unit:

To cancel if desired, click the "**Configuration**" button at the top to return to the main configuration page.

To proceed, click the "**Continue**" button to bring up the file "Browse" dialog:

Click the "**Browse**" button and select the .oup file you downloaded, and then click "**Update**" to upload the file into the currently non-running software bank. This will not take you off the air since the software bank it is uploading to will need to be selected and then the unit rebooted in order to run the new software.

Once initiated, you should see this screen:
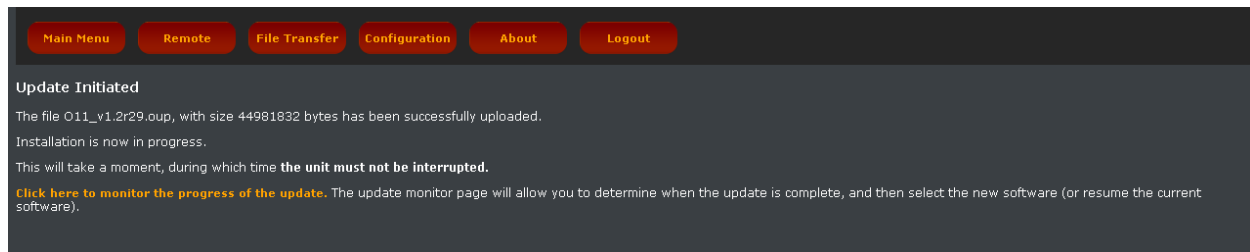
Read the screen carefully, noting that the unit must not be interrupted while it is loading the update file, then click the yellow "**Click here to monitor the progress of the update**" link.

You should see the following screen that contains a status box with which to monitor the status of the update:
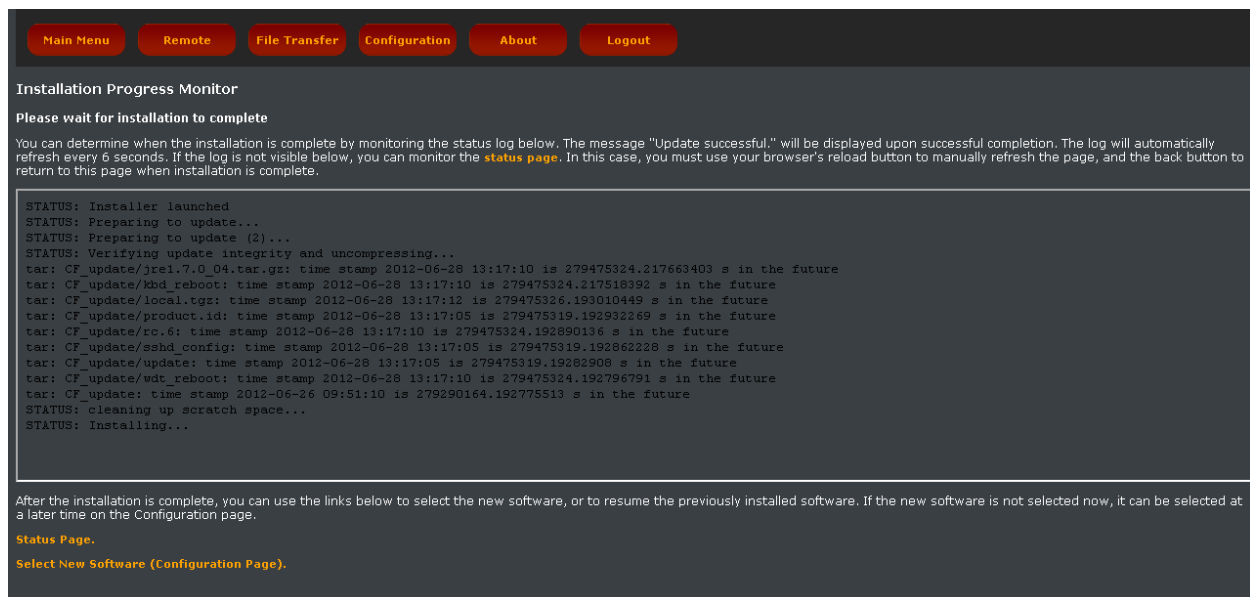
After a short while, a scrollbar will appear on the right-hand side of the status box.
Periodically, the screen will refresh and you will need to manually scroll the scrollbar down to see the latest text.

When the update is completed, you will see "Update Successful" at the bottom of the status box:
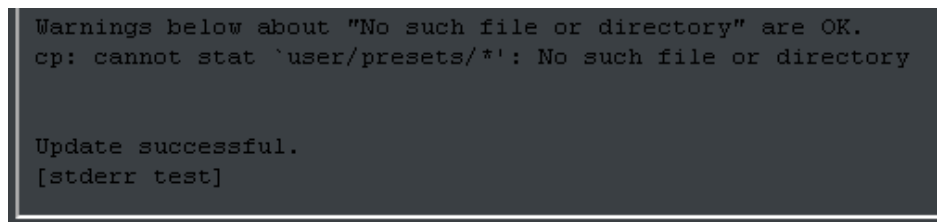
Once you see the "Update Successful" message, click the "**Select New Software (Configuration Page)**" link to return to the main Configuration page.

To run the newly loaded software, click on the appropriate "**Bank 0**" or "**Bank 1**" radio button that is next to the version information of the newly loaded software and then click "**Apply**".

The following message will be displayed:
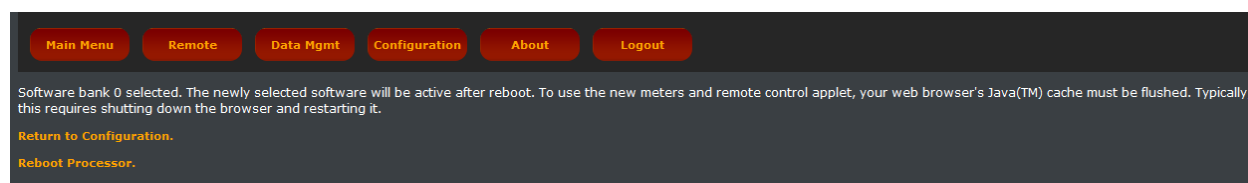
A reboot of the unit will be required to run the software selected in the new software bank. Note that the first time the unit is rebooting into new software, the reboot can take much longer than a normal reboot. This is normal so be sure you are prepared for the unit to be off the air for several minutes.

If you will be rebooting later, click the yellow "**Return to Configuration**" link to return to the Configuration menu.

If you are ready to reboot now, click the yellow "**Reboot Processor**" link to reboot.

Once the processor has rebooted and the main screen is showing, touch the Input or Output icon button and then the "I/O Config" tab. Now touch the padlock icon to unlock the I/O config preset list and then select your desired I/O Config preset from the list. If you do not have one, select "default".

Touch any of the processing icon buttons and then the "Preset" tab. Now touch the padlock icon to unlock the preset list and then select your desired processing preset from the list.

If you were using the Livewire outputs you may need to go into the Setup menu to re-enter your output channel numbers and re-enable the Livewire outputs. Please note that for proper sync, the LiveWire inputs should not be used unless at least one of the LiveWire outputs is enabled.

Feature Activation

To activate additional features on your Omnia.11 such as upgrading to the HDFM version from the FM Only version or licensing the G-Force plugin / Perfect De-Clipper, you will need to download the hardware ID file (omnia.oid) by clicking **Get Hardware ID**. Save this file and send it to Omnia tech support when requested.

A feature activation file will be sent to you. Upload this file to the unit by locating the file with the **Browse** button and then click the **Upload feature** button.
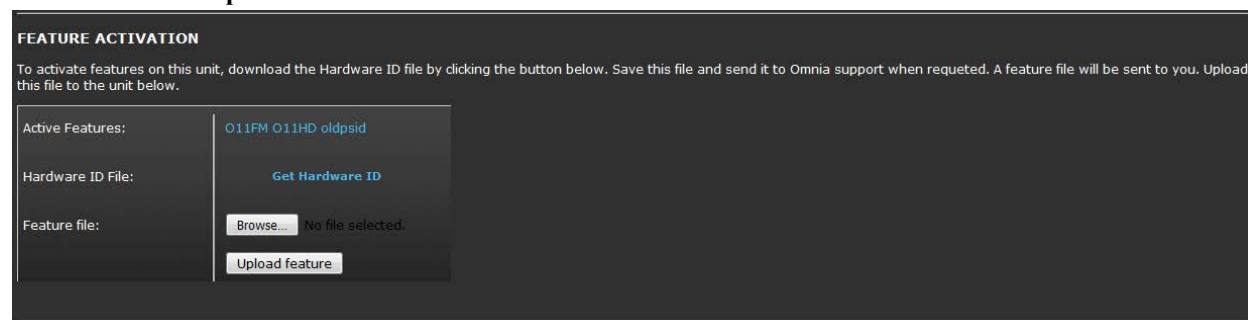
Utilities
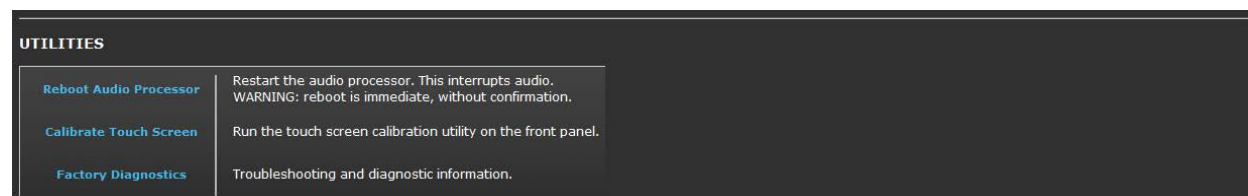
Reboot Audio Processor

Clicking this button will reboot the Omnia immediately.

Calibrate Touch Screen

Clicking this button will start the touchscreen calibration app.

Warning: This should only be done if directed to by Omnia Tech Support and only if the screen calibration is significantly off. It must be done very precisely using a non-scratching stylus to touch the indicated targets exactly in their centers.

Click the "**Factory Diagnostics**" button to bring up a diagnostic log, a table of CPU temperatures, log file buttons and a button to restart the Omnia.11 meters. The top half of the screen shows the Process Status log and a table of CPU temperatures:

```
Factory Diagnositics

Process Status:

  PID TTY        STAT    TIME COMMAND
 1260 ?          R       0:00 boa
 1645 ?          S       0:00 /bin/sh /usr/local/bin/start-Omnia
 1646 ?          SL1     0:04 rtai_APS_SBE -e -p 1 -v -c 4 -n APSTSK -t APM -d APE -i APS -l APL -a APA -y APY
 1648 ?          S       0:00 /bin/sh /usr/local/bin/start-Omnia
 1651 ?          S       0:00 /bin/sh /usr/local/bin/start-Omnia
 1652 ?          S       0:00 /bin/sh /usr/local/bin/start-Omnia
 1658 ?          SL1     0:14 rtai_BS412Clipper -e -p 2 -v -c 2 -n CLPTSK -t CLM -d CLE -i CLS -l CLL -a CLA -y CLY
 1660 ?          SL1     0:03 rtai_Omtx -e -p 2 -v -c 8 -n OMTSK -t OMM -d OME -i OMS -l OML -a OMA -y OMY
 1679 ?          SL1     0:02 rtai_HD -e -p 2 -v -c 8 -n HDTSK -t HDM -d HDE -i HDS -l HDL -a HDA -y HDY
 1685 ?          S       2:03 olua base_server.luac
 1688 ?          S       0:09 tcp_server
 1699 ?          SL      4:53 rtai_meter-int -i -f /usr/local/etc/fm-5b6b_meters.conf APSTSK CLPTSK HDTSK OMTSK
 1700 ?          S       0:02 failover /usr/local/etc/fm-5b6b_meters.conf
 1701 ?          SL      0:00 rtai_param-int -f /usr/local/etc/fm-5b6b_params.conf APSTSK CLPTSK HDTSK OMTSK
 1717 ?          S       0:00 /bin/sh /usr/bin/startx /usr/local/etc/xinitrc -- -nolisten tcp
 1742 ?          S       0:00 xinit /usr/local/etc/xinitrc -- /usr/bin/X -nolisten tcp -auth /home/user/.serverauth.1717
 1749 ?          S       0:00 /usr/bin/xterm -geometry 80x12+0+0 -name login
 1785 ?          S       0:00 /bin/sh /usr/local/bin/launch_fp
 1790 pts/0      Ss+     0:00 sh
 8839 ?          S       0:00 wait_for_button
 8840 ?          S       0:00 meter_server /usr/local/etc/fm-5b6b_meters.conf
 8852 ?          R       0:00 /usr/local/cgi-bin/omnia.cgi
 8853 ?          R       0:00 ps x
```

Omnia 11 Temperatures	
Core 0	55 C
Core 1	55 C
Core 2	59 C
Core 3	64 C
LM87	55 C

In most browsers you should be able to cut & paste this information into an email to send to Omnia Support, if requested to do so.

The bottom half of the Factory Diagnostics screen contains Log File link buttons that can be used to generate log files for troubleshooting at the request of Omnia Support and a button to restart the Omnia.11's front panel and remote meters should they stop working.

LOG FILES

Update	Status page from last update performed
Engine Start	LiveWire Engine startup.
Sys Local Start	System final startup.
ACMRP	DSP command and control.
DSP int	DSP interface.
Omnia Start	DSP startup.
Graphics	Graphical Subsystem
Front Panel	Front Panel

METER RESTART

Use this if the meters stop responding on the front panel or remote.

Meter Restart	Restart meter communications and front panel.

Appendix D: G-Force and Perfect DeClipper

INTRODUCTION to G-Force

Hello, and thanks for your interest in Omnia.11 G-Force!

The Omnia.11 G-Force option is the result of several years of intense Research and Development by Frank Foti and Cornelius Gould with the help of Team Omnia including Mark Manolio, Rob Dye and Frank Foti's boss, his pet cat, Silvio Dante - who provided the funding for the project.

Seriously though, The Omnia Team is proud to bring this technical achievement to our flagship audio processor! G-Force ships as the standard processing engine on all new Omnia.11 units and is available as an optional plugin on all existing Omnia.11 units running v3.0 software or higher. G-Force brings groundbreaking improvements to the art of processing! A demo mode is included in v3.0 so you can try G-Force without having to purchase a license.

A little background on G-Force is in order.

The overall goal of G-Force was to spread the intelligent processing engines to every stage of dynamics processing, including bass clipper management. It has always been Cornelius' goal to provide intelligence to dynamics processing so that complicated time constant operations could be performed and manipulated with just a small number of parameters for the end user.

Version 1.x of the Omnia.11 was the first step in this direction. Omnia.11 G-Force features dramatic improvements in this area, and the intelligence encompasses all aspects of dynamics processing -- up to and including the program adaptive bass clipper.

Since all of the dynamics processing sections feature internal intelligence, we are able to use the computer in the Omnia.11 to coordinate the local intelligence in each stage. This is done in such a way that their actions can be more faithful to the source content while simultaneously providing unparalleled source-to-source consistency.

One tremendous benefit that this computer management of the intelligent stages brings to the show is the new "Quick Setup" tab. Early testers of G-Force found that the Quick Setup section provided the controls they needed to get their station "dialed into the zone" within 20 minutes or so!   This is a great improvement over the days of hunting through the large array of controls available to find that perfect combination of settings that brings your station to life.

During focus group discussions, potential end users liked to refer to the new quick start tab as the "PD Page", where programmers with very little knowledge of audio processing are able to dial in the overall sound of the radio station with just 9 controls.

Of course, the advanced settings are all still there; just think of them as tools to "put the icing on the cake."

The new intelligent limiter sections of G-Force are extremely powerful compared to Omnia.11 version 1.x. You can make adjustments that were absolutely unthinkable in 1.x due to intelligent limiter sidechains as well as advanced intermod mitigation algorithms that allow the limiters to operate quickly and positively. They are able to control program peaks effectively and transparently for superior clipper protection. This means music with more punch, loudness, and clarity than before while providing the best on-air announcer vocal performance yet!

The limiter sections are so effective that the "Auto Sense" function, which was a key feature in version 1.x, is not needed (or desired) in Omnia.11 G-Force.

We feel confident that you will enjoy the sound quality of G-Force. In addition, we hope you will also appreciate its forgiving, effortless and positive reaction to user adjustments that will make getting your on-air signature sound fun again.

Now, get out there, and make some great audio!

OPERATION

Ensure that the 11 is running in the blue G-Force mode. If not, navigate to the "PROCESSOR STYLE SELECTION" section in the Configuration page of the remote control webpage interface.

Version 3.0 comes with a demo mode so you can evaluate G-Force without purchasing a license. In demo mode, audio is interrupted every with 1 second of silence every four hours, and the front panel will indicate "DEMO MODE" in bold letters.

To switch to G-Force mode, select the G-Force radio button and then click "ReStart". **Note: The unit will reboot causing audio interruption.**

You can switch back to "traditional" (orange) mode at any time by selecting the O11 1.x (that is: v3.0 running the 1.x algorithm) radio button followed by "ReStart". **Note: The unit will reboot causing audio interruption.**

PROCESSOR STYLE SELECTION

Use the radio button to select the type of audio processing that will run. Click ReStart to stop the audio processing and start again with the selected style. **ReStart will create many seconds of interrupted on-air audio.**

- ● O11 1.x FM/HD — Traditional Omnia 11 processing that duplicates release 1.x

- ◉ GForce FM/HD — GForce Omnia 11 processing, new in release 3.x

[ReStart] (Interrupts Audio!)
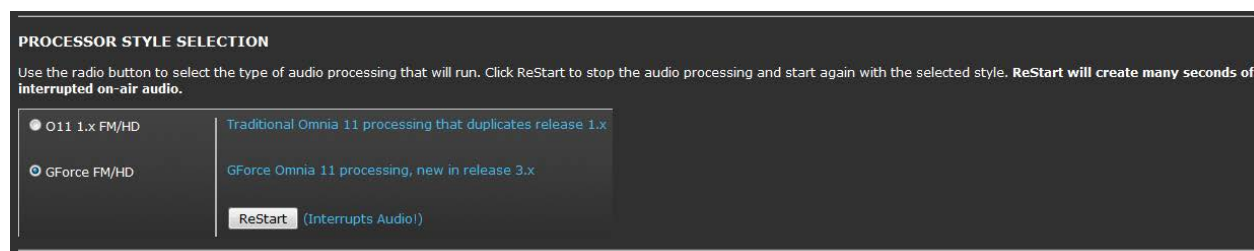
Omnia.11 G-Force Preset Selection

Our suggested method for using G-Force for the first time is to listen to all of the presets while offline. Pick the ones that sound closest to what you want on-air. Then put the Omnia.11 G-Force on-air, listen to those candidate presets on your "trusted" radios, and decide on one to start with. A list of the G-Force presets with descriptions can be found starting on Page 119.

Quick Setup Tab

Once you've picked the winning preset on air, chances are that programmers will want to make some tweaks. The first step to the tuning process starts on the **Quick Setup** tab. Do start here first, as Quick Setup operates on a global level that touches many internal parameters not accessible by any of the other controls in the user interface.

Preset	Quick Setup	Basic	Advanced

Loudness

Clipper Drive	Limiter Drive
-1.5 dB	2.5 dB

Bass

Bass	Bass Thump
1.0 dB	4.5

Brightness

Presence	Treble	Sparkle
3.9	4.0	1.5

Enhance Level and Density

Stereo Enh	St. Enh Density
3.5	9.25

Tips for using the Quick Start controls to adjust a preset to match your desired sound:

A. If preset is louder than desired but otherwise has the sound you desire, you have two choices: Preserve the texture of the preset and reduce loudness by lowering the "clipper drive" to taste, or create a more open texture for the given loudness of the preset by lowering the limiter drive which will reduce the "overall density".

B. Overall bass levels of a preset can be set using the "Bass" control. This will adjust many parameters simultaneously (including important but hidden ones) that govern the bass content of a given preset.

C. The brightness characteristics of a preset are determined by the three brightness controls. These controls are somewhat interactive with each other and adjust many "under the hood" parameters that determine the high frequency personality of a preset.

D. The stereo sound stage can be manipulated using the Stereo Enhance control. Our stereo enhancer has also been updated, and to our ears, it captures the sound of the "Space EFX" plugin of the original Omnia classic. The effect is pleasing and the new stereo enhancer shuts itself off completely during mono content. The density control adjusts the speed of enhancement. This is helpful to sculpt the type of stereo sound field you will have when the effect is used.

With these nine "Quick Setup" controls, most users should be able to "dial in" many presets to suit their markets using this small collection of controls alone. More advanced users will find these controls to be very powerful as well as they interact with the existing controls in the advanced menus of the Omnia.11 V3.   We encourage you to revisit the quick setup controls to "feel their effect" after making changes to more advanced settings elsewhere in the menu system.

When finished making adjustments, be sure to save your modified preset with a new name (you can't overwrite the factory presets) using "Save Current As" in the Preset tab.

Quick Setup Control Descriptions

● **Clipper Drive**: Adjusts the "brute force" loudness level of the Omnia.11. Higher levels of clipper drive equal greater loudness, with the potential side-effect of greater overall distortion. Use carefully to avoid unnecessary listener fatigue.

● **Limiter Drive**: Adjusts the overall drive level of the multiband limiter system. The effect of limiter drive in G-Force is VERY different from earlier Omnia.11 versions. The effect of greater amounts of limiter drive is that of more on-air density, and not necessarily that of greater loudness. Extremely high levels of limiter drive creates a "wall of sound" type of effect, but be careful. Such levels of drive can cause listener fatigue (and tune-out after a relatively short period of time).

● **Bass**: The Omnia.11 had many places in the system to tweak bass. Specifically the types of bass, the texture of bass, etc. This control simply turns the overall bass level up or down...because sometimes that's simply all you really want to do. The bass control tunes many "hidden" parameters within the algorithm with this control.

● **Bass Thump**: Adjusts many different (hidden) parameters under the hood including the action of the dynamic bass clipper. At higher levels, the "kick" or "thump" action of bass material is emphasized.

- **Presence**: This control tunes many hidden parameters to bring out the "presence" or higher mids (brightness) in program content.

- **Treble**: This control tunes many hidden parameters to bring out the highs in program content. The effect starts around the 5K range and up.

- **Sparkle**: The Sparkle control brings out the "air" or "sparkle" region of the audio spectrum. Use just enough to add a touch of professionalism to your on-air sound. Too much, however, can be a bit irritating. This control shares a number of parameters with the "treble" control, so the two are somewhat interactive.

- **Stereo Enh**: Adjusts the stereo image enhancer. Higher values widen the stereo sound field. Careful adjustment of this parameter and the "St. Enh. Density" control can provide a unique stereo soundstage for your station.

- **St. Enh Density**: Adjusts how fast the stereo enhancer algorithm functions. Lower values equate to a slower speed, and can be useful for emphasizing stereo ambient effects (such as reverb. Higher values (faster speeds) are useful for enhancing specific elements within the stereo soundfield (such as instruments, vocals, etc.). When using slower values, it is advisable to use lower enhancement levels ("Stereo Enh" control).

Intelligent Wideband AGC

The wideband AGC in the "version 1.x" of the Omnia.11 was widely acclaimed by many as "the best darn wideband AGC ever". With G-Force, we took things to a new level.

The new wideband AGC algorithm not only looks at the audio using multiple frequency bands, it also uses psychoacoustic analysis to add more power to the intelligently controlled side-chain. Gain reduction is not just derived by level, but is also based on several psychoacoustic properties. The intent is to provide smooth yet responsive gain control over a wide range of program levels, and to do it in a way that is least obtrusive to the ear and to provide intelligent data for downstream control stages.

The new wideband AGC can be adjusted to ride through material that alternates between full instrumentation to moments of single instrument (or solo voice) and back without obvious disruption of the sound stage, all while still maintaining precise level control.
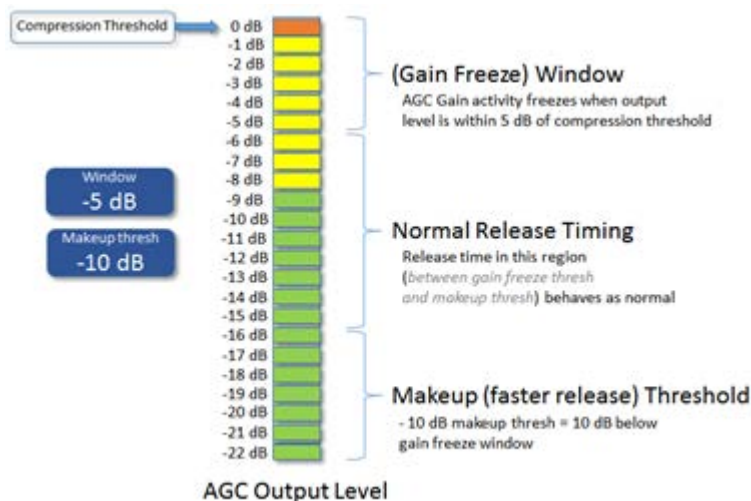
The Basic Tab controls on the new Wideband AGC operate exactly like the ones in 1.x. However, there are major advancements in the operation of the "Window" and "Make Up" functions found in the "Advanced" tab (shown on the next page).

Advanced Tab Wideband AGC Control Descriptions

- **Window:** The wideband AGC system of the Omnia.11 (as part of the overall algorithm improvements) now features an improved windowing algorithm. Audio that falls within the "do nothing" window (as defined by the user) will cause the AGC to freeze, neither compressing or releasing. This is useful when high RMS rich material (already processed loudly) is fed to the Omnia.11 as the AGC system will not add more "density" to already dense material as long as their waveforms fall within the window. This is all thanks to improved RMS and density detection schemes that are better able to differentiate between program peaks and long term average levels. You will notice much improved "stability" in the gain riding operation of the AGC system but responsiveness when the need arises.

- **Makeup Threshold:** The Makeup Threshold control itself isn't new, but its operation has changed a bit. It interacts with the Window control and can be thought of as a "soft window". Audio that remains above the makeup threshold value will use the release time as defined by the user. Audio that falls below the makeup threshold value will have a faster release time, allowing low level material to be brought up faster without using a blanket faster release time which could cause listening fatigue. When the audio level is brought up to the Makeup threshold, the normal (user) release time will once again be applied.

The value expressed in the Makeup Gain controls (in dB) is the audio level below the level expressed in the window control where makeup action occurs. The combination of the Window make Up Threshold controls constitutes a "dual staged windowing" system for the AGCs.

Compression Threshold → 0 dB
-1 dB
-2 dB
-3 dB
-4 dB
-5 dB

(Gain Freeze) Window
AGC Gain activity freezes when output level is within 5 dB of compression threshold

-6 dB
-7 dB
-8 dB
-9 dB
-10 dB
-11 dB
-12 dB
-13 dB
-14 dB
-15 dB

Window
-5 dB

Makeup thresh
-10 dB

Normal Release Timing
Release time in this region
(*between gain freeze thresh and makeup thresh*) behaves as normal

-16 dB
-17 dB
-18 dB
-19 dB
-20 dB
-21 dB
-22 dB

Makeup (faster release) Threshold
- 10 dB makeup thresh = 10 dB below gain freeze window

AGC Output Level

- **RTP Level:** RTP stands for Return to Platform. What RTP does is return the gain of the AGC to the selected amount of gain reduction or "platform level" in the absence of audio. This control adjusts the "resting" or "platform" gain reduction level the AGC will return to when audio pauses or stops (while gated).

  The primary purpose of RTP is to prevent the AGC gate from increasing the gain unnecessarily or holding the gain too low during pauses in audio, which could result in an increase in noise level or unexpected sudden increase in level when the audio returns.

- **RTP Speed:** controls how fast the adjustment to the platform level (set with the RTP Level control above) takes place – i.e., how long it takes the AGC to move to the target RTP gain reduction level. Range is from "0" (off) to 11 (fast).

  Note: For maximum gain-riding range, we suggest a Wide Band RTP Speed setting of "0.0" for most popular music formats which effectively disables RTP. Use higher settings if you have consistent board operators and don't mind that quieter program sections remain quieter.

- **Pause Threshold:** activates and changes the characteristics of the dual platform "smart" moment-to-moment gate function. A setting of 0.0 turns off the smart gating, reverting it to conventional gate behavior. Settings other than 0.0 activate the smart gating function and higher settings allow the smart gating to be more aggressive.

  Note: Middle-range settings can completely eliminate any perceived "pumping" effect during shorter quiet sections without compromising overall longer-tem gain-riding ability.

- **Filter Freq:** (High-pass Filter Frequency): This drop-down control adjusts the cutoff frequency of the built-in high-pass (lo-cut) filter. Available settings are "Out" (not recommended), "20 Hz", "30 Hz" and "40 Hz". A setting of at least "20 Hz" is suggested for most formats to keep sub-sonic signals from affecting the processing performance.

- **Ratio:** This variable control adjusts the overall compression ratio of the Wideband AGC.   As ov version 3.0r78, the values expressed on this control are relative. Lower values equal lower ratio values. .1 is roughly 10:1. A value of .02 is about 2:1.
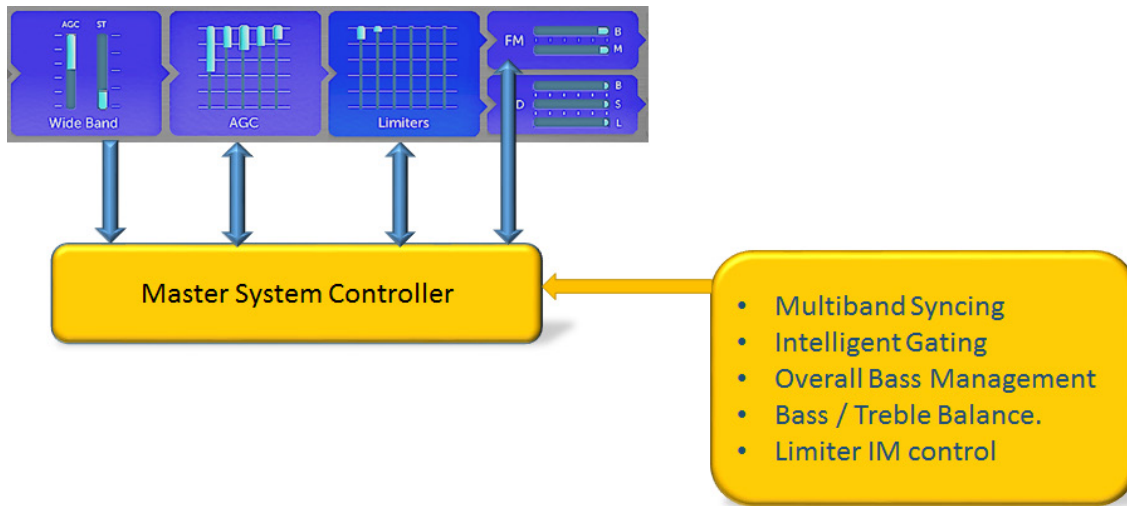
Since the intelligent sidechain of the wideband AGC contains a treasure trove of information about the acoustic sound signature of material on your program buss, we can use this data to manipulate all of the stages after the wideband AGC making the multiband AGCs, limiters, and even portions of the clipping process "program aware". It is also where the data used by the "Intelligent Gating" and "Mode Control" sections comes from. This means G-Force is capable of being extremely transparent sounding even during heavy dynamics processing.

This data is used by the system controller (the "compute" portion) of the Omnia.11 to synchronize the gating and dynamics functions of stages downstream from the wideband AGC, providing unparalleled clarity and punch to the multiband AGCs and Limiters.

In the past, it could be a struggle to adjust the multiband processing sections downstream of the initial AGC stage. Much of the time was spent managing the "mushiness" of the sound that typically happens as processing stages become further and further removed from the program input.

The system controller can help here since it is able to keep all downstream stages "source aware" so that as much program impact as possible can make its way to the listening audience.   You decide how much you want to let through and are not hampered by the limitations of "stacking stages" of processing.

New Multiband AGC

Basic Tab and Dynamic EQ Controls

Drive: This controls the overall drive level into the multiband AGC system. Individual band drives can be adjusted by tapping the "XO" button to the left of the controls.

Gate Master: The Gate Master adds or subtracts (depending on how it is adjusted) the gating threshold on all of the multiband AGC bands together. This control *offsets* the values of the individual multiband gate thresholds.

Attack Offset: Attack Offset makes a relative change to the individual attack times within each of the multiband AGCs. Positive values speed up the attack times, negative values slow the attack times down.

Release Offset: The Release Offset control makes a relative change to the individual release times within each of the multiband AGCs. Positive values speed up release times, negative values slow the release times down.

Intelligent Gating (Master Intel Gate): As part of the full implementation of Cornelius' "G-Force Technology", there are a few new functions introduced into the Omnia.11's G-Force upgrade. Intelligent Gating is one of them. Since the G-Force system operates on a global level encompassing ALL of the dynamics processing, it is aware of what is happening in all stages of the process. As a result, it is capable of altering the individual bands of the multiband AGC for processing that better "matches" the program source.

One of the critical aspects of this is coordination of the multiband AGCs so that their operation "blends" with the source material better. A critical function is the Intelligent Gating system.

The G-Force algorithm can alter the behavior of the multiband AGC's gating functions in a way that allows them to contribute significantly to building the RMS energy needed for consistent loudness while suppressing common side-effects often heard in other multiband AGC systems. As the program spectrum shifts around, the algorithm intelligently shifts the gating activity to keep the bulk of RMS build-up centered around the bands with the most audio energy.

How much influence this system has over the normal gating functions is determined by the "Master Intel(igence) Gate" control.   Higher values (towards 0dB) mean stronger control by G-Force.

The intelligent gating system allows the multiband AGC system to operate over the full range permitted by its local system of gates. As a result, higher levels of intelligent gating will not cause the multibands to "stick" at some high level during moments of dynamic level change. It is only concerned with keeping the bands with minimal energy from floating around "unchecked".

When adjusted (or "tweaked") along with the Sync control, a LOT of power can be unleashed!

- **Sync:** This controls the amount of adjacent band syncing in the 5-Band AGC, relative to the middle (MH or ML) band. A setting of "0.0 dB" provides maximum sync between the bands. At this setting, minimal spectral manipulation will take place. A setting of "-2.0 dB" will allow 2 dB more "independence" in the immediately adjacent band and 4 dB in the second-adjacent bands. Use lower settings (along with lower settings of the Gate Thresh controls) to get more spectral manipulation. Use higher settings to preserve the frequency balance of the original program material. Also, please note that on presets where the AGCs are operating faster, a lower Sync setting will generally be needed.

- **Sync Master:** The Sync Master control in the Basic tab of the AGC menu allows you to select whether AGC Band 2 (the ML band) or Band 3 (the MH band) will be the master band the other bands reference to when using the Sync feature. In the example below, a Sync value of -4.0dB has been applied:

  Select "ML Master" when you want the overall brightness to match closer to the source.

  Select "MH Master" if you want things to be brighter overall.

  If the Sync control in the Basic tab of the AGC menu is turned down, this control will have less effect. (And virtually no effect at all if Sync is set to -12)

- **Engage Control:** If you would like to bypass the 5-Band AGC section, switch off the Engage switch.
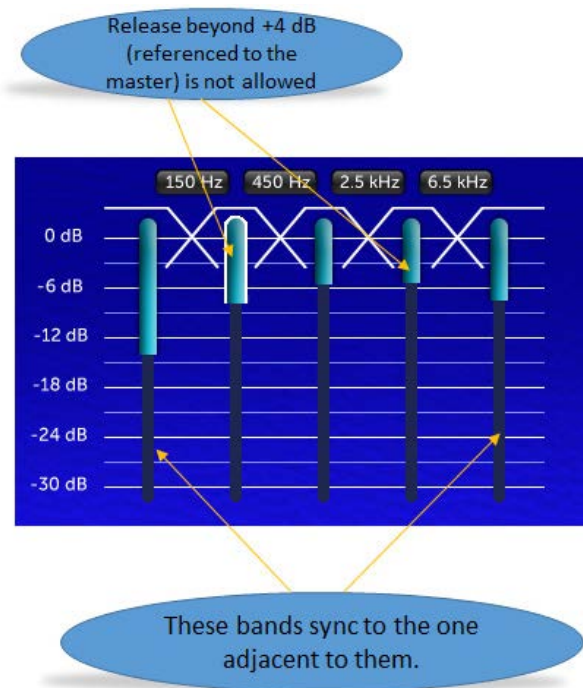
Process Mode Switch Control: This switch determines which bands have the G-Force influence of the AGC control side-chains. When switched on, the side-chains are manipulated by the system controller (Omnia.11's computer) in a way that produces more "open" and "dynamic" sounding audio. As a result, audio within the bands chosen for control "move forward" in the mix, and sound more "musical".

There are similar controls within the multiband limiter system as well.

The process mode switch control has three options.

0: There is no G-Force altering of the multiband AGC side-chains.
1: G-Force control is applied to the LO, and ML bands of the AGC
2: G-Force control is applied to ALL bands of the multiband AGC system.

Advanced Tab Controls

HI Band AGC Advanced Tab Controls

Each of the multiband AGC sections has a few new controls added. All of the multiband AGC bands feature "Window" and "Threshold" controls. The three highest bands also have their own "Intel Gate" controls.

- The **Window** Control: The wideband AGC system of the Omnia.11 has always featured a wideband "do nothing" window. We have now extended this functionality to the multiband AGCs. The newly re-designed windowing algorithm makes it possible to finally implement this function to the multiband AGCs.

For more information on the windowing function, refer to the Wideband AGC section.

Audio that falls within the "do nothing" window (as defined by the user) will cause the AGC band to "sit there", neither compressing nor releasing. This is useful when high RMS rich material (already processed loudly) is fed to the Omnia.11 as the AGC system will not add more "density" to already dense material – as long as the waveforms fall within this do nothing window.

- **Makeup Threshold:** The makeup thresholds in the multiband AGCs operate the same as in the wideband AGC. The Makeup threshold interacts with the window (gain freeze window) control. The Makeup threshold control can be thought of as a "soft window". Audio that remains above the makeup threshold value will use the release time that is defined by the user. Audio that falls below the makeup threshold value will have a faster release time – this allows low level material to be brought up faster without using a blanket faster release time, which could cause listening fatigue.   When the audio level is brought up to the Makeup threshold, the normal (user) release time will once again be applied.

The value expressed in the Makeup Gain controls (in dB) is the audio level below the level expressed in the window control where makeup action occurs. The combination of Window, and Make Up threshold constitutes a "Dual staged windowing" system for the AGCs.
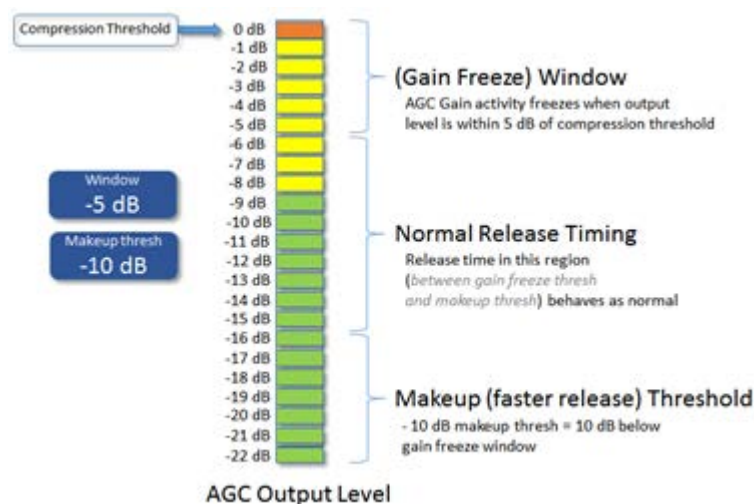
- **Threshold Controls:** We've added Threshold controls to the multiband AGC system. This will allow expert users to custom tailor what "flat frequency response" means for their formats.

- **Intelligent Gate (Offset):** In addition to the master intelligent gating in the top level multiband AGC control set, we've provided means via the "Intel Gate" controls (in the advanced tab) to offset the value of the master intelligent gate control on the highest three bands of the multiband AGC. This ability comes in handy in controlling the "brightness" characteristics of the multiband AGC system. Lower "Intel Gate" numbers allow that band to "stand out" more in the mix.

Dynamic EQ - An Overview

Adjustment of the dynamic EQ can be made by clicking on the "Dyn EQ" button on the multiband AGC Basic controls tab.

The Dynamic EQ is a revolutionary tool for audio processing. Its history can be traced back to the Telos Delta phone hybrid from the mid 90's, and later adopted into the Telos VX phone system. It was revolutionary for phone hybrids, and Frank Foti and Cornelius Gould recognized it to be a powerful concept to bring to audio processing.

> **The dynamic EQ is NOT a multiband compressor, AGC, or other similar process. It is a process that ONLY operates as a program controlled equalizer. It does not care about level. If the audio is quiet, it will do its thing at that quiet level. If it is loud, it will do its thing at that level.**
>
> **As a result, it can provide spectral consistency from source to source *without* messing with the dynamic range of the program content!**

For Omnia.11 G-Force, the Dynamic EQ was transformed into a four band process, and placed ahead of the multiband AGC. It is able to manipulate the frequency balance of the LO, MH, HI, and SH bands. The ML band is used as the reference for the others, so the frequency balance there is static, but the static level can be changed by the end user for tailoring the frequency balance that is output to the multiband AGC section, if desired.

The operation of the dynamic EQ can be observed using the dynamic graph to the left of the controls. It will display in real time what actions the Dynamic EQ is performing on program content.

Dynamic EQ Adjustment

There are a number of controls available to the end user for customizing its operation to their respective formats.

- **Dyn EQ Engage:** This switch can be used to bypass the Dynamic EQ stage in the Omna.11 processor. It can be useful to A/B with and without, particularly when you see an extreme equalization curve being developed. Doing this provides great insight into the power of the Dynamic EQ feature, and is a great diagnostic tool!

- **Dyn EQ Mode:** There are two modes of operation for the Dynamic EQ: "Separate" and "Interactive".

Separate Mode: In Separate mode, each individual EQ engine watches the master reference calculation algorithm, which monitors the "ML" crossover output.

**Dyneq "SEPARATE" Mode**
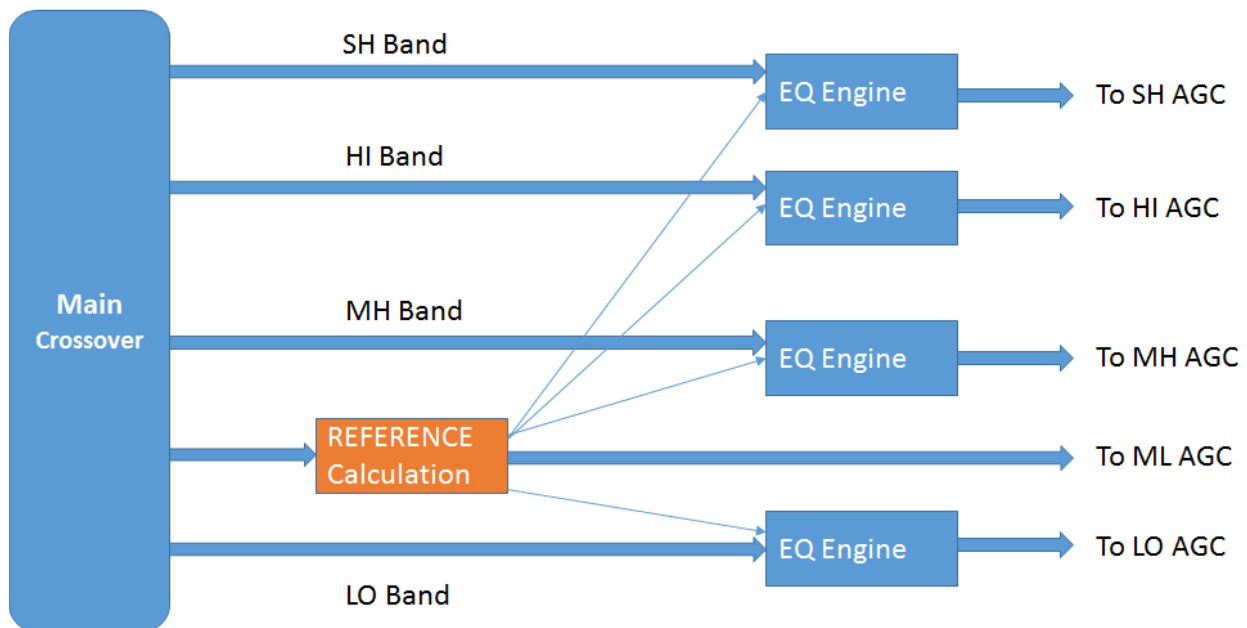
Separate Mode maintains a "warmer" tonal balance with "a bit of top end sparkle". In Separate mode, the Dynamic EQ graphic display shows the frequency response of the Dynamic EQ system as it feeds the multiband AGC.

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Interactive Mode: In Interactive Mode, the top three bands of dynamic EQ operate in a chain, where the SH EQ engine watches the HI EQ engine for its reference, and the HI EQ engine watches the MH engine. The MH engine watches the reference engine.
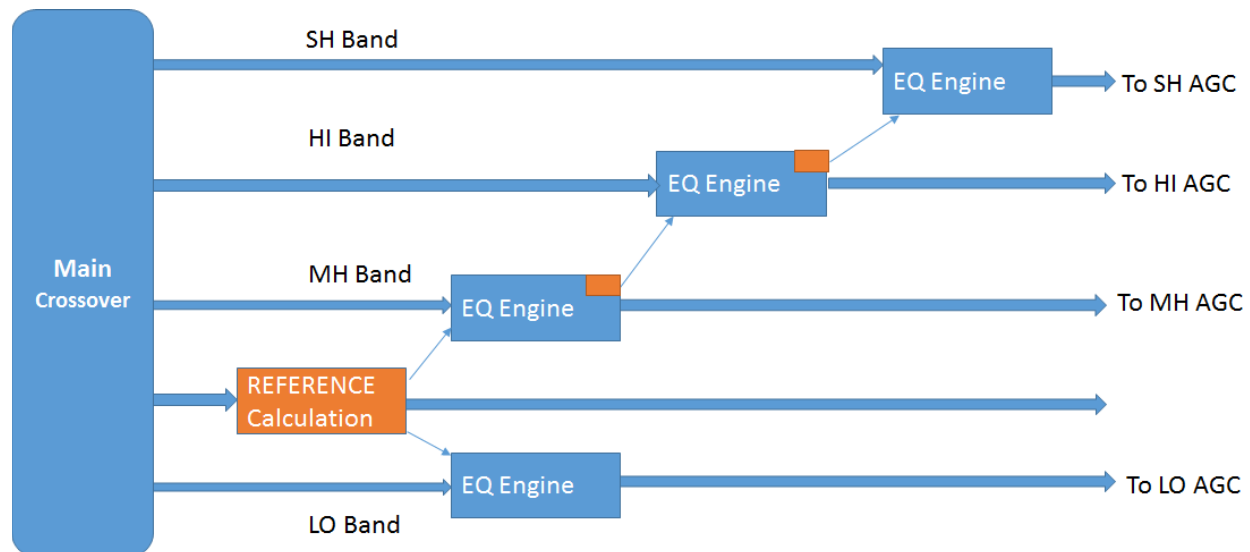
Interactive Mode maintains a "brighter" tonal balance.

The Dynamic EQ display representation needs to be interpreted a bit differently in interactive mode. You may see a graph that shows 2 dB of boost in the MH EQ, none in the HI EQ, and, maybe 5 dB of boost in the SH EQ. While this looks like it would be strange, keep in mind that what you are seeing in this case (INTERACTIVE MODE ONLY) is a representation of the gain calculations relative to the adjacent reference band.

- **Boost Ratios:** The boost ratio controls are used to limit how "hard" the EQ engines operate. 100% settings allow the system to operate in a 1:1 ratio. In other words, a 3dB difference (or error) between an individual EQ Engine and its reference results in a 3 dB EQ correction. 50% settings result in a 1.5 dB correction for the same scenario.

- **Cut Ratios:** In the initial G-Force release, they are disabled. When enabled, they will allow the ability to reduce EQ gain when necessary.

New Limiter Section

Basic Tab Controls

In Omnia.11 Version V3 with G-Force, the G-Force Technology extends to the multiband limiter section as well! Users can choose how much of this effect is applied and where using the LF and HF mode switch controls, as well as the LF & HF density controls.

The main goal of the G-Force Technology in the limiter stages is to manage & create more consistency in the texturing created by the multiband limiters.

- **Drive control:** In Omnia.11 G-Force, the limiter drive control has an entirely new role in life. It not only adjusts the overall drive level to the limiters (as before) but now it serves a bigger purpose of "texturing" your station's audio.

  Due to the super tight control characteristics of the new limiter system, and its new high speed ultra-low IMD management algorithms, driving the limiters hard without loss of quality or clipper management is possible! Driving the limiters harder causes a smooth, forgiving, and carefree transition to a "thicker" or "denser" on-air sound.

  Older version issues such as inconsistent live vocal quality are GREATLY reduced (if not eliminated) in G-Force. Driving the limiters lighter or harder does not change loudness levels on the dial. It only manages how "dense" your station's audio sounds. For a more open / natural sound, watch the multiband limiter activity on high RMS content (like the choruses on heavily compressed / limited content like P!nk, or Kelly Clarkson songs - or metal songs in general), and adjust the multiband limiter Drive to just "tickle" the limiters to about maybe 1-2 dB or so (3-4 dB when the optional Perfect DeClipper is used). What you will see is that the limiters will run extremely lightly on high RMS material and work harder on dynamic content (such as older songs, and live voice), yet sound remarkably transparent and loud! Why "re-limit"

program material that is already limited to within an inch of sanity and doesn't need any additional density enhancement? This allows the limiters to work as real peak limiters, adding density only to material that needs it.

- **Attack Offset:** Similar to the scheme in older Omnia.11 software, the Attack Offset control makes a global change to all of the attack times in the multiband limiter system. A bigger number equates to a faster attack time. The individual attack and release times are scaled up or down according to the Attack Offset control setting. A value of "-5" places the multiband limiter attack time under computer control (or automatic attack), where the system actively (dynamically) modulates attack times for the best "punch" vs. "clipper peak control". When in "automatic attack" mode, the individual attack controls in each of the limiter sections become controls to "modify the shape" of the automatic attack times.

  Since the limiters' attack times intelligently engage whenever extreme conditions exist, using a value of -5 places the system solely under the control of the computer. Higher Attack Offset values creates an "override", allowing attack times to be more under user control, and less under the control of the computer -- unless a condition occurs to cause the user value to be insufficient to protect the final clipper, in which case, the computer will (temporarily) override user attack settings.

- **Release Offset:** The release offset control does the opposite of the Attack Offset control mentioned above. A higher value creates a faster release time across all limiters. A value of "5" places the exact release time of the individual limiters under control of the computer (automatic control).

  When in automatic mode, the release times are actively modulated to release as fast as possible without causing objectionable intermod distortion, and minimizing listener fatigue. Settings lower than "5" gently transitions to a slower, program controlled, release slope. Lower values are useful for programming meant for long term critical listening.

- **LF & HF Limiter Density controls:** Use these controls to set the desired amount of "density texturing" of the limiter sections. Higher number values equal more density (or "thickness") created in the high or low frequency bands. For greater TSL (Time Spent Listening), lower values in the HF Lim Density control create less long term listening fatigue. We recommend a value of around "2".

  Higher values of HF Lim Density can be useful where limiter activity in general is extremely light, or if users want to emulate the HF characteristics of older analog audio processing gear…which can be useful for some "retro" formats.

  There is more freedom in the lower frequency bands (LF Lim Density control). Lower value numbers here create more "openness" in the low frequency and low-mid bands (SL, LO, and ML bands). Higher level settings give more "sustain" to these frequencies, and can add a level of "excitement" to some material.

  The density controls operate by modifying parameters in the computer controlled attack & release algorithms.

- **Limiter Mode switches:** These switches determine which bands have dynamics sidechain manipulation by the system controller (Omnia.11's computer). When switched on, the sidechains are manipulated in a way that produces more "open" and "dynamic" sounding audio vs. the traditional "flat" sound produced by multiband limiters. As a result, audio within the bands chosen for intelligent control "move forward" in the mix, and sound more "musical".

- **LF Limiter modes:** The LF limiter mode switch features three modes:
  Mode 0 is "off".
  Mode 1 turns the SL and LO bands on. This produces more dynamic audio in the bass frequencies only.
 Mode 2 turns the control mode "on" for not only the SL and LO bands, but the ML band as well.

- **HF Limiter modes:** There are two modes that determine the dynamic control status for the MH, HI, and SH bands:
  Mode "0" is off.
  Mode "1" is on.

Improved Equalization System

The limiter section of the Omnia.11 now features an extensive equalization system.

In addition to the previous three parametric bands of equalization, users now have a fully adjustable low and high shelf filters. This comes in VERY handy when there is a desire to reproduce the classic "low end" sound of earlier Omnia processors. For example, you can set the low shelf to lowpass at 80 Hz with a Q of "0.9", and a few dB's of boost for smooth pleasing "oomph" to the bass texture of program material.
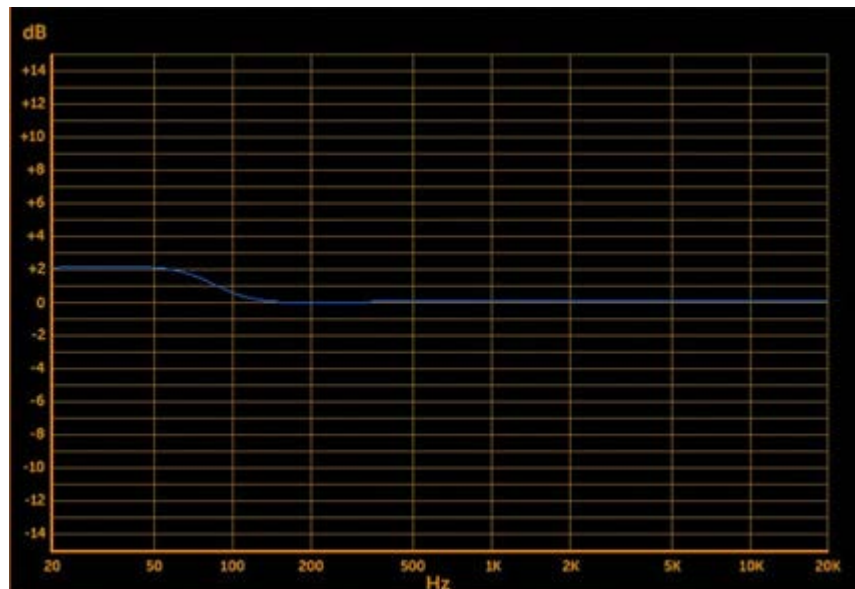
New Bass EFX Tab

Bass EFX Tab Controls

- **Solar Plexus:** Solar Plexus is in G-Force as well! We've added a new control called "**Subharmonic Balance**".

  When Subharmonic Bal is set to "Off" the Solar Plexus effect is very close to the subtle "thunder" as heard in the original "thunder bass" control in earlier Omnia.11 version 1.4. When Subharmonic Balance is turned "up" the Solar Plexus effect is more obvious, and encompasses a broader range of bass frequencies.

  Similarly to Deep Bass range (see below), be careful not to apply too much of the Solar Plexus effect as it can exaggerate low frequency room noise or mic "plosives". Higher settings can also cause some audible distortion when heavy bass is present. Be sure to monitor on speakers or headphones that can reproduce the lowest frequencies in order to hear the full effect of what Solar Plexus is doing.

- **Deep Bass Boost & Warm Bass Boost**: These controls can be used to apply a "static boost" for both the Deep bass and Warm Bass enhancers. Boosting the levels here will cause an immediate and audible increase to their respective frequency bands.

- The **Phat Bass** control adds subtle low mid / upper bass detail to program content, and helps to define the sound of bass not only in small speakers, but larger ones as well. The effect is program controlled, so do not fear the use of large amounts of "phat bass" boost.

- **Deep Bass & Warm Bass Range: I**f these "range" controls are set to "0", there is no dynamic program controlled action of the bass enhancers. The static boost controls on the basic menu act as shelving (deep) and bandpass (warm) equalizers of sorts. As the range controls are increased, the Omnia.11 dynamically applies more enhancement in these frequency areas whenever they are deficient in the program source. The

higher the settings, the more aggressively Omnia.11 will try to bring out these frequency tones. If there are already sufficient amounts of energy in these bands, the Omnia.11 will apply less enhancement to these bands. The Omnia.11 will not apply any additional enhancement to these frequency bands on material that has really strong bass content. It will only add where energy is deficient.

Be careful with high amounts of deep bass range if you do not have high pass filtering on studio mics. High levels of deep bass range can enhance microphone "plosives". So, if you have a notorious "P-Popper" on staff, either employ 80 Hz high pass filtering on the studio mic processor, or use less deep bass range!

Excessive warm bass range boost can cause some program material to sound "muddy". Listen carefully, and adjust the controls using small amounts over a long period of careful listening.

- **Deep Bass Slope**: When set to 12 dB per octave, the deep bass / warm bass characteristics are broader, and favors upper bass / low mid tones. This is a useful setting for stations playing primarily older material (such as Classic Rock or 70s & 80s formats).

- **Bass Enh Engage:** The G-Force release features the ability to turn off the active bass enhancement stages to allow for "before and after" comparisons.

New FM Clipper Features

The FM clipper section of the Omnia.11 V3 / G-Force update contains the same groundbreaking final limiter unveiled in version 1.6.

We've added a meter that quantifies the "perceived distortion" for a given clipper setting. This helps users to adjust for the "loudness vs. distortion" tradeoff.

The level of distortion will be displayed in red on top of the main clipping depth (Main Clip) meter (in blue).

Generally speaking, the FM clipper drive is properly adjusted when you are able to achieve the desired loudness with a minimum amount of distortion. Some adjusting of the "limiter drive" control may be necessary if the proper loudness level is not achieved without excessive distortion.

It is normal to see brief moments of high distortion readings that last fractions of a second. This is OK. You do not want long term distortion (red) levels beyond 1 or 2 dB or so. The exact reference here varies from market to market as the acceptable level of distortion is not the same across a broad range of radio markets.

FM Clipper Advanced Features

Once you are in the FM Clipper section, choose the "advanced" tab below to switch to the advanced features.
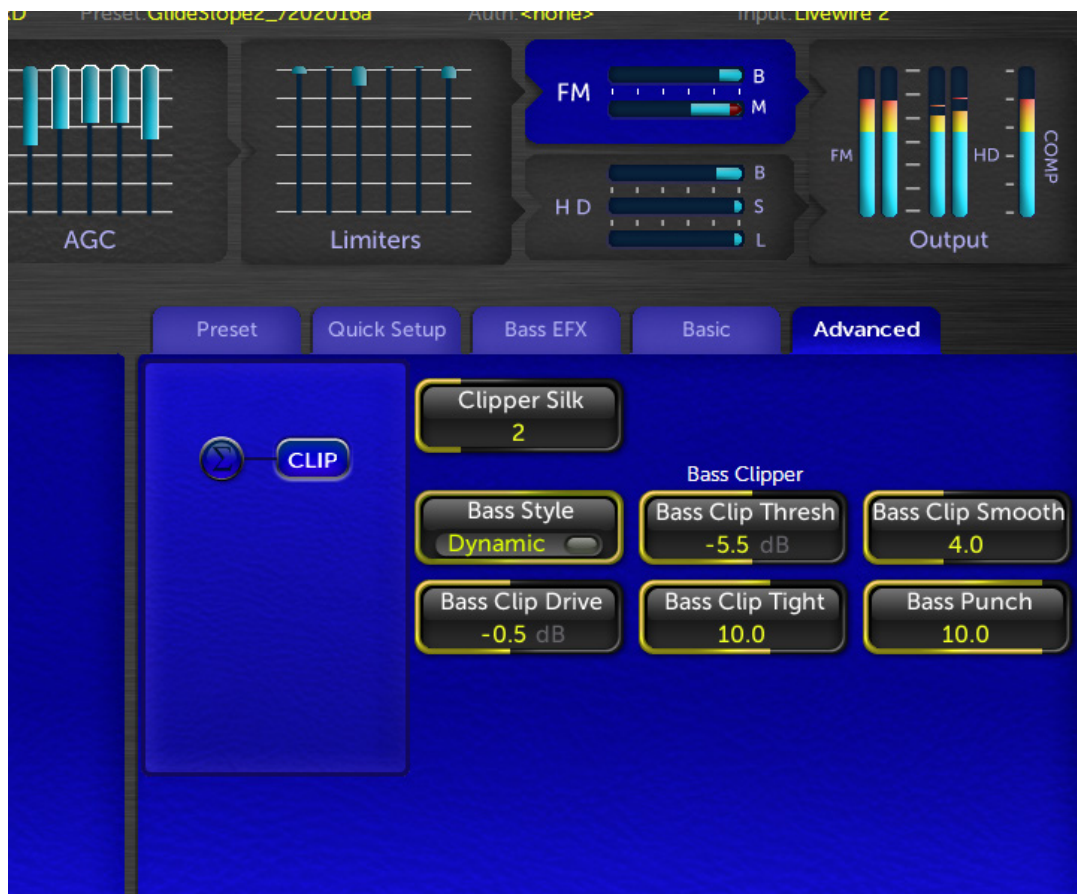
- **Clipper Silk:** This function is similar to the "Clipper Silk" parameter available in older Omnias. Higher values feature a smoother sound to the clipper, lower values can provide more "clarity", but could possibly be a bit less forgiving in terms of distortion. Care should be exercised when adjusting the dynamics and enhancement settings in earlier stages if lower values are used.

- **Bass Clip Drive:** Increasing bass clipper drive can create stronger "dominating" bass. It may be necessary to increase "Bass Clipper Tightness" at higher drive settings to prevent a "muddy sounding" low end.

- **Bass Clip Tight:** Higher settings create a "tighter" more defined bass sound. Lower settings create a "girthy" bass sound, but too much bass clipper drive with lower settings here could create a flabby overwhelming bass sound. Use care, and also adjust the "Bass Thump" in the quick setup tab if necessary.

- **Bass Punch:** This control shifts around the distortion products created by the bass clipper system. Higher settings allow more clarity of deep bass products, but might create some intermod distortion of higher frequencies. Lower settings produce less high frequency intermod distortion, with the trade-off being thinner sounding bass.

Perfect Declipper (optional)

Omnia.11 G-Force was designed from the ground-up assuming the incorporation of Hans Van Zutphen's "Perfect Declipper", an ingenious real-time de-clipping algorithm.

What it does is to continuously monitor program source content as it arrives to the Omnia.11's input. It watches for "clipped" waveforms (waveforms clipped by either lack of headroom, or deliberately in highly mastered music tracks). When it sees these clipped waveforms, it calculates the angular trajectories of the waveforms as they approach flat topping, it recalculates the peak that would have been there.

The Perfect Declipper does not stop there! It also monitors all of the harmonic waveforms, and their relationships to the fundamental frequencies that were present before flat-topping, and regenerates their activity around the main signals that were flat-topped!

This process greatly reduces (if not completely eliminates) distortion present in the mastering process. This is important for broadcast audio processing! It may seem silly at first glance to unclip material so it could be clipped later, but when you look closely, it makes a lot of sense!

Consider the fact that much of the sophisticated work that happens at the back-end level clipping system of today's FM broadcast processors. The modern-day FM broadcast processor uses sophisticated clipping algorithms designed to hide much of the distortion you would normally hear for a given level of loudness (dial presence). Now consider that a lot of the same type of distortion is present in much of today's modern mastering techniques - only not as sophisticated. There is NO distortion masking used at the record mastering level.

In this situation, much of the distortion the FM system is built to remove is already part of the program content. So the work of these advanced broadcast loudness clippers is compromised by the fact that the same type of distortion is in the source material! When run through broadcast processing, the distortion you don't want to make on the air is already present in the source, thus making your station sound "bizzy", or "fuzzy".

Perfect Declipper adds clarity to your on-air sound by removing this distortion. Also, since much of the clipping in the mastering process removes just about all the peaks in percussion and other transient waveforms, modern source material sounds flat, uninteresting over the air. With Perfect Declipper, these transients are restored. Percussion (drums, kick drums) have impact again. Your music program audio will "breathe" on air, and have depth of field.

Turning on Perfect DeClipper

The Perfect Declipper can be switched on by tapping the "input" tab, then by turning on the "DeClipper" switch.

The Perfect Declipper requires an activation license to function. If this option has not been purchased with G-Force, please contact your Omnia dealer to purchase a license.

NOTE: If you are using the DJ output to feed your announcer headphones, Perfect Declipper will need to remain OFF because it introduces additional delay right at the input, affecting all of the Omnia.11's outputs including the DJ output.

New Remote Control Options

Omnia.11 G-Force now features two methods of remote management. The first is via the traditional Java Web browser based remote control. (Note that, to our knowledge as of this writing, only the Mozilla Firefox browser and some versions of Internet Explorer still have full Java capabilities).

The second is by a new downloadable Java stand-alone application. In recent years, it has become increasingly difficult to use the web browsers with Java due to security issues. Some browsers have eliminated Java support all together. This lead us to introduce a different, and more stable remote control approach.

The stand-alone download option is available by logging into the Omnia.11 with your browser, and going to the "remote" tab.
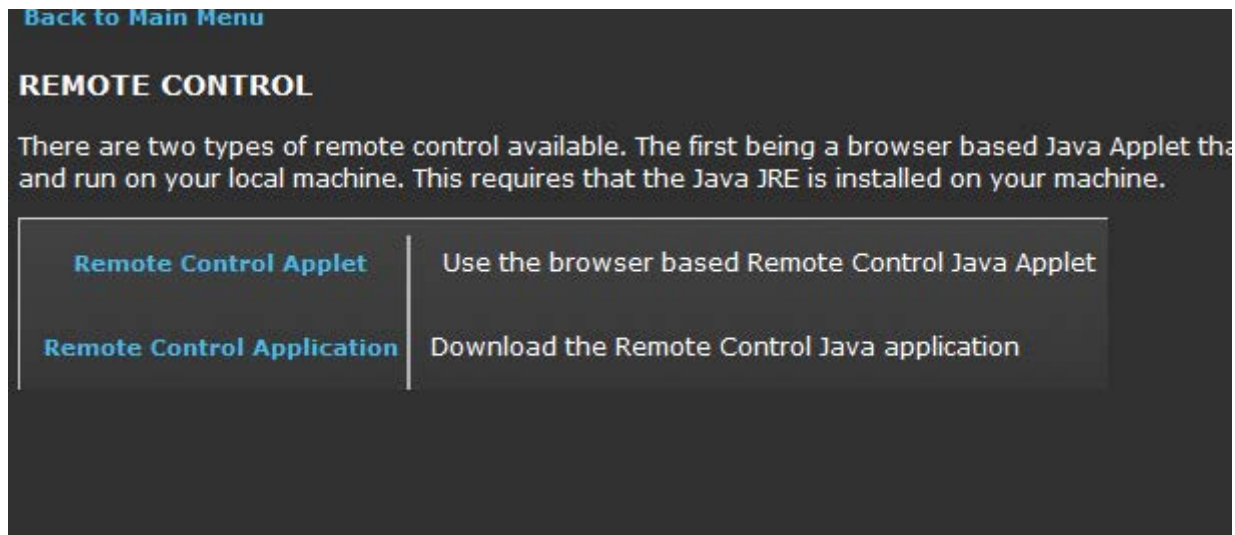

Clicking on "Remote Control Application" will prompt you to save the .jar file to your local computer. You will still need to have Java installed on your computer to run this app, but you will no longer need to have Java installed within your web browser. In fact, it may be desirable that you use the downloadable application only, and uninstall the remote application from your browser.

Upon each login, the stand-alone remote control application will check its internal version with the operating software of the Omnia.11. If a version conflict is detected, the application will alert you to the condition. It is advisable to log into the Omnia.11 after a software update to download the version compatible with the current Omnia.11 OS.

New (remote control) feature…

At the bottom of the remote control window, you will see a horizontal rectangle box. This is the "holding pen" or Toolbar for controls you wish to have quick access to.
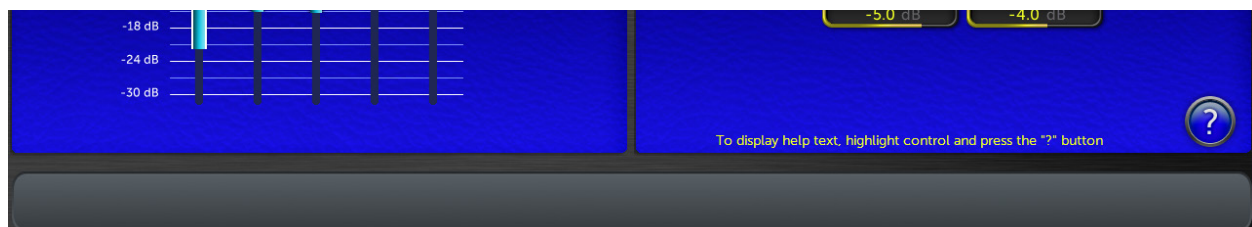
Controls can be pinned to the toolbar by right clicking the control. An option to "send to Toolbar" will appear. Clicking on this option will place the control to the toolbar.
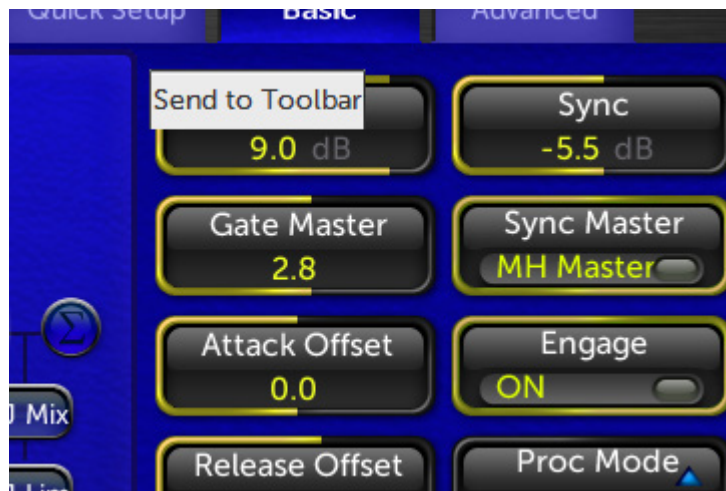
Controls can be removed from the toolbar by right-clicking on the shortcut, and choosing "Remove".

G-Force Preset Descriptions

Below is the complete list of G-Force presets included in this release. Note that they don't all have descriptions as many are fairly self-explanatory and some are variations on an overall "theme". Some do not have format names at all. Some may recognize a few "rocketry" terms thrown in ☺ Note that the names and descriptions are not set in stone! You should listen to as many as possible with your program material (preferably offline at first) and pick one or two to start with.

AC: The **AC** group could be a good place to start for you if you are interested in a more "laid-back" sound.

AC_Punch / AC_Punch_Open / AC_Soft / AC_Soft_Bass / AC_Vocal_Punch: Open sounding presets useful for AC / Hot AC, or any other music format where higher TSL is desired.   3.0.1: add more dial presence and clarity.

Analog_AAA / Analog_CHR / Analog_CHR_Brite / Analog_Rock / Analog_Smooth1 / Analog_Smooth2: The **Analog** group has a warm, analog-type processor sound with variations in loudness and brightness while staying true to that warm, analog sound.

Azimuth: A preset with good midrange power. Good starting point for many rock formats. 3.0.1: add more dial presence and clarity.

Azimuth_Rock: Derivative of Azimuth tuned for classic rock formats.

CGSmooth: These presets can be used "as-is" if they fit your needs, or can be used as a starting template for your own customized version. Many adjustments have been made to take advantage of parameters that further improve limiter IMD suppression performance as well as bass options not available before version 3.01.

CGSmoothOpenW / CGSmooth_OpenW2 / CGSmooth_Warm: Warmer / broader bass tones are featured in this version of the "CG Smooth" preset. Features 12 dB / octave deep bass slope setting, and other associated bass processing settings. This preset is tuned for maximum loudness. For many markets, setting the overall clipper drive to -3 dB will be necessary.

Chameleon_Open1 / Chameleon_Open2: Nods to CG's analog processors that "started it all"!

Classical1 / Classical2 / Classical3 / Classical4 / ClassicalPure1 / ClassicalPure2: Excellent starting points for Classical or Jazz formats. Pick the one you like best to start with.

CleanMuscle / CleanPower: Bass oomph vs. extra loudness. Take your pick!

Cosmic_DEQ: A good starting point to use if you don't like the "smile" curve and want a more natural presentation with good, solid but not overdone bass and nice midrange warmth. "DEQ" means that it uses the Dynamic EQ feature rather than relying on

Cosmic_DEQ_NSE: The same as above with the stereo EFX enhancer disabled. Unlike earlier processors, you may find (like I did) that G-Force lets the stereo image come through clearly without additional enhancement!

Cosmic_Natural_NSE: This is a variation on the above with even more natural mids! NOTE: This preset has an issue where the limiter thresholds may be set too high for the Omnia.11's clipper. If you are interested in this preset, please download Cosmic_Natural_NSE2 from our website.

EastWind: Named after a certain steam engine, EastWind is a preset that brings the sound signature of the "traditional" (orange) mode to G-Force.

Elevation: A cool sound without a target.

EventHorizon: A good starting point for pop music formats.

EventHorizon_CHR: This is a more aggressive version of the "EventHorizon" preset. This was created with the input of several big market CHR / Hot AC programmers. It has a more refined, sculpted bass sound.

GForce: GForce preset is all about the bass! 3.0.1: add more dial presence and clarity. Utilizes advanced clipper options.

GlideSlope1 / GlideSlope2 / GlideSlope_Open: One of the favorite presets from the G-Force beta test program. 1 is the original, 2 features controls that weren't available during beta testing and Open is a more open sounding variant.

GoWithTheFlow: Similar to Elevation…another "sound without a target" that could make a great starting point.

HitCityRadio / Hot_AC / HotMix / HotMix_v2 / Mighty80s: These are G-Force versions of the popular "orange" mode presets.

ModernRock: Derivative of the CG Smooth base presets, tweaked around the format indicated in the preset name.

Nashville_1 / Nashville_2 / Nashville_3 / Nashville_Open / Nashville_Smooth: Great starting points for country music or contemporary Christian formats. Each variant has a different sound based on real field experience.

OrbitalElements: Another "sound without a target" that could make a great starting point.
PhaseAngle / PhaseAngle_Brite: Another favorite from the beta testers.

PowerMix / PowerMix2 / PowerRock: These all have a special "bass power" to them useful for building presets where you want a solid bottom end.

Proof: For making measurements. Be careful not to select this by accident!

ReferenceFlat / ReferenceFlat_NOAGC: Great starting points for building presets from scratch.

RockNRoll: The default preset made to have a similar sound signature to its namesake in the previous "orange" mode 11's.

RockNRoll_LoIMD: Same as above but takes advantage of the new IM distortion reduction in G-Force.

Smooth: Generic "round" sounding preset.

SubOrbital: Another "sound without a target" that could make a great starting point.

Talk_Smooth1 / Talk_Smooth2 / Talk_Warm1 / Talk_Warm2 / Talk_Warm3 / cham_talk: Try one of these as a starting point for a primarily talk format.

ThrustVector: Another favorite of the beta testers that uses the clipper more for texture.

UrbanAC / UrbanAC_Bright / UrbanAC_Open / UrbanAC_Open2 / UrbanAC_Soft: Great starting points for Urban or Urban-leaning AC formats.

Vinyl / VinylSmooth / VinylSmooth2 / VinylSmooth_Brite: A generic starting point for those looking for a natural sounding preset. Modified from Cosmic_Natural_NSE.

WarmGrowl / WarmRound: Can be useful as starting points for Urban formats.

Appendix E: "Voltair Aware" Insertion Point

As of version 3.0, the insert point in the 11 has been moved to a more optimum point for use with watermark encoders and the Voltair. This is the result of extensive collaboration between the Omnia and Voltair R&D teams.

All inputs and outputs are now available for both Patch Send and Patch Return. Note however that there is only 1 AES/EBU input so if you wish to use AES/EBU for the patch point, your program audio will need to come in via the analog inputs or Livewire.

You can also use Livewire for the insertion point, freeing up both the analog and AES/EBU I/O. If you don't have an existing Livewire system, you can add an Axia X-Node and X-Switch to make this work. Please see the next section in this document "**Using the Omnia.11's Patch Point with the Voltair / Watermark Encoder Combo (Without an existing Livewire Network)** for complete details.

Using the Insertion Point

Setting levels:
Whatever output you choose for the insertion point, it is important that the output channel (send to watermark encoder) is set for -12 dB output.   The chosen Omnia.11 input to return the audio from the output of the watermark encoder needs to be set for 0 dB. With these settings, the insertion point audio will pass in and out of the Omnia.11 at unity gain. This is important to avoid negatively changing the sound of your station when turning on the insertion point feature!

Patch Return Source Switch:
This is to set the desired input to the Omnia.11 for returning audio from the watermark encoder.

Patch Send switch:
This is to set the desired output FROM the Omnia.11 to feed the watermark encoder.

Patch Mode switch:
This control turns the watermark insertion feature on and off.

Patch Tone Switch:
Sometimes it may be desirable to check for unity gain through the insertion point system. This control turns on a setup tone that ONLY feeds the insertion loop for level verification. This tone is not sent on-air but while in use, there will be no watermark signals sent over the air!

Patch Out Level:
This control may be useful for presets whose outputs might exceed the headroom of the insertion point link. It modifies the headroom of the link without disturbing "unity gain". This setting saves with the preset do that the proper insertion level is recalled when choosing the preset.

Voltair Mode:
This is a special mode that optimizes the audio through the link for use with a watermark encoder. When using the insertion point for watermark encoders, it is desirable to use this feature regardless of whether or not a Voltair is actually being used. Benefits are usually gained either way, though it is most effective when a Voltair is in use.

Appendix F: Using the Omnia.11's Patch Point with the Voltair / Watermark Encoder Combo (Without an existing Livewire Network)

The block diagram below gives the overview of the devices used to create the Omnia.11 / Voltair / Watermark Encoder setup.

Read on for details and settings while referring to this overall block diagram of the device interconnection:
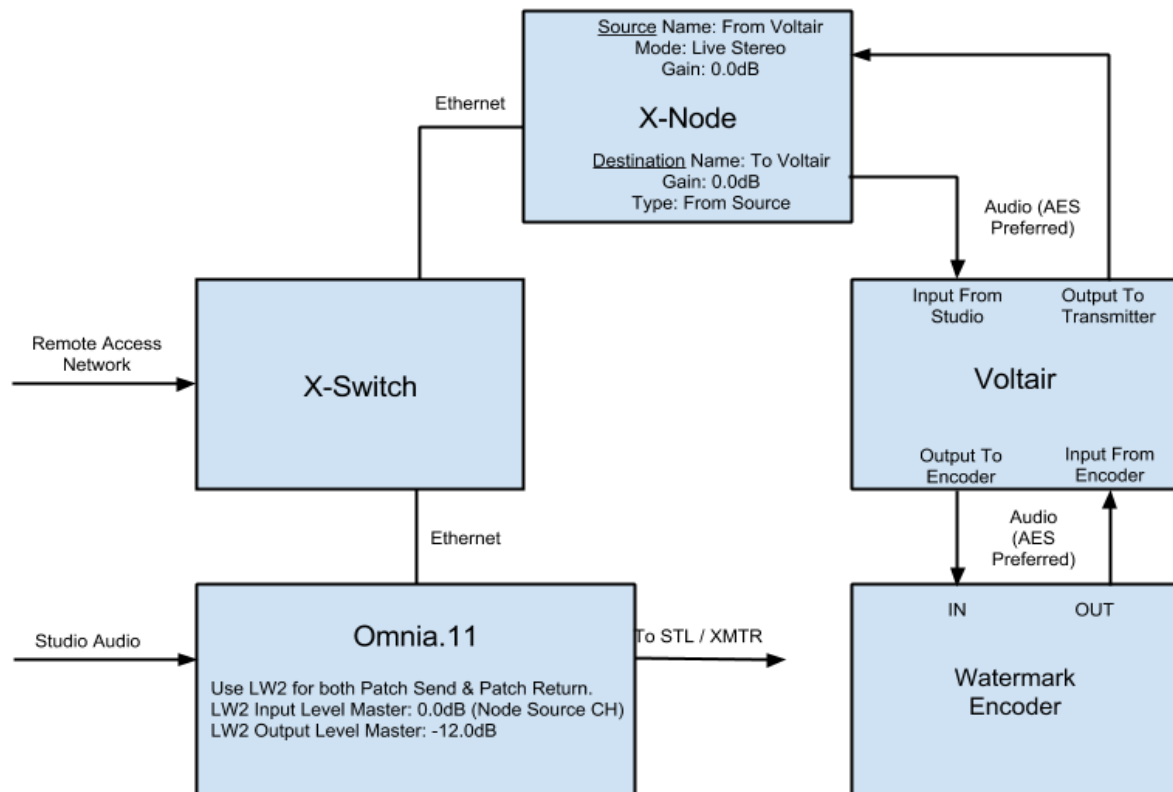
Before proceeding, ensure that the Ethernet and Audio connections shown have been made and appropriate IP addresses have been set in all of the devices per their user manuals.

Axia x-Node Settings:

- NOTE: AES/EBU digital I/O will provide more consistency & repeatability from install to install as you do not have to deal with resistor value drift in analog audio gear. Levels are important!

Navigate to the Axia Node's webpage interface and select "Destinations" under "Advanced Options".
You will be setting the Destination Channel/Address to the channel number you will set in the Omnia.11 for Livewire Output #2 (see the next page).

Please note that the channel numbers shown here are for example only. Channel numbers must be unique and cannot be duplicated on the network. Normally, it is best to use channel numbers that are based on the IP address of the unit. Please see the Appendix: "Axia Livewire Channel Numbering" for full details.

Set the Output Gain for this destination (that will be feeding the Voltair / Watermark Encoder combo) to "0 dB".
It would also be convenient to name this destination "To Voltair". Click "Apply".

Changing to the "Sources" settings on the Axia Node, make sure that the input that is accepting the "Output to Transmitter" Voltair output is also set to "0.0 dB". Also ensure that the Mode is set to "Live Stereo".

It would also be convenient to name the source "From Voltair". Click "Apply".

Note the Channel number of this Source. Remember that the channel numbers shown here are for example only.
Your actual channel numbers should be based on the IP address of the unit.

Omnia.11 Livewire Settings:

We recommend using the "Livewire2" input and output for the standard Insert Points.

Navigate to the Omnia.11's Setup / LiveWire screen and set the Output #2 Channel to a convenient channel number not used anywhere else on the Livewire network. Normally, these channel numbers are based on the last octet of the unit's IP address. In the below example, the last octet of this Omnia.11's IP is "175" so the channel number assigned to Output #2 is 17502.

Click on the "Enable" button (it should turn green) and then click "Apply".

Set or select this channel number in the Destinations options of the Node (see previous page).
Set the "Input #2" channel number to the Axia Node's Source channel we setup on the previous page. In this example we used Channel 12301. Click "Apply".
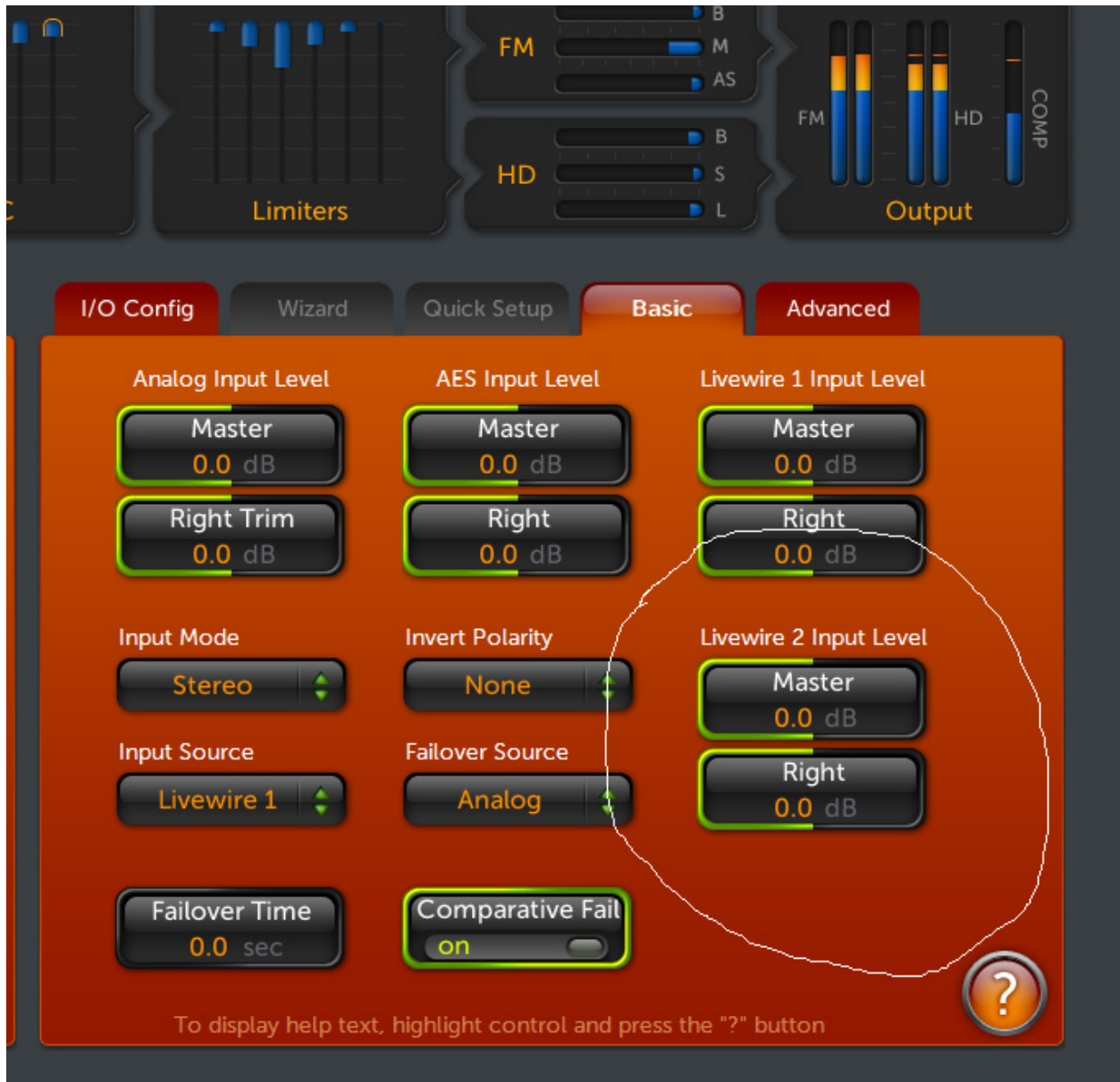
Omnia.11 Output Menu Settings:

Next, navigate to the "Output" menu / Basic tab / Livewire screen on the Omnia.11.
Set the Livewire 2 "Output Selection" to "PP" and set the "Livewire 2 Level" Master to -12.0 dBFS.
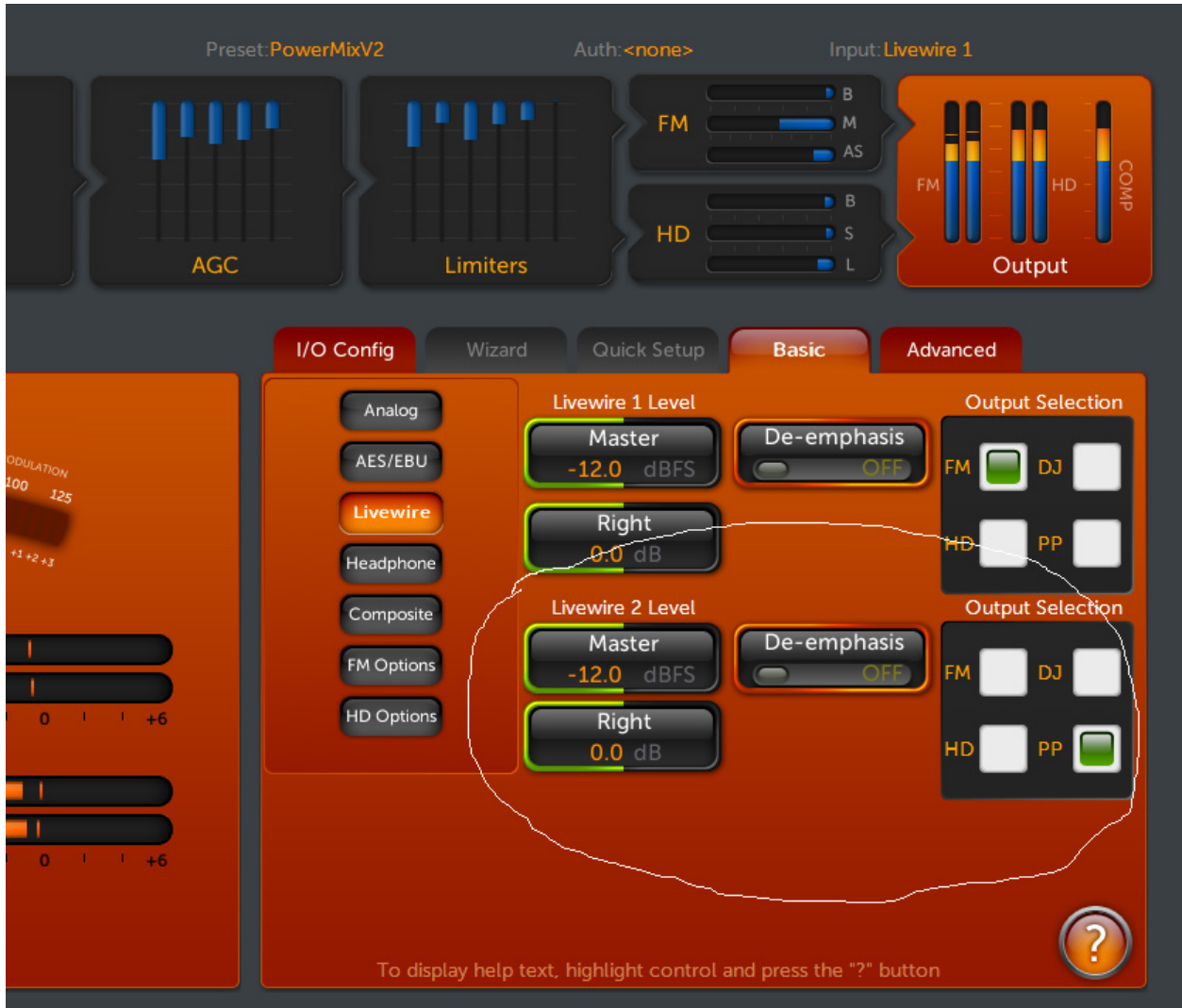
Omnia.11 Input Menu Settings:

Navigate to the "Input" menu / Basic tab on the Omnia.11 and make sure that the "Livewire2 Input Level" is set for "0.0dB".

Omnia.11 Insert (Patch Point) Menu Settings:

Navigate to the "Input" menu / "Advanced" tab in the control pane of the the Omnia.11.

Set both "Patch Return Source" and "Patch Send" to "Livewire2". This sets the second Livewire input of the Omnia.11 as the return path for the watermark encoder / Voltair combo, and sets the second Livewire output as the send path for the watermark encoder / Voltair combo.

Before placing the Omnia.11 into service, verify that the setup works as expected.

In the metering pane containing the "Dorrough Loudness Monitor", click on the "Detail" tab to see the advanced metering for the insert patch point.

Next is to verify proper gain within the patch point environment. There are a number of tools available to you for this purpose.

To start with a basic overall test, in the control pane, turn on the "Patch Tone" switch. This sends a test tone to the patch outputs at the standard -12 dBfs operating level. When activated, the "Patch Return", "Patch Return Zoom", and "Patch Send" should all read -12 dB. If there are any discrepancies in meter readings, double check that the Omnia.11's patch outputs are set to their proper settings, and that the LiveWire nodes are set to a gain of "0dB" on all inputs and outputs.

If analog nodes are being used, be sure to set the output termination to "600 ohms" for proper levels.

Note: When the Patch Tone is activated, the Voltair and any items within the patch system is removed from service, so the tone test can be performed at any time without fear of placing the tone on air.

*** Remember to turn the Patch Tone off after testing, as the patched devices (watermark encoders, etc.) are not online (not on-air) while the tone calibration test is in effect! ***

The "Patch Out Level" control: Some highly customized presets can have mix levels that produce levels significantly higher than the -12 dB standard reference. The "Patch Out Level" control is used to compensate for these presets, allowing for proper levels within the insert point system.   The intention of the control is to maintain headroom on the Livewire or AES link to prevent digital overload of the external digital links on audio peaks.

When adjusting the Patch Out Level, the Omnia.11 will automatically compensate for the level difference on the patch return, maintaining the proper clipper drive that was originally part of the user preset.

Appendix G: Axia Livewire Channel Numbering

A fast guide to IP address and Channel Number planning

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Introduction

An Axia node is an I/O device that provides an audio gateway into to the IP world of audio routing. Whether it's an Analog node, AES/EBU node, Microphone node or a PowerStation console engine, incoming audio is converted to 48Khz - 24bit audio data which is then delivered to a multicast group. A unique Multicast address is created for each stream based on the Livewire Channel Number that is entered into the Sources page of a node or PowerStation. This document will explain how Multicast addresses are generated and how to calculate them, how to design a logical plan for device IP addresses, and a corresponding plan for Channel Numbers.

How Livewire Numbering Works

A Livewire network utilizes Multicast IP addresses for incoming audio streams (called Sources), in the range between 239.192.0.1 and 239.192.127.255. Each time the last octet of the multicast IP address is filled, the address numbers "roll over", incrementing the 3rd octet group by one, and starting to fill the 4th group again, starting with "0".

This sounds harder to comprehend than it really is. Here's an example: if the Channel Number "1" is entered for a Livewire audio stream, the multicast address will equal 239.192.0.1 (this is the address that the 48KHz-24bit stream goes occupies in the Livewire network).

- If the number 100 is entered, the multicast address will equal 239.192.0.100
- If the number 256 is entered, the multicast address will equal 239.192.1.0
- If the number 1101 is entered, the multicast address will equal 239.192.4.77
- And so on.

Typically, you do not need to concern yourself with these Multicast address numbers. All you need to know is the number that is entered into the Channel field. As long as each channel field is given a unique number, you will not have duplicate multicast streams.

So the question that arises is: how does one best maintain the system to insure that no device will create a duplication of Multicast data?

Planning logical IP Addresses

In the days of analog facilities, a well-built plant would have each cable numbered. The number of cables was astronomical. Recommended best practice of the time was to create a "wire book." This book contained a list of each wire, its number, and what was connected to each end of the wire. The amount of information could be very extensive, depending on how complicated the wire job was.

The same practice could be applied to documenting the Axia Livewire domain, and the end result would be, again, a massive book that one would need to refer to any time they wished to make a change or find something. I personally believe this is a poor practice; better options are available when working with Livewire.

Each device connected to the network requires an IP address. Depending on the Class of network, the amount of available network devices can vary. For simplicity, I will discuss a class-C network. A plain-vanilla Class-C provides 254 unique addresses; usually plenty. If we imagine a facility with 6 physical studios, we can divide the available quantity of unique addresses into 6 or more groups. There is also plenty of room to divide them into logical, easy to remember groups.

For example,

- Studio 1 is given IP addresses X.Y.Z.110 - X.Y.Z.119
- Studio 2 is given IP addresses X.Y.Z.120 - 129
- Studio 3 is given ip addresses X.Y.Z.130 - 139

You can see that the last octet of the IP address will define its location. 110-119 = Studio 1 and 160-169 = Studio 6. This equates to 10 devices per studio. You can see that providing a unique IP address to every device in your network is fairly easy when following this method.

Planning logical Channel Numbers

Next, we need to address Livewire Channel numbers. Remember, each Livewire audio source needs to be given a unique "identifier" (Livewire Channel Number). Livewire Channel Numbers can be anything from the number 1 to the number 32767. So how should one organize this? With the methods of "wire books" or by use of a logical numbering method? I've shown how one might design an easy IP address numbering plan — so why can't we play off that same design for channel numbering?

Example:
STUDIO 1

- St1_Analog-Node = X.Y.Z.111
- Input.1 = 11101
- Input.2 = 11102
- Input.3 = 11103
- …
- Input.8 = 11108

As you can see, the first three numbers of the Channel have a relation to the last octet of the IP address of the device. If we consider the possibility that we would never introduce two devices with the same IP address, we could conclude that no Livewire Channel numbers would be the same.

- Device A (X.Y.Z.121) Ch#12101-12108
- Device B (X.Y.Z.122) Ch#12201-12208

Conclusion

Random numbering of Sources provides almost no protection against duplicate Multicast data streams.

Creating a flat, sequential numbering plan leads to the need of a "wire book" and the perpetual need to reference to that book to determine which numbers have been used and which haven't.

Creating a logical number plan, which references Channels to previously established device IP Address numbers can virtually eliminate the possibility of duplicate numbers, and also leads to a better-organized system that can easily be maintained.