



# Omnia 8x

**Livewire™ IP-Audio Based Audio Processor**

**Installation and Operation Guide  
Version 1.0b / January 2009**



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## Introduction

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Once again, Omnia innovates with Omnia 8x. While others continue to play catch-up, Omnia moves forward with a unique approach to processing, where multiple instances are required. HD Radio multicasts, streaming Internet audio, network delivery systems, cluster installations - there are more audio channels generated in today's radio facility than ever before. All of them need dynamics processing to maintain the high quality of your audio in bit-reduced environments.

Omnia 8x doesn't process just one audio signal- instead you'll find the power of eight discrete stereo Omnia audio processors in a single, networked box. Using a powerful engine, processing architecture is easily modified or updated via download. It is possible for the engine to contain multiple instances of different architectures. The flexibility is like no other! A Livewire™ interface provides all input/output, routed via an IP-Audio network. No need for sound cards, or wasting cycles in a PC.

We started with algorithms modeled after those used in our popular Omnia-3, then refined them even further. Omnia 8x's unique processing architecture is designed to work ahead of any bit reduced audio coder to reduce artifacts and improve the sound of audio destined for HD Radio, Internet and satellite broadcasting.

In addition to coded audio applications, the power of Omnia 8x can also benefit other areas of the radio facility. Use it to process headphone feeds where off-air monitoring is not possible; as multi-band level control for remote codecs or on-air telephone systems; to process and send multiple audio streams from a single audio complex to multiple transmitter sites; or on-demand for in-studio musical performances or commercial production applications.

Omnia 8x makes life even easier when it comes to audio connections. Omnia 8x uses the Livewire™ standard for professional networked audio over Ethernet, so you can connect directly to your Livewire™ IP-Audio Network using a single CAT-6 cable. That's all that is needed for 8 channels of stereo I/O, plus remote control. If you don't have a Livewire™ network, that's no problem; just pair Omnia 8x with an Axia AES/EBU or Analog Node for use as a standalone, high-density audio processor.

### **Omnia 8x Is The Perfect Solution For:**

HD Radio installations, Master Control facilities and network head ends, where multiple channels of audio processing are needed • Professional processing of Streaming Audio feeds • Processing for headphone feeds where off-air monitoring is not possible • Multiband level control for remote codecs • Sweetening caller audio from broadcast telephone systems • Processing and sending audio streams from a single studio complex to multiple transmitter sites • In-studio musical performances • On-demand processing for production rooms or dubbing stations • HD Radio Multicast channels • Satellite Uplinks

## Features:

Eight stereo audio processors in one 2RU chassis, each with three bands of processing, and look-ahead final limiter

- Built-in Livewire™ interface for single-cable audio, control, and data connection to IP-Audio networks
- Connect directly via Ethernet to an Axia Audio Node for standard AES and analog I/O
- Networked remote control and configuration using any standard web browser
- Reliable 24/7 processing based on tried-and-true Omnia-3 algorithms
- Flexible architecture that can be used for multiple processing purposes: FM, AM, HD Radio, DAB, Internet streams, etc
- Future Ready engine platform allows new processing designs to be implemented easily – The online software upgrade procedure ensures you'll always have the latest developments

## More...

The audio industry employs dynamics signal processing for many aspects within a broadcast station, recording studio, mastering facility, and numerous other requirements. From simple compression of a microphone channel, to special desired effects in the production studio, and on through the creation of dial-dominance in the transmission path, processing has always been a hardware based implementation. Even with the evolution of digital signal processing (DSP), processors are still physical *boxes* that engineers, producers, and program directors *tweak* as they endeavor to achieve that signature sound. But where is it all headed as technology moves into a different form or box? The personal computer has revolutionized our culture, and it now can provide us with the required machine cycles of power to accomplish many of the tasks we ask DSP chips to perform.

We introduce to you a new audio processing platform that is available as a pure software utility...Omnia 8x! Our research and design efforts revealed how dedicated hardware functions are now reduced to software applets, or plug-in modules, and brought to life inside a software based *engine*. The ability to download a processor into the radio studio facility of tomorrow is available today. Now, a processing system is as easily configurable with the point and click of the mouse. We've come a long way from swapping out boxes in the equipment rack room to simple downloading of executable files! With workstations becoming the mainstay in the studio facility, the audio processor also has a place in those machine cycles as current technology allows us to further create a synergy of technical resources.

Our Omnia processors dominate the airwaves the world over. We are on the fast track as the *best kept secret* in the recording and mastering field. The products that have helped us achieve this success are based upon innovative ideas in the area of dynamic audio processing. Thus, it keeps within our mission to *raise the innovation bar* yet again and migrate our processing efforts into the true executable software domain. Chances are that soon *others* will follow.

Omnia 8x is not only a software processing solution; it's an affordable device that has numerous applications. It's modeled after the highly successful Omnia.3, our DSP-based 3-Band processor. From basic audio production, to recording, mastering, webcasting, and workstations, Omnia 8x offers what other rack mountable, or PC based *hard-card* products do, but it doesn't require the overhead of these other products. It makes use of the processing power available with current faster PC resources. Today, off the shelf PC's contain more than enough power to perform dynamics processing and serve up audio streams in a single computer, or web-server.

Compare that to the use of dedicated audio hardware that performs these same functions. Those not only cost more to acquire, but also consume more technical rack space, as well as infrastructure. Just think...we're approaching the day where *everything* will emanate from a single machine! Omnia 8x is a step in that direction.

# Motivation

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The worldwide broadcasting industry has over 15,000 radio stations. All of which employ some form of dynamics audio processor in the transmission path. This does not even count the plethora of production utilities that require some form of dynamics application. The digital workstation, audio console, and routing switchers have revolutionized the broadcasting industry. It is now possible to completely operate an entire facility from a single computer. *Every* function for on-air purposes is now in one digital form or another. The increasing ability of software packages for the broadcaster to synergize between one-another continues to grow, and the future is looking brighter with respect to an eventual single system solution where the entire facility will operate out of some form of workstation-like system.

Development has now been done in the area of audio processing as well. We have reached that day when the *box in the rack* can be replaced with a simple software (S/W) package on a machine. In some smaller applications, this has begun already! Consider when everything will become S/W created from some single-ended system that has a low-level RF output that is coupled into a transmitter, or remains in the digital realm as it is routed via the Internet. Part of that system will include a processing function, as is performed today using hardware (H/W) devices.

Another barrier to adoption of the hardware processors is the signal path. With current audio processors, the computer playing out the audio must send the audio via an analog sound card. Then the computer doing the subsequent encoding must receive the audio again via a sound card. While this works well enough, many potential customers perceive it as being awkward.

Livewire™, the linear IP-Audio network solution, eliminates costly sound cards, and enables simple and easy connection among peripherals. Not to mention that it provides backhaul for remote control and data.

Effective processing divides audio into multiple frequency bands and dynamically adjusts levels to be optimum. On the surface, this is a simple function. But to get the sound appropriately optimized without adding undesirable “artifacts” is a tricky blend of art and science involving many trade-offs. Expert ears coupled with audio design expertise are required to get the engineering work accomplished – and these are rare combined skills.

Omnia 8x is multiple instances of a stand-alone software signal processor. It does not require a dedicated PC card to operate as it utilizes Livewire™ I/O and the dedicated resources of an engine. Omnia 8x incorporates multiple instances of our Omnia A/X core, which is an applet for a production suite, mastering, Internet streaming, satellite uplinks, HD Radio, or stored-file applications. The dynamics processing algorithms are based upon the highly successful *Omnia.3net*, which is a hardware based DSP audio processor.

# Design Values

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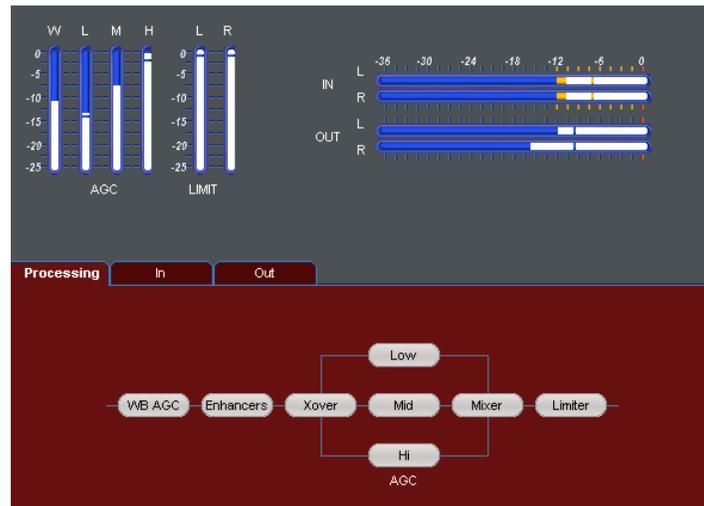
## General

**Audio Processing** Omnia 8x performs internal calculations with precision sufficient to guarantee 24-bit dynamic range. Omnia 8x employs the following processing architecture:

- *Wideband AGC*
- *3 Band Combined Compressor/Limiter*
- *Adjustable Bandwidth Lowpass Filter*
- *Final Look-Ahead Limiter*

## Web Browser Interface

A web browser creates the user interface which provides access to all user settings and functionality. The audio block window has the following blocks. Each will have the listed controls, accessible by clicking on the block to open a sub-window:



- **Input gain**
- **X-Over**
- **Wide-Band AGC**
- **3 Band AGC/Limiter**
- **Drive control for each band**
- **Mixer**
- **Final Limiter**
- **Selectable Lowpass Filter**
- **Output Gain**

## Displays

The interface shows the following display elements:

- **Input and Output Level Meters**
- **WB-AGC Bargraph Meter**
- **Bargraph Meter For Each Of The 3 Processing Bands**
- **Bargraph Metering for the Final Look-Ahead Limiter**

## **Presets**

Presets work like the hardware processor counterpart. These are a way for users to have multiple processing styles, be able to store and recall them, etc. Presets include most of the user adjustable settings.

With presets it's possible to:

- Save and recall presets to/from disk.
- Select from among currently loaded and factory presets.
- Import presets from a separate Omnia A/X processor.
- Print a hard-copy of a preset.

## **Remote Control**

All communication with the Omnia 8x engine and Livewire™ nodes is done via a network web browser.

## **Audio Input**

Audio is input via a Livewire™ network.

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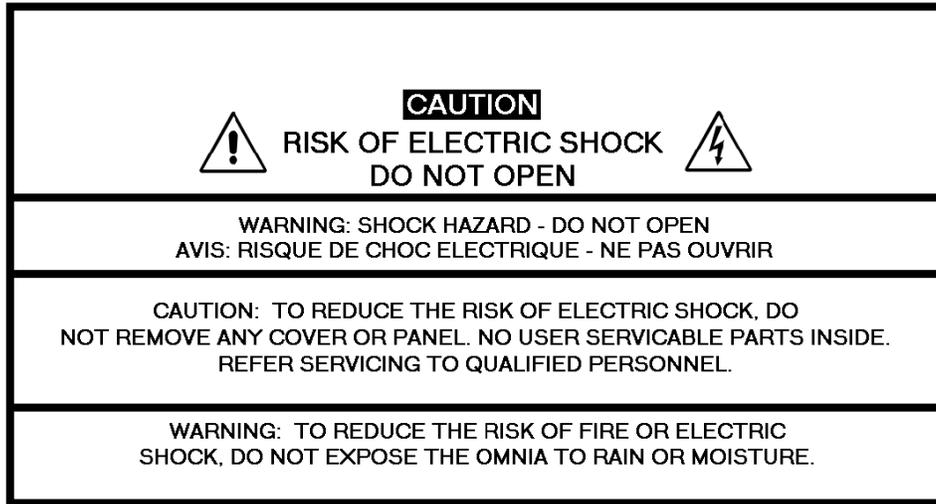
# SAFETY INSTRUCTIONS

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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

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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. OmniaONE FM is in compliance with the EU RoHS Directive.

# Manual Update Notification

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*Audio Processing* – a unique art form that we take very 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.

The following URLs have been included for your convenience:

Manual Updates	<a href="http://www.omniaaudio.com/support/manuals.htm">http://www.omniaaudio.com/support/manuals.htm</a>
Frequently Asked Questions (FAQ)	<a href="http://www.omniaaudio.com/support/faq.htm">http://www.omniaaudio.com/support/faq.htm</a>
Tech Tips & Support Bulletins	<a href="http://www.omniaaudio.com/tech/tips.htm">http://www.omniaaudio.com/tech/tips.htm</a>
Software Upgrades & Remote Software	<a href="http://www.omniaaudio.com/support/updates.htm">http://www.omniaaudio.com/support/updates.htm</a>
White Papers & Technical Discussions	<a href="http://www.omniaaudio.com/tech/default.htm">http://www.omniaaudio.com/tech/default.htm</a>



# Omnia 8x Preliminary Setup

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## Connections, IP Configuration and Channel Settings.

### Before You Begin

The setup procedure for Omnia 8x is divided up into three areas: Input/Output via Livewire™ nodes, IP Setup/Configuration, and Audio Processing usage. This manual will cover IP configuration/setup and audio processing usage. Livewire™ I/O is detailed in the user guide for the specific node used in your system.

Before beginning your Omnia 8x configuration, determine a range of IP addresses to assign to the Omnia 8x unit and any Livewire™ nodes. Be sure to log each device's IP as you assign it. IP addresses used in a Livewire™ network must be valid Unicast IP addresses. Determine your network's subnet mask settings at the same time (typically this value is set at 255.255.255.0 for intranet applications). **Unicast vs. Multicast IP Addresses:** Data is routed over IP networks in one of two ways: point-to-point unicast or multicast.

Livewire™ devices use common TCP/IP unicast IP addresses for control and web browser access. These are numbers you assign within the range used by your network. Since most Livewire™ networks are not intended to be accessed via the Internet, we recommend you use the non-routable IP addresses in the range of 192.168.0.0 to 192.168.255.255. These IP addresses have been set aside for use with local networks, when it isn't necessary (or even desirable, for security reasons) to use a public IP address.

Multicast allows efficient one-to-many connections, so Livewire™ uses that for its audio streams, source advertising, and synchronization signals. You do not need to assign these multicast addresses because the system does this automatically.

For more information on network construction, please refer to our companion booklet: Introduction to Livewire™: System Design Reference and Primer, available at: [www.AxiaAudio.com/downloads/](http://www.AxiaAudio.com/downloads/)

To configure Omnia 8x, you'll need a computer. Any desktop or notebook PC with an Ethernet port and a standard Internet browser is acceptable.

### Connection

For cable connections, CAT. 6 Ethernet cable is required. We strongly recommend shielded CAT. 6 if your facility design calls for cable runs through areas containing high levels of RF. (For greater detail on cable selections, we again recommend you read *The Axia Guide to Choosing Category Cable* available from [www.AxiaAudio.com/tech/](http://www.AxiaAudio.com/tech/).

Always make certain that power has been applied to your Livewire™ Ethernet switch before powering up Omnia 8x. If you haven't done so yet, it's time to get Omnia 8x mounted into a rack. We recommend leaving 1RU of "breathing space" for ventilation above and below the Omnia 8x when you rack-mount the unit. Cable connections for Omnia 8x are entirely different from any other audio processor you may be familiar with. There are no audio inputs; Omnia 8x needs only a single CAT.6 data cable and AC power connection to operate. **Important: Your Omnia 8x MUST be grounded.** Grounding reduces the risk of electric shock by providing a "path of least resistance" for electric current. Improper grounding can result in a risk of electric shock.

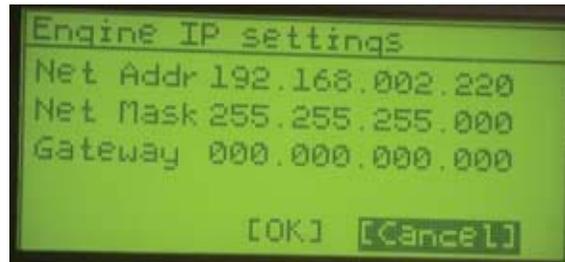
Check with a qualified electrician if you are in doubt about how to properly ground this equipment. If your local electrical code prohibits the use of a Station Ground for this purpose, as described above, use the specific "Safety Ground" your local regulations mandate.

After rack mounting the unit, Route a length of CAT- 6 cable from Omnia 8x to at least a 100Base-T port on your Livewire™ Ethernet switch but don't connect it yet. Using the supplied AC power cord, connect the Omnia 8x to the mains.

## IP Configuration

Power on your Omnia 8x; the front-panel display will indicate the boot-up sequence. When the screen displays the IP address and network connection information, push the control knob to call up the Main Menu.

Turn the control knob to highlight Option #4, **IP Settings**, and push the knob inward (click) to select.



1. Push the control knob and you'll see that the first line of the display (marked **Net Addr**) is underlined. Push the knob again to select this line.
2. You'll see a flashing underline under the first digit of the IP address. Push and rotate the control knob to select the value for this digit. Push again to "take" the value.
3. Continue this sequence until your IP address is properly entered. When finished, turn the control knob until the check mark at the end of the line is highlighted, and push the knob to apply the new IP address value.
4. When you've set the subnet mask and gateway IP address, choose **OK** at the bottom of the screen.
5. You'll be asked if you'd like to reboot for changes to take effect. Select **YES** and connect the Ethernet cable to your Omnia 8x.

## Channel Settings

For the next steps we'll be using the Omnia 8x's HTTP interface, so connect a computer loaded with an Internet browser to the local switch. This computer should have an IP address in the same range assigned to the Omnia 8x.

**Note:** Omnia web interfaces have been tested with Microsoft Internet Explorer, version 5 or later, but may also work with other browsers.

Whatever browser you choose, **Java must be enabled and your pop-up blocker, if any, must be disabled** in order to work with the Omnia equipment.

Note that Windows Vista versions *do not* have Java installed by default as in prior versions. You must install the Sun Java package found at <http://www.java.com/>.

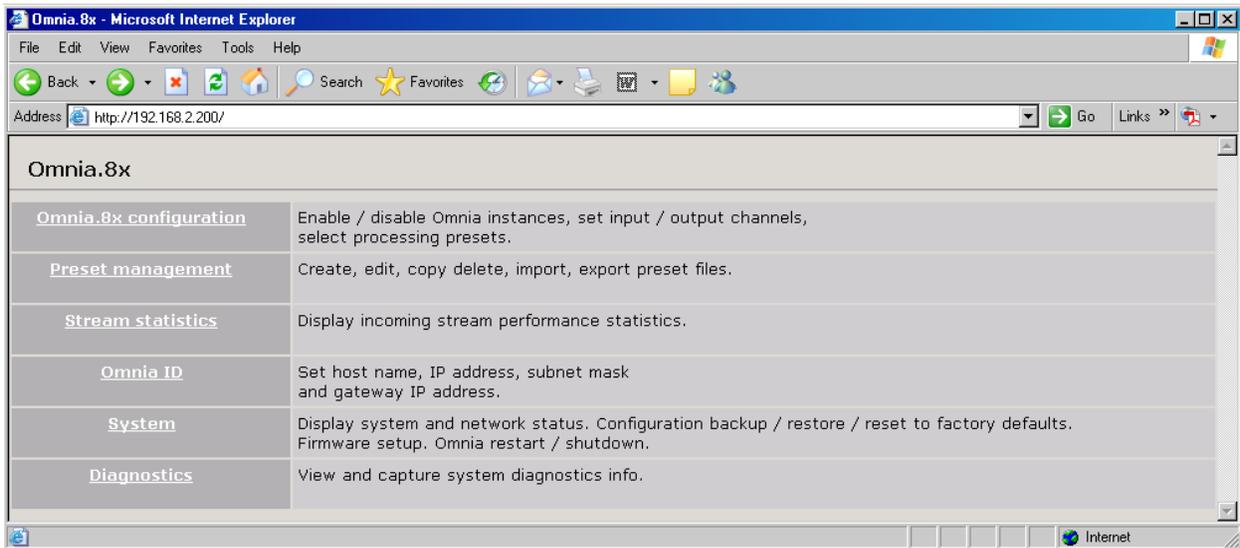
In a Livewire™ network, individual devices (audio nodes, studio controllers, etc.) are identified by unique IP addresses. But what about the audio streams these devices generate? Think about how many audio sources and destinations there are in even a small studio — there are a lot to keep track of. In the analog days, we'd affix a numbered label to each cable that entered the terminal room to identify each audio circuit. Obviously, we can't attach pieces of paper to digital packet streams, but we can give each one a "label."

We refer to these "labels" as Network Channel Numbers. Each Livewire™ system can support 32,766 channels of audio, which enables us to give each audio source or destination its own unique numeric channel number.

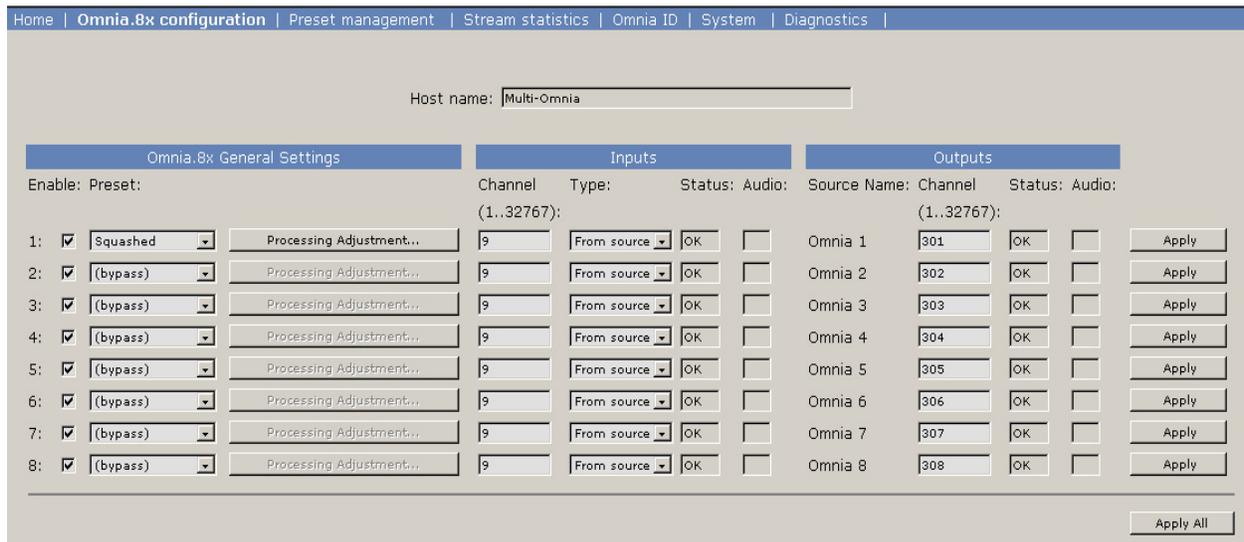
Note: We've observed that 32,000+ channel numbers exceeds the average human's RAM storage capacity. We recommend using a spreadsheet program — just to make sure you don't generate painful read-memory register errors.

As soon as you connected your Omnia 8x to the network (following the steps in the previous section), it began to generate audio using factory default channel numbers. To avoid conflict with other studios and devices on the Livewire network, we'll need to change those default values to new channel numbers.

1. Open the browser on your computer and point it to the IP address you previously set for your Omnia 8x.



2. Choose the **Omnia 8x configuration** menu option to configure the input/output buses of the Omnia 8x. You'll be prompted to enter a user name and password. The default user name is "user". Leave the password field blank. You'll see the screen shown below:



This screen allows you to set **Channel** numbers for all of the audio inputs and outputs generated by Omnia 8x. Work down the list, assign each one a unique channel number and record them in your channel number log. Note that if some or all of the 8 channels will be using a common input source, the channel numbers for these can (and should) be the same.

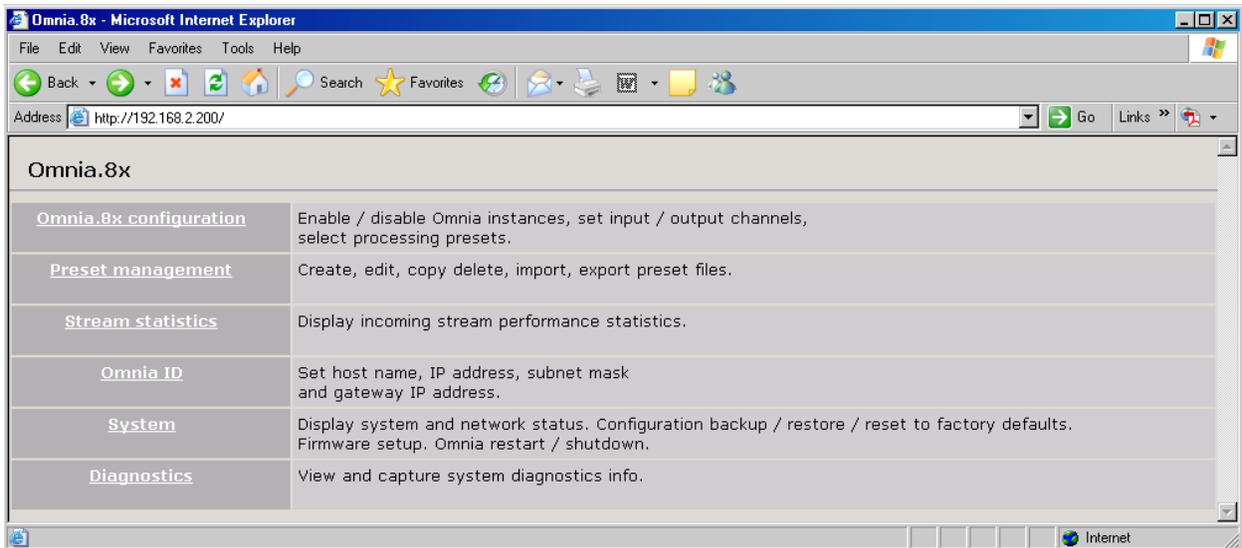
3. Find the column entitled **Enable**. Make sure all of your desired streams are enabled.
4. Choose **Apply** for each row or simply choose **Apply All** to apply all of the changes made on this screen.

**A word about stream types:** You'll notice that there are several different types of streams available in the **Mode** dropdown box: **From Source**, **To Source**, and **Surround**. Normally, just leave these set to: **From Source**.

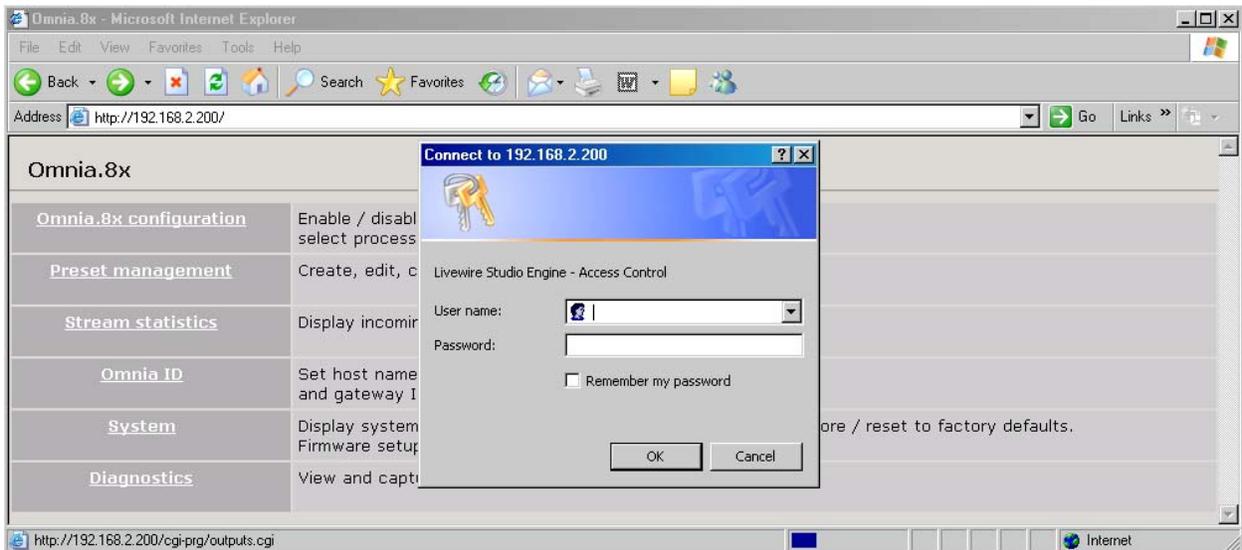
# Omnia 8x Configuration Screens

Previously, we covered the basics of setting up your Omnia 8x. Now, it's time for a thorough look at all of the controls found in the Omnia 8x's configuration Web pages.

## The Main Menu

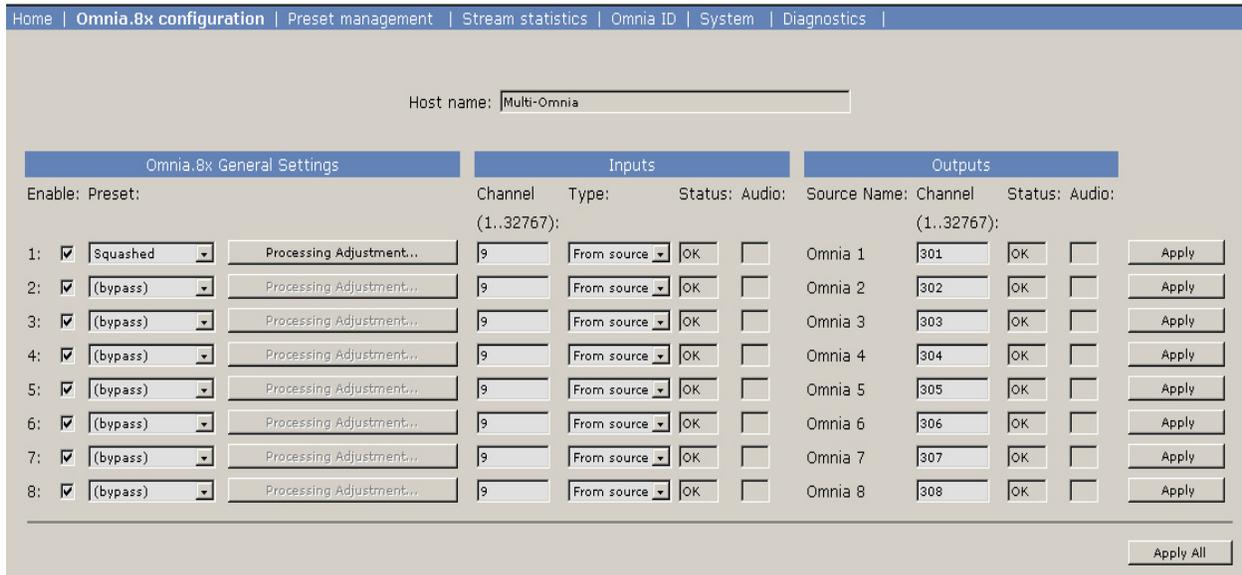


This is the “jumping-off” point for all of the Omnia 8x settings pages, the page you’ll see after entering your Omnia 8x’s IP address into your Web browser. Upon making any menu choice, you’ll be asked for a password. The default factory login is **user**; leave the password field empty. Click **<OK>**.



Some of the menu items presented here – such as **Stream Statistics** – are purely informational in nature. Others – **Omnia ID**, **System** – contain options and settings that are used for setup of your Omnia 8x.

# Omnia 8x Configuration Menu



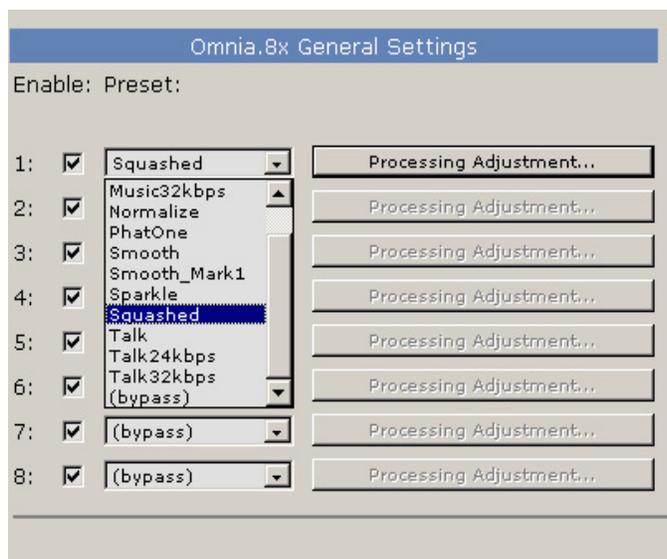
This is the key menu for all activity. Instances of processing are enabled or defeated, presets are selected, access to processing adjustment, Livewire™ routing, and source management is handled in this menu.

Instances of processing are *enabled* by clicking in the check box on the left-hand side of the menu. To enable processor #3, just click the *enable* box next to line #3. It's that easy! Input and output channel assignments are set for each instance. The values in each box should correspond to the Livewire™ node settings. The input type should be left in the default <From Source> mode.

When audio is present in any instance of processing, the box under the audio column will turn green. This verifies that audio is routed in and out of the various processors.

## Preset Selection

Presets for each instance are selected from a drop-down box:

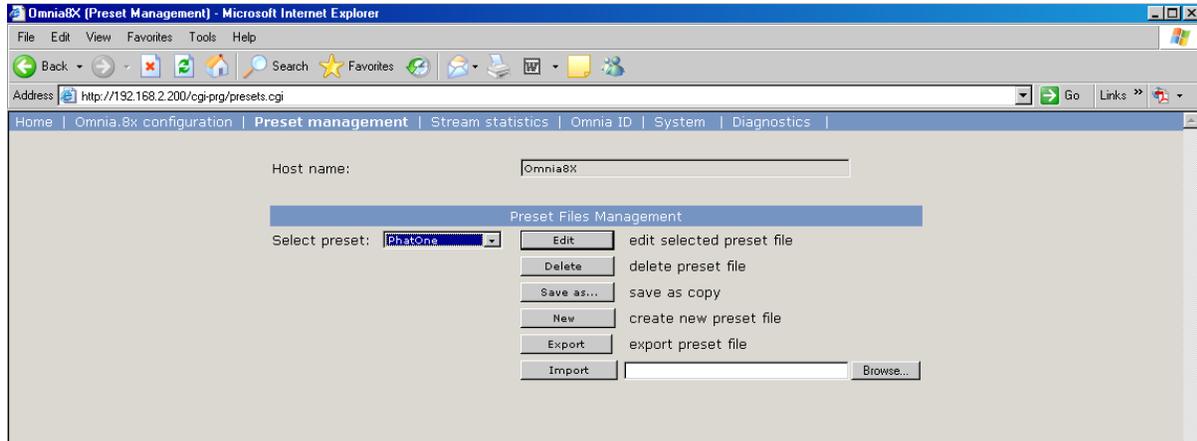


Click and scroll to the desired preset.

Afterwards, click <Apply> for that instance, and the preset will become active. **Note:** The <Apply> button must be clicked whenever any change is made in this menu page. If multiple changes have been made, the <Apply All> button at the bottom will activate all changes that were made.

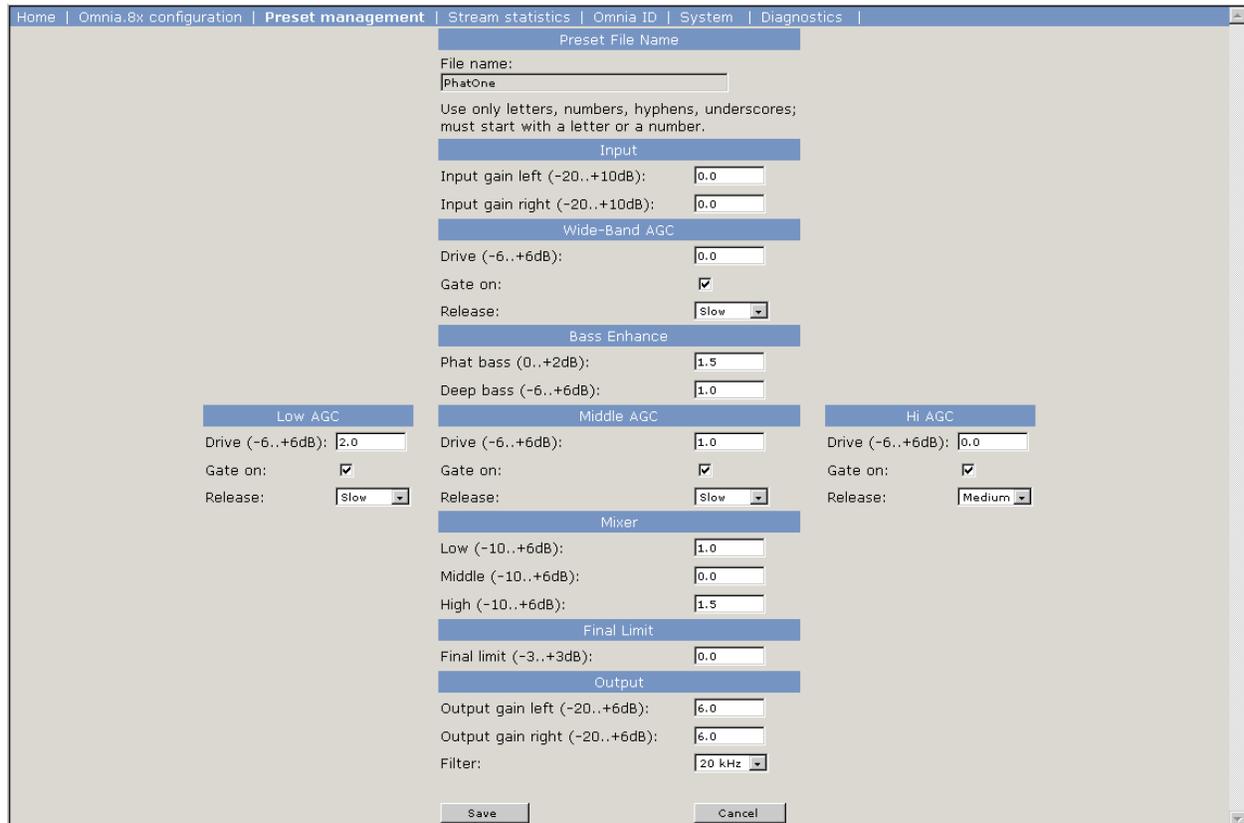
## Preset Management Menu

Presets that are offline can be edited, modified, deleted, copied, imported and exported through the *Preset Management* menu page. Click on **<Preset Management>** from the home page or from the highlighted menu selections that appear just below the address line of the browser.



Working with presets is straightforward:

Select a preset from the drop down box. The management choices are: *Edit*, *Delete*, *Save As*, *New*, *Export*, *Import*. When either the *Edit* or *New* options are selected, a worksheet-style page appears:



When creating a new preset, all of the parameter boxes will be blank. When finished, click the **<Save>** button at the bottom of the page. This will switch back to the *Preset Management* page.

Presets from Omnia A/X can be imported using the *Import* function. When selected, a browse box will appear.

Navigate to the folder where the Omnia A/X preset is located, and select it. The selected Omnia A/X preset will be imported and converted into the file format for implementation into Omnia 8x.

Changes to any of the processing parameters can be made from this worksheet page off-line, but it may be more convenient to use the on-line <**Processing Adjustment...**> applet, which allows changes to the processing parameters to be made in real-time, while listening to the processed audio and watching the processing meters. See Page 11 for full details.

## The Omnia ID Menu

The **Omnia ID** menu contains several important settings and options.

### IP Settings Section

- **Host Name:** Enter a unique name for this particular system. This name is displayed on various information and diagnostic screens.

Home | Omnia.8x configuration | Preset management | Stream statistics | **Omnia ID** | System | Diagnostics

### IP Settings

Host name:   
Use only letters, numbers, hyphens, underscores; must start with a letter or a number.

Network address:

Netmask:

Gateway:

Warning: all changes except host name take effect after restart  
Attempts to set network address and netmask to 0.0.0.0 will not be accepted.

Syslog server (IP address):

Syslog severity level filter:

1. **Network Address:** This field contains the IP address you've assigned for this Omnia 8x.
2. **Netmask:** The subnet mask for your IP-Audio Network.
3. **Gateway:** If your Livewire™ network has a network gateway to allow outside access, enter its IP address here.
4. **Syslog Server (IP Address):** Your Omnia 8x can generate detailed logs of system activity. If you choose to keep syslogs, enter the IP address of the server on which you wish the logs to be stored.

**Syslog Severity Level Filter:** This menu choice allows you to set the level at which the Syslog begins storing system events.

**Emergency:** Generates Syslog only if the system is completely unable to operate.

**Alert:** Syslog contains only messages notifying you that immediate attention is needed for the system to remain operative. **Critical:** Syslog contains only messages about critical system errors.

**Warning:** Syslog contains only messages about errors that could cause the system to become unstable. **Notice:** System is operating normally, but Syslog contains messages about unusual events that you should know about.

**Informational:** Logs all informational messages. This includes all routine events.

**Debug:** Captures all system activity for diagnostic use. After making changes, click the **Apply** button to save them.

## System Menu

This screen contains several software utilities and information fields pertaining to your Omnia 8x.

Home | Omnia.8x configuration | Preset management | Stream statistics | Omnia ID | **System** | Diagnostics

Host name:

System Status	Configuration Management
System status: <input type="text" value="OK"/>	<input type="button" value="Backup"/> Save configuration data to file
Network status: <input type="text" value="OK"/>	<input type="button" value="Restore"/> <input type="text" value=""/> <input type="button" value="Browse..."/>
CPU usage: <input type="text" value="54%"/>	<input type="button" value="Reset cfg"/> restore default settings and restart
Link speed: <input type="text" value="1 Gbps"/>	Warning: System will reboot after restoring configuration settings.
Network usage In: <input type="text" value="4.4%"/>	<b>Restart / Shutdown</b>
Network usage Out: <input type="text" value="3.9%"/>	<input type="button" value="Restart"/> restart application (Bank 1)
Temperature: <input type="text" value="44°C"/>	<input type="button" value="Down"/> stop application (exit to OS)
Fan 1 speed: <input type="text" value="878 RPM"/>	
Fan 2 speed: <input type="text" value="878 RPM"/>	

Front Panel Passcode	Hardware and Firmware
New passcode (4 digits): <input type="text"/>	Hardware: <input type="text" value="Core Solo"/>
Verify the new passcode: <input type="text"/>	<input type="radio"/> Bank 0 2.4.6f1 (#170) 15-nov-2006 11:20:00
<input type="button" value="Apply"/>	<input checked="" type="radio"/> Bank 1 Omnia.8x 1.4.1a (#31) 26-oct-2007 18:30:00
	<input type="button" value="Commit"/> commit this version to Bank 0
	<input type="button" value="Apply Selected Bank"/>
	Warning: System will reboot after changing the current bank.

The **System Status** section of the page provides information about the physical state of the Omnia 8x.

**System Status** and **Network Status** inform you as to the health of the Omnia 8x and its connection to the Axia etwork.

**CPU Usage** indicates how hard the Omnia 8x engine is working.

**Link Speed** tells you the type of link with which the Omnia 8x is connected to the local network switch.

**Network Usage In** and **Out** show how much bandwidth is being consumed on the Omnia 8x engine-to-switch link.

**Temperature** monitors the ambient temperature inside the Omnia 8x chassis. If the temperature exceeds operating limits, a warning will appear on the front-panel display.

**Fan 1** and **Fan 2 Speed**: Monitors the fan speeds of the engine's two internal cooling fans.

The **Configuration Management** section lets you make backups of and restore your engine settings. Use the **Browse**, **Backup** and **Restore** buttons to accomplish these actions. Use the **Reset Cfg** button to reset all of your Omnia 8x's settings to an "as-shipped" state. This command will completely erase any choices you have made and reset your Engine to the way it came from the factory, so use with caution!

The **Front Panel Passcode** fields allow you to pass-code-protect the physical controls on the Omnia 8x's front panel.

**Front Panel Passcode**

New passcode (4 digits):

Verify the new passcode:

By default, access is open. However, if your Omnia 8x is located in a public space in your facility, you may wish to set a code to limit front-panel access to authorized personnel. To enable this feature, enter a four-digit code in the top box shown in above, then enter it again in the lower box to confirm. Click **Apply** to activate passcode protection.

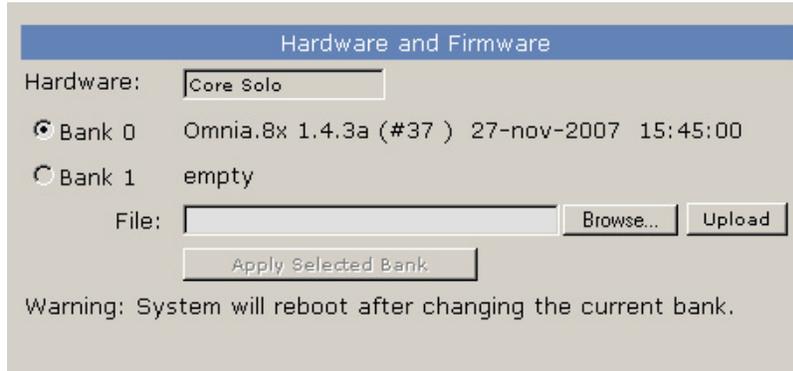
The **Hardware and Firmware** section is where you upload and apply new operating software for the Omnia 8x.

### Updating the Software

Software update files are always loaded into Bank 1.

The update file will have a “.tar” extension. The latest version is always available for download from our website here:

<http://www.omniaaudio.com/support/updates.htm>



The screenshot shows a web interface titled "Hardware and Firmware". At the top, there is a blue header with the title. Below the header, the "Hardware:" field is set to "Core Solo". There are two radio buttons for "Bank 0" and "Bank 1". "Bank 0" is selected, showing "Omnia.8x 1.4.3a (#37) 27-nov-2007 15:45:00". "Bank 1" is unselected and shows "empty". Below the radio buttons is a "File:" input field, a "Browse..." button, and an "Upload" button. A "Apply Selected Bank" button is also present. At the bottom, a warning message reads: "Warning: System will reboot after changing the current bank."

If Bank 0 is currently selected and in use as shown at left, click the **Browse** button, locate and select the Omnia 8x .tar update file on your computer so that it shows in the **File** field, then click the **Upload** button to upload the new software to the Omnia 8x into Bank 1.

Once the file has uploaded it will show up next to Bank 1, where “empty” is showing now in the example to the left.

To run the new software, click the Bank 1 radio button to select it and then click **Apply Selected Bank**. The Omnia 8x will reboot after changing banks, interrupting the audio, so plan this operation for off-hours or switch program output to another source to avoid program interruptions.



The screenshot shows the same "Hardware and Firmware" interface. The "Hardware:" field is still "Core Solo". Now, "Bank 1" is selected, showing "Omnia.8x 1.4.5 (#42) 13-dec-2007 17:15:00". "Bank 0" is unselected and shows "Omnia.8x 1.4.3a (#37) 27-nov-2007 15:45:00". Below the radio buttons are two buttons: "Commit" (with the text "commit this version to Bank 0" next to it) and "Apply selected bank". At the bottom, the same warning message is present: "Warning: System will reboot after changing the current bank."

If Bank 1 is currently selected and in use as shown at left, press the **Commit** button, which takes the software in Bank 1 and loads it into Bank 0, freeing up Bank 1 for new software.

Please note that the software currently in Bank 0 will be deleted.

Once the currently running software is committed and running in Bank 0, proceed as above to load the new software into Bank 1.

Please note that you can run Omnia 8x software from either Bank 0 or Bank 1. Simply click on the radio button next to the software bank you wish to run from, and click **Apply Selected Bank**. The Omnia 8x will reboot after changing banks, interrupting the audio, so plan this operation for off-hours or switch program output to another source to avoid program interruptions.

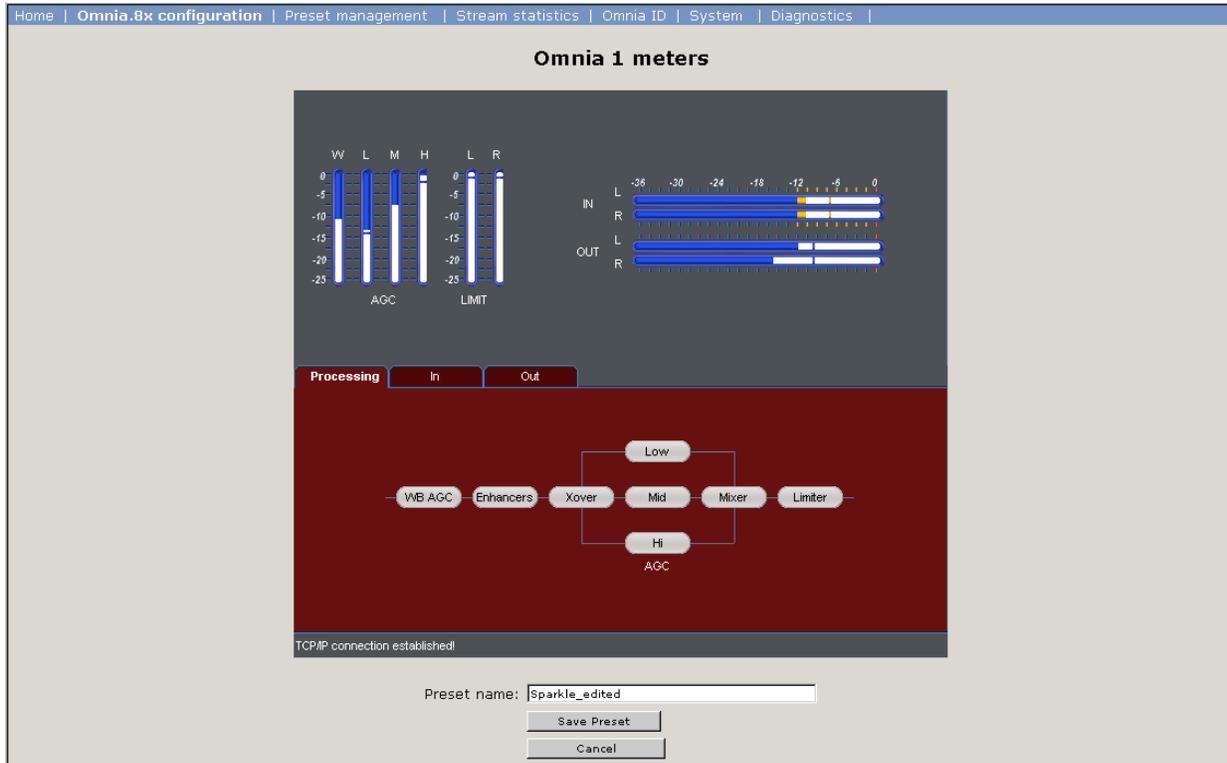
### Diagnostics Menu

The Diagnostics menu provides tools to help Omnia Support in the event your system needs attention. To enable a Diagnostics Trace, click the radio button corresponding to the **Simple**, **Medium** or **Detailed** options, then click **Apply**.

The other controls here provide other options relating to generating diagnostic information. Please use these only as instructed by Omnia or Axia Support.

## Processing Adjustment Screen

This is where you get at the fun stuff! Each of the eight processors can be individually adjusted. Click on the button labeled <Processing Adjustment> from the *Configuration* menu and a new menu page appears. The following illustration shows the adjustment page for processor #1.



The adjustment screen is divided up into two sections: metering displays and block diagram.

At the bottom of the page is a **Preset Name:** field used to save user presets. See the next chapter: **Operation**, for full details.

# Operation

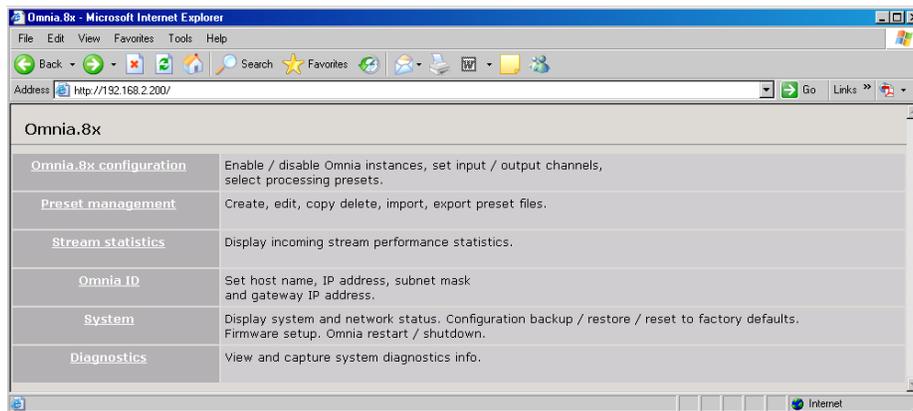
Omnia 8x is the Omnia3.net processor, except it's completely implemented in software. The only hardware, per say, is the engine that is running multiple instances of the application. The algorithms in Omnia 8x are exactly the same as the rack mountable hardware counterpart. The only difference is that the number of parameters to adjust is limited. If you are familiar with Omnia.3net, then Omnia 8x is even easier to understand.

## Input/Output (I/O) Considerations

One of the factors that differentiate Omnia 8x from hardware, or hard-card counterparts, is the I/O. All I/O is handled via the Livewire™ interface. Depending upon the Livewire™ system configuration, I/O can exist in the form of analog or digital signals through an Axia Node, or a Livewire™ stream from an existing IP-Audio network. As long as Omnia 8x is properly installed and functioning, it does not care what form-factor the audio I/O is in. It can be analog or digital via a node, or Livewire™ stream. It becomes a seamless function to Omnia 8x.

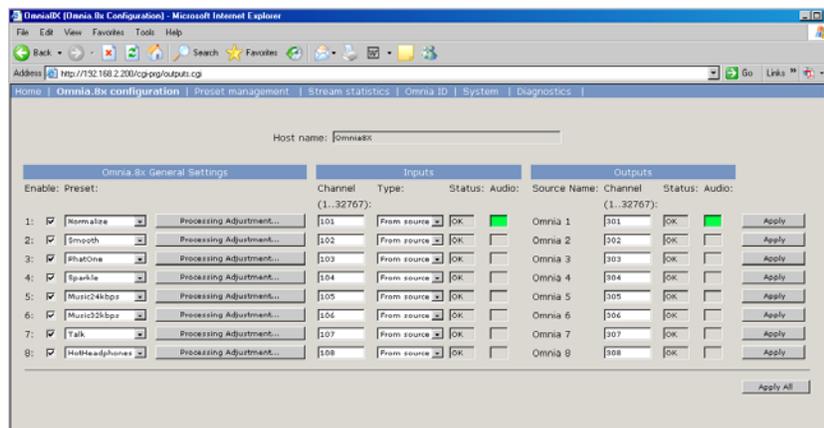
## Starting Up

Omnia 8x can be accessed via a web browser. Point to the IP address of the Omnia 8x engine and the *Home* menu page will appear.



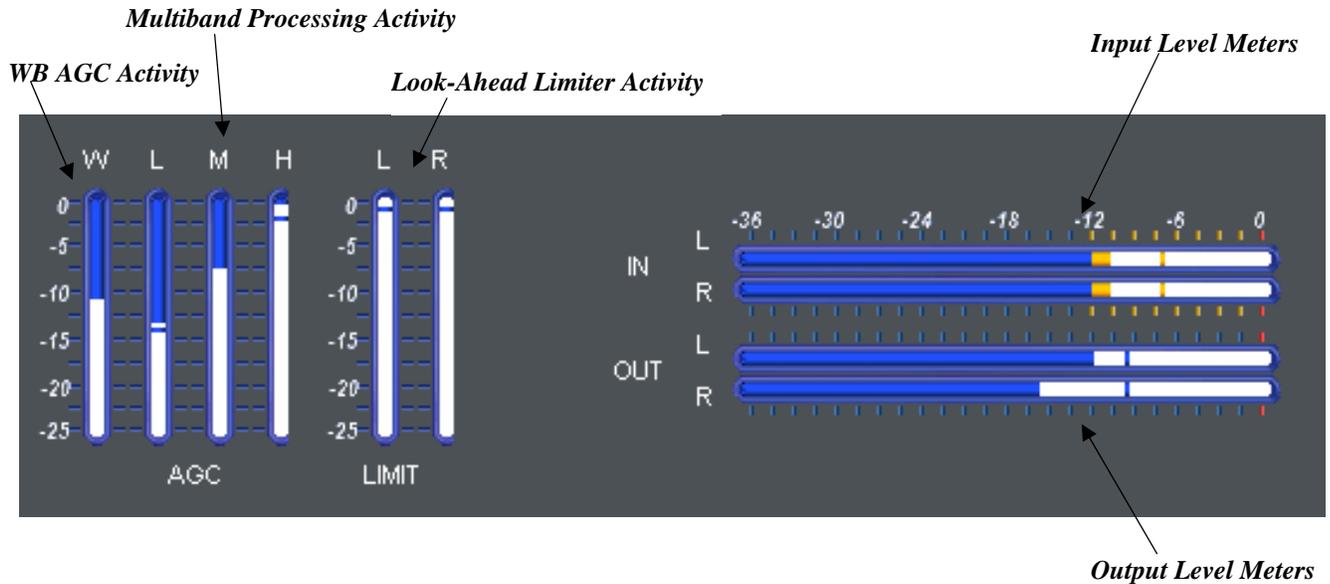
Click on *Omnia 8x Configuration* to access the menu page where the processing instances are enabled. You will be prompted for a password. The default factory login is *user*; leave the password field empty. Click **<OK>**.

Enable whatever number of processors that are needed by clicking the *Enable* box for each desired instance. Upon clicking *Apply* for each instance, the processing becomes activated.



## Metering Display

The bargraph meter display is a straightforward representation of what the Omnia 8x is doing:



Omnia 8x is intuitive and easy to use. Applying audio will activate movement on the bargraphs, and this is confirmation that processing is occurring. Before making adjustments, it helps to know how to interpret the metering displays.

## Understanding the Bargraphs and Indicators

The bargraphs are capable of indicating more than just level information. The *texture* and *density* of the audio signal can be observed, based upon the dynamic action of the bargraphs, and peak-responding indicators. Of interest are the smaller bars that appear at the end of the solid bargraphs, as they indicate peak level. The solid bar section represents the RMS average of the signal. Wide dynamic range will display a separation between the peak bars and the solid bargraph, whereas signal with little peak information will cause the peak bars to ride on the crest of the bargraph.

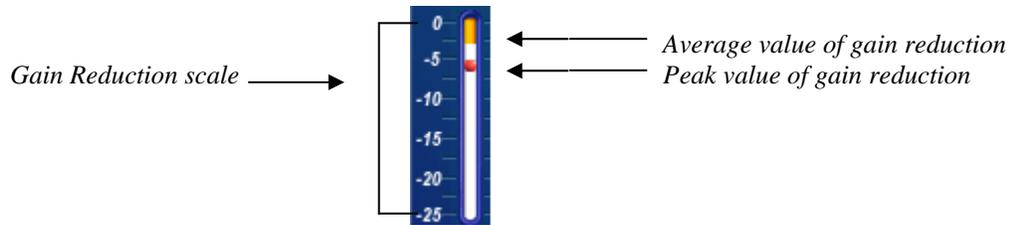
The bargraphs provide a wealth of information about the processing control in Omnia 8x. The algorithms automatically adapt the style of compression/limiting control being employed on a moment-by-moment basis. This can be deduced if the metering is studied over time. During normal operation, the indicators will have a dynamic “bounce” that you will be able to get a feel for. Every now and then, you will see the processor react quickly and show a larger amount of gain reduction. Notice that the response is very fast. This action will recover very slowly, and return to “rest” with the main bargraph. This action will be easily noticed on material that is very dynamic in texture.

Another feature unique to Omnia 8x is processor “Hold”. During brief pauses in audio, the bargraphs will “freeze” and the *GATE* indicators will show the processor has entered the *Hold* mode of the algorithm. This is most easily noticed when there is a “dry” voice being processed. The bargraphs can indicate up to 25 dB of gain reduction.

The *Input/Output* level meters will change from blue to yellow whenever the level exceeds  $-12$ dBfs. *Note:* The input and output levels are displayed relative to 0dB full scale (0dBfs). The red “0” indicator on the input/output bargraphs means that every available bit of signal level is being used at that time! There is nothing more in the level department, except to create distortion...*nasty sounding distortion!* For this reason, the input levels should be reduced if the bargraphs are “in the red” and peaking up to “0” dBfs on a regular basis.

## Interpreting the Gain Reduction Meter Displays

Through careful observation of the processing bargraphs, significant information can be acquired and analyzed about the audio signal on a moment-by-moment basis. The yellow bar shows the average value of the gain reduction, while the floating ball indicates the peak value of gain reduction.



**Gain reduction meter (typical)**

Since the processing algorithms in Omnia 8x 'adapt' to the audio, it is capable of performing many different processing functions at different times. The processing display bargraphs may appear to indicate different kinds of operation with different program material. This behavior is primarily based on dynamic range differences in the program material. For program material that is already processed (like most modern popular music CD's) and lacking dynamic range, the bargraphs will indicate differently than they will with material that has a high degree of dynamic range. This is because audio signals that lack dynamic range will possess a lower peak to average ratio. Conversely, audio signals with a wide dynamic range possess a higher peak to average ratio. The Omnia 8x adapts differently to each case.

For program material that has low dynamic range (high RMS and low peak levels), there will be more activity in the WB-AGC section and less activity in the Multiband Processors. The WB-AGC will respond to high RMS energy, while the Multiband section receives lower peak energy so will not show as much activity. Sometimes the Multiband section may not indicate any action at all. For Omnia 8x, this is completely normal! Examples of this behavior might be seen with heavily processed commercials or music, or with music passages of sustained level. A good example is the Aerosmith CD "Pump." This recording has very little dynamic range. Try any up-tempo selection from this disk and you will see the Wideband-AGC section make initial adjustments along with small amounts of multiband limiting. Once adjusted, the Wideband-AGC section will stay deep in gain reduction, although with little movement, and action within the multiband limiters will be minimal.

When the programming has wide dynamic range (low RMS and high peak levels), the opposite will occur. The Multiband section becomes more active, while the WB-AGC section will appear to have less activity. During these events, the Multiband sections may be working aggressively, while the WB-AGC section indicates little activity. Good examples of programming able to cause this behavior: vocal passages, live voice, classical music, and passages with high transient levels. Good test examples: almost anything classical, as well as almost anything by Steely Dan!

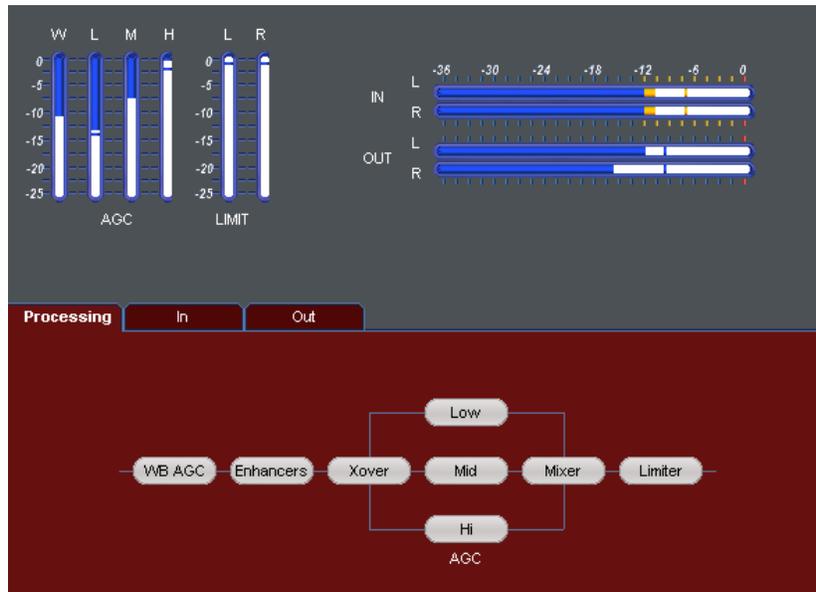
Also keep in mind that the WB-AGC section is designed to operate much more slowly than the Multiband sections, primarily because of the nature of each function. Remember that the WB-AGC section operates on the program's RMS (average) energy. During gain calculations, the incoming program's "average" level is established, and gain adjustments, if needed, are made based on those calculations. This is why the WB-AGC section will appear to move slower as it makes changes over relatively long time periods.

The intent of the Multiband section is to normalize the spectral balance and provide control of the peak levels. Peak energy must be detected and adjusted in a quick and accurate manner while, at the same time, not interfering with the sonic integrity of the audio signal. For this reason, the Multiband sections operate faster, with special background instructions to govern their behavior, and strictly on an as-needed basis.

Since the processing displays are capable of providing a wide range of information, we do not recommend setting up the system based on any specified meter indications. Instead, we recommend setting up the processing by using your ears to judge the sound. We've provided the meters only to analyze the signals and aid you in adjusting the specific parameters needed to achieve your desired sonic results. Like a speedometer, the meters are a guide, not the road!

## Processing Adjustments

Here's where the action is! A block diagram depicts the flow of the audio signal, and illustrates the processing functions that are available to adjust. A mouse-click on any of the *buttons* will provide access to that function.



Block Diagram

### Input

A mouse-click on the *In* “tab” button displays the input section *sub-menu*.

There is a single knob that adjusts both the Left & Right channels equally:



Click on the knob to highlight it and adjust the mouse wheel (if present) or click-hold and move the mouse itself left or right to adjust the level. There is a 30dB range of adjustment between -20dB and +10dB.

Using normal program audio, a correct gain setting results in **peak** indications (the “-” segments) hitting -12 dBFS (where the level meters turn red) or a little higher. This corresponds to system headroom of 12 dB. You may adjust for more headroom if you wish (lower indications), but setting the input level for less headroom (higher meter indications) is strongly discouraged.

### WB-AGC (WideBand AGC)

A very flexible wideband leveler section provides smooth, transparent control of the input program. This is achieved through two significant Omnia innovations, a dual referenced release gate and a hidden, intelligent “makeup” gain algorithm. The dual gate reference is a unique process that correlates the dynamics of the audio input signal to a “rolling” reference level, and from that information makes conditional decisions affecting the character of the release function.

A hidden, Make-Up Gain, control signal determines when the amplitude of the input program suddenly falls to a reduced level. It then adjusts the side chain gain in order to “fill in” the softer program passages so that the average level is increased. This allows the AGC function to operate with slower time constants, while significantly

increasing the average audio level. These slower overall time constants yield lower intermodulation distortion, contributing to Omnia's trademark sound.

Using Classical music for an example, the orchestra often plays *forte*, and then enters abruptly into a quiet passage. Conventional AGC algorithms would hold the softer passage down until it was able to slowly recover at the static release time setting, making such passages nearly inaudible at normal listening levels. Omnia 8x's *makeup gain* function allows a hidden, faster time constant to provide quick recovery, but *only during the softer passage*. As soon as the orchestra starts to play louder, the "makeup" time constant yields control back to the primary AGC circuit, returning gain to the previous platform level. This sophistication preserves the dynamic integrity of the signal while greatly enhancing the listenability of the program.

This is the first processing section within the Omnia 8x, so the controls in this section affect the overall signal, its density, and hence affect every other processing section following it. The job of the Wideband AGC is to erase long-term audio level fluctuations, while doing so in a very unobtrusive manner. This sub-menu provides a few parameters that tailor the action of this section. Click on the **WB AGC** button in the block diagram and the following adjustment screen will be displayed:



**Drive:** The sets the audio level that enters the *WB-AGC*. Increasing the *Drive* will produce more compression. This control is calibrated between  $-6\text{dB}$  and  $+6\text{dB}$ , and adjusts the signal level into the Wideband AGC. It should be adjusted to net approximately 12dB of gain reduction with typical programming. Too little gain reduction can defeat the "leveling" function of the Wideband AGC. Too much gain reduction has little additional benefit. Nominal gain reduction values for the Wideband AGC are between 10 and 15dB.

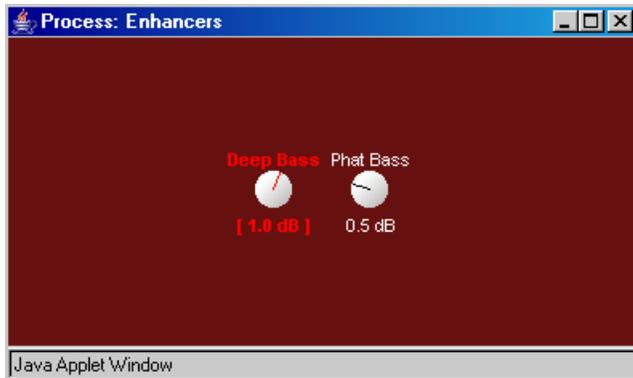
**Release:** Controls the speed of recovery for any given amount of gain reduction. Faster action yields less dynamic range and the presence of more density to the audio. The *Release* control sets the time constants in relative terms using *Slow*, *Medium*, and *Fast*. Because the time constants are program-dependent, calibrating these controls in absolute time values (ms/dB) would be useless—therefore we use simple terminology.

**GATE:** When set to *ON*, it will *freeze* the gain at the last level of processing action that occurred before the audio signal fell below the threshold of operation. Correct adjustment of this control helps to minimize "pumping", and the increase of background noise during pauses in programming.

Clicking *OK* after adjusting any of the parameters in this section will save the change and close the sub-menu.

## Bass

This section contains the Bass EQ controls. In the Omnia 8x's unique signal processing architecture, these controls are placed in their optimal position — just before the multiband processor sections. Each of the *Deep Bass* and *Phat Bass* controls can boost the level up to 12 dB. Be careful here not to overdrive the following sections or over-emphasize these lower frequency ranges. When used properly this specialized low frequency enhancement tools can deliver the thunderous bass and warmth that the Omnia is known for, and it can do so without making the sound muddy.



**Deep Bass EQ:** For those who demand *thunderous* bass, the Omnia 8x has it! Up to 12 dB of “thunder” can be added to shake your walls! This is not a simple bass boost, but a rather sophisticated concept that takes into consideration the time alignment of the low frequencies as they pass through the entire system. It allows a loud, clean low end, with absolutely no sacrifice to the overall loudness of your signal. The **Deep Bass** function is a shelf boost at 85 Hz, utilizing a phase compensated 12dB/octave slope to emulate the EQ function.

**Phat Bass EQ:** Phat Bass is a unique enhancement that adds filtered harmonics of the lower registers to the upper bass frequencies. The algorithm extracts information contained in the initial attack to do its work, and low frequency texture is therefore emphasized. Older recordings sound fuller (or phatter) with the added illusion of loudness. **Phat Bass EQ** also helps radios with small speakers sound like they have more bass than they actually do.

## X-Over

**Phase Linear, Time Aligned Crossover:** Most multiband audio processors make a compromise in the crossover area in order to provide a flat dynamic frequency response. This is done to avoid audible peaks or dips in the recombined frequency response as the individual band gains change during processing. In an effort to minimize this problem, most processors use a fixed phase-offset in the crossovers. While such treatment helps to minimize frequency response peaks and dips, it also results in a loss of phase linearity, increasing 'smearing', and reducing musical clarity.



In Omnia 8x's implementation, the crossover network is carefully time-aligned so that the recombined spectrum remains flat, regardless of the amount of gain control being applied within any band. This true phase linear response assures that harmonic overtones are not displaced in time. The result: the truer, more natural, and more musical Omnia sound. The crossover frequencies are not adjustable.

## Multiband AGC Sections

Similar in character to the wideband AGC described above, but expanded to three bands, this section has the ability to significantly add power and loudness to the audio while tailoring and pre-processing it for delivery to the final limiter section. The system uses different algorithms for each of the bands: The low and mid bands use a *feedback* configuration, which produces a larger, warmer sound on lower frequencies. The presence and high bands utilize a *feedforward* design that maintains a more open, natural and musical texture on higher frequencies.

As with any multiband processor, improper adjustment can exaggerate noise at high frequencies, particularly with older recordings that possess a good deal of tape hiss. This can especially occur if the highest AGC band is driven so that significant gain reduction occurs, and the band's gating control is set to the lower end of the scale. During audio segments that have little or no HF content, the AGC will try to increase its gain in an effort to restore treble balance. Even during periods when the gate function is in the default **Freeze** mode, the problem might still exist with some programming. In those situations, even an increase of the gate threshold control to higher numbers may not help the situation.

Since the user parameters are the same for all three bands, only the LF Band will be detailed here.

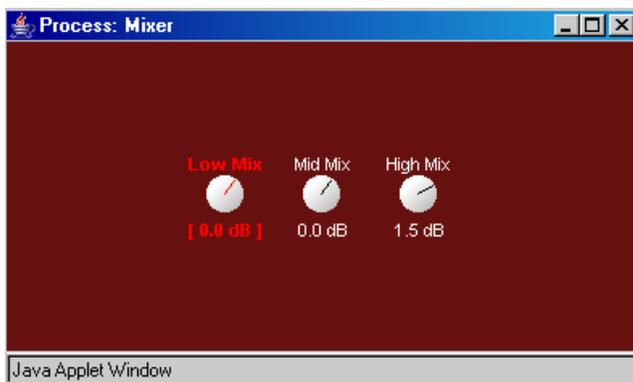


**Drive:** The sets the audio level that enters the *WB-AGC*. Increasing the *Drive* will produce more compression. This control is calibrated between  $-6\text{dB}$  and  $+6\text{dB}$ , and adjusts the signal level into the Wideband AGC. It should be adjusted to net approximately  $12\text{dB}$  of gain reduction with typical programming. Too little gain reduction can defeat the “leveling” function of the Wideband AGC. Too much gain reduction has little additional benefit. Nominal gain reduction values for the Wideband AGC are between  $10$  and  $15\text{dB}$ .

**Release:** Controls the speed of recovery for any given amount of gain reduction. Faster action yields less dynamic range and the presence of more density to the audio. The *Release* control sets the time constants in relative terms using *Slow*, *Medium*, and *Fast*. Because the time constants are program-dependent, calibrating these controls in absolute time values (ms/dB) would be useless—therefore we use simple terminology.

**GATE:** When set to *ON*, it will *freeze* the gain at the last level of processing action that occurred before the audio signal fell below the threshold of operation. Correct adjustment of this control helps to minimize “pumping”, and the increase of background noise during pauses in programming.

## MIX



This is where the three multiband processors are mixed together. Use care in adjusting this section, as too much level from one particular band may cause an excessive amount of emphasis to that range of frequencies. Such adjustment may also drive the final limiter bands in that range of frequencies too hard, causing the sound to become unnatural, dense, and squashed. As explained earlier, if your desire is to “EQ” the sound, you should perform that function using the drive levels in the multiband section. The mixer is primarily intended for minor “EQ” changes to the overall sound. There is a  $\pm 6\text{dB}$  range of adjustment for each band.

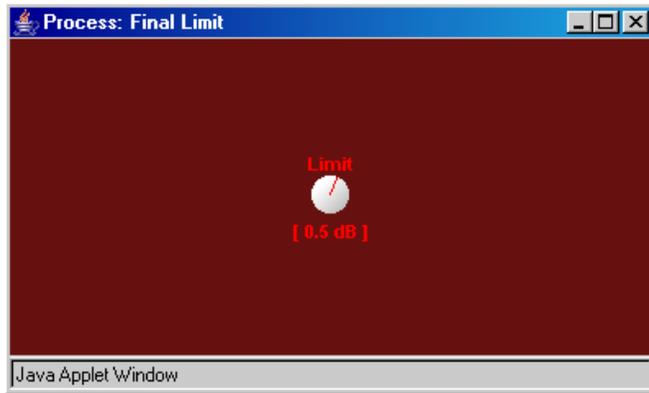
## Final Limiter

Omnia 8x employs a lookahead limiter to provide absolute and precision peak control. This limiter has been designed to minimize processing side-affects like IMD, which are usually associated with limiters of this type. Using an innovative design that cancels intermodulation products before they develop, allows this limiter to sound extremely transparent. The limiting function is derived using numerous control signals that monitor one another.

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

On the other hand, a lookahead limiter yields extremely low levels of THD, although it will create some IMD component, and this allows the audio coder to operate with minimal sonic artifacts.

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 appear *edgier*. This is from the added harmonic content. In contrast, the lookahead limiter will appear *busier*, or dense as the action of the control signal may be heard, when more limiting is applied.



**Limit Drive:** Here is where the loudness versus quality is most evident! This limiter's adjustment range is +/-3 dB, in 0.1dB steps. It is advisable to make minor changes, primarily as the 'loudness fine tuner'. Be careful; there is a lot of available power here!

## Output

Clicking on the *Out* "tab" button brings up the peak output level and lowpass filter settings.



Peak *Output Level* adjustment is done using the single *Gain* control that adjusts both the Left & Right channels together. The control range is from -26dB to +6dB of gain. This level is normally set to the maximum input level, or just below it, of the device that the Omnia 8x output is connected to.

**Output Filter:** For webcasting applications, especially at lower bitrates, it is sometimes desirable to reduce the audio bandwidth. A pull-down menu provides eight different filter response curves that can reduce the spectrum down to 4kHz.

# Fine Tuning Omnia 8x

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Our goal is to provide dramatic sonic improvements by Omnia 8x right out of the box. We know that you will want to tailor one or more of the presets slightly to create a more “custom” sound, or you might really delve in and significantly modify the parameter settings to create their own unique “signature sound.”

## About Loudness and Fatigue

If you're an audio processing expert, you'll find what we've included within the Omnia 8x to be the most powerful tools ever. If you're new to audio processing, we recommend proceeding with caution and with knowledge of your goals.

Getting the most out of your Omnia 8x processor (or any other processor for that matter) starts with knowing your objectives beforehand, and knowing where you can make tradeoffs. If your goal is to create a hot master *and* obtain extreme amounts of detail and quality, keep in mind that there *are* limits. Reaching one goal is usually at the expense of the other. There will always be those individuals who feel that louder, at any cost, is better. The added distortion from the endless and pointless pursuit of raw loudness may generate negative effects on listeners. Be careful.

Having said all of this, we firmly believe that Omnia 8x will get you closer to your ideal than any other processor or combination of processors available today. It is definitely capable of generating moment-to-moment loudness; it has the *muscle*. It also maintains that famous Omnia *clarity* sought after by top engineers all over the world. We encourage all end-users to utilize the power of the Omnia 8x to create good, *competitive* loudness while maintaining a higher degree of quality.

## Clarify Your Processing Objectives

Whether one is seeking better overall quality or specific spectral improvements, try to articulate and write down your goals. Do you want a little more loudness or “presence” in the final master? Are there certain characteristics of the sound of other recordings that you like, want to emulate, or just surpass? Are there any you want to avoid? When adjusting processing, please give thought—real thought, to how you'd like your final master to sound. What do we mean by that? Well, if your desire is to add loudness, and in most cases it probably will be, decide on the *degree* of loudness that you want.

## The Adjustment Procedure

1. Review your objectives.
2. Once you're up and running, start with a degree of processing that is similar to what you'd normally use and then, if desired, become more aggressive. A careful approach is less likely to draw hasty, or even negative, opinions.
3. Listen for awhile, then adjust, and listen for awhile again. Try to avoid the temptation to continuously “fiddle” with adjustments, just moments after getting the system running. Remember that you should evaluate the operation over time, not moment to moment!
4. 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 8x is capable of producing.
5. 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.

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

## Getting the Sound You Want

If you believe that your desire is to process aggressively, here are some suggestions that should help you achieve that goal. Conversely, if you have the rare luxury to strive for increased sound quality, we have suggestions for you too! Omnia 8x is designed to minimize the impact of the quality vs. loudness trade-off.

We recommend that before starting the process of *cranking it up* just for the sake of raw loudness, try to decide what sonic characteristics you feel are lacking in your final sound. In many instances, it's not just about increasing the drive to the limiters, or the clipper. It can be as simple as creating an *illusion* of added loudness by changing a single time-constant parameter. There are even known instances where the use of *stereo enhancement* created the necessary apparent loudness. Please don't bite at the first temptation to *crank* the system. Sometimes the old adage of *less is more* really applies!

Before delving into alternative processing possibilities, please give the next brief section some thought. It may help provide you with some needed direction in your overall processing plan.

### A Word about Loudness

Making this confession is a little like telling your parents you dented the car. But here it goes: It's OK for your final mix to be loud...*very loud!*

In the past, loudness was a problem due to the limitations of the processors of the day. In the quest for ultimate loudness, you probably either adjusted (or modified) your old processor well outside of its “safe” range, or pushed the 0dBfs ceiling level in the signal chain and accepted the byproducts of the interactions and conflicts among them.

Omnia 8x has changed all of that! It's been designed to look at the incoming audio, and *know* how to make your final mix consistently loud, and without the artifacts or grunge created by your current processor. Omnia 8x makes loudness an effortless exercise.

One more confession: It's also OK for your master to *not* sound loud, yet sound incredibly musical and grunge-free, because the Omnia 8x has given you the choice. Omnia.6CD is a system that maximizes the audio quality of your signal, yet at the same time satisfies your competitive requirements.

### Quality versus Loudness

The trade-off between quality and loudness is primarily determined by how you choose to use the limiting and clipping sections. While each function alone will generate added loudness, they each have different advantages, as well as side effects.

When excessive limiting is used, intermodulation distortion is increased, making the audio sound “mushy”, and “smeared.” The added short term density can also cause the audio to be “tight”, “squashed”, or “dense.” The “dynamics” artifacts caused by excessive limiting might sound like “pumping,” “breathing.” The rule for limiting is “a little goes a long way!”

When excessive clipping is used, harmonic distortion is increased. The audio level is in effect “running into the brick wall.” Too much clipping can cause the audio to sound “broken-up,” “torn,” “rough,” or “edgy.” As you might imagine, the harder the limiters and clippers are driven, the louder the audio perception. However, you are also much more likely to encounter increased intermodulation and/or harmonic distortion.

The following sections are provided to assist you in designing the personality of your sound. As we said earlier, there is no precise recipe for setting up audio processing. While there are some basic fundamentals that you can use to get started toward the sound that you desire, it may require a concerted effort with extended listening and subtle

processing changes over time to achieve your ultimate goal. Just remember to know your goals, take your time, and adjust methodically.

## Increasing Loudness

Try to resist the temptation to just *crank up* the aggressive processing sections, like the limiters. Those will add loudness of course, but usually at the cost of quality. Many times, building a little more RMS level in the AGC sections will do the trick instead, and with no obvious sonic penalties. The following are some suggestions on where to begin to make changes. We suggest that you them in the order described.

Increasing loudness can be accomplished in four ways:

1. Alter the following parameters in the AGC sections:
  - Increase the **AGC Drive** to the **WB** (wideband) AGC section.
  - Increase the **Drive** to each band of the Multiband AGC screen.
  - Increase the **Release** time settings in each band to make it operate faster.
2. Drive the Final Limiter section harder.
3. A combination of the above steps, but in small increments! It might sound crazy, but it's true! In this situation, resist the temptation to make too many changes at once. When that occurs, it becomes difficult to determine why the result of an adjustment did or did not make sense. Focus on one specific area of your sound at a time. Once that area is satisfactory, then move the focus to the next area, as needed.

Based upon the above suggestions, you can experiment with different styles of processing. Some prefer to have their processing be perceptibly loud, but dynamic. This may give the illusion of loudness, retaining detail and clarity, and reducing listener fatigue. This can be done by centering your efforts in the multiband section, and avoiding heavy use of the final limiter. One trick that works well is to use fast release times in the multiband limiters, but do not let them produce more than 5 dB - 7 dB of gain reduction. This keeps the IM distortion of the limiters to a minimum, and doesn't "over-squash" your sound. Adjusted in this manner, the Limiter sections are relied upon to generate higher long-term RMS levels, which translates into increases in perceived loudness.

If the quest is to produce a "loud and proud" signature, then the limiters should be leaned upon a bit more. *Loudness at all costs* is usually the reason for moving the processing in a direction like this. Using larger amounts of drive to the multiband limiters, along with faster release times will generate a signal of high short-term density. The effect of the processing set in this manner is that the audio is consistently loud at all times . . . a wall of sound. The drawback is that the *density* can cause fatigue. While Omnia 8x is designed to minimize fatigue, it is capable of generating large amounts of density that could eventually lead to fatigue. Be careful!

## Adding More Detail—When Loudness Isn't the Last Word

Now that we've "squashed the grape," lets look at what it takes to undo a heavily processed signal. Basically, just reversing the procedures listed above will do the trick:

1. Reduce the drive to the Final Limiter.
2. Back off on the influence of the multiband stages:
  - Reduce the amount of **Drive** to each band in the multiband.
  - Reduce the **Release** times to slow down recovery.
3. Ease up on the Wideband-AGC sections:
  - Reduce the **Drive** to the WB AGC.
  - Reduce the **Release** time to operate slower.

Backing off the Limiting sections first will allow the processing to retain a level of competitive loudness while enhancing quality, and the overall dynamic texture will be affected less. Start with reducing the **Limiter** amount in 0.5 dB steps. It's surprising how much detail can be restored from just a small change of 0.5 dB. Generally, changes in the **Limiter** drives will have the most noticeable effect on quality, but it will also affect the relative loudness level, too. You'll need to find a "happy medium" that's right for you.

## Equalization Changes

Tailoring the shape of the overall audio spectrum can be done in three different sections:

1. The relative *drive* settings in the multiband AGC menu. These controls set the drive levels of the multiband AGC sections.
2. The settings of the multiband *Mixer* controls.

Both options will provide noticeable change in EQ. We suggest you use the first two listed options. In either case, an EQ change is still followed by a *dynamically* controlled stage. Therefore any excessive EQ change can be 'undone' by the subsequent AGC.

The last option, adjusting the *Mixer*, is designed to provide a final *minor* trim to the spectrum. If you've noticed that we calibrated these controls in 0.10 dB steps, then you know what we mean when we say these controls are for fine trim! Since this stage is *after* all of the dynamic AGC and Limiting, a radical change in level in the *Mixer* will result in additional and possibly excessive limiting of audio in that band. We suggest that changes implemented here be limited to no more than about 1.0 dB. Naturally, the decrease in mix level can be done to any desired amount.

## Thunder Bass

Omnia 8x has the power to shake the walls with low end! If your source material has it, Omnia 8x will put it in the mix, and with muscle! Making changes to this characteristic is done using the following parameters, and for maximum effectiveness, in the order listed:

1. In the Enhance Menu, increase the amount of *Deep Bass or Phat Bass* boost.
2. Increase the drive to the LF Limiters with the appropriate controls in the Limiter *XO* screen.
3. Speed up the *Release* times of the LF *Limiters* sections.

When it comes to processing, moderation is the key! If all of the above steps are utilized in the pursuit of more bass, then severe low frequency over-enhancement can occur. Excessive bass boost can produce the illusion that the presence and high frequencies have been lost. They are still there, but are being acoustically masked by the lower frequencies.

Generally, an increase in the Enhance Menu's *Bass* boost functions alone will provide more than sufficient enhancement to the low end.

## Reducing Codec Artifacts

Dynamics processing is an extremely useful tool that will reduce audible artifacts from lossy-compression codecs. High frequencies tend to be the first perceptible annoyances, followed by that *swishy-swirly* water like sound that's quite common at lower bitrates. These artifacts can be reduced, and in some cases removed when the audio processor is applied as a tool.

Generally, it's understood that as codec bitrates are reduced, so is the audio bandwidth. Omnia 8x contains selectable low pass filters in the *Output* section. Reducing the audio bandwidth through filtering will help. Additionally, the upper band of processing can be reduced in the *MIX* section, which will allow that band to act as a dynamic governor. Operating the HF Band in the *slow* release time will reduce HF density which improves intelligibility as the encoder masking algorithm is not loaded as heavily with HF content.

# Applications

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## Streaming (webcasting)

One of the biggest advantages to Omnia 8x is the ability to employ it for streaming applications. As stated earlier, it's possible to install both Omnia 8x and the audio encoder on the same PC. It's compatible with all the favorite *flavors* of streaming codecs. It's recommended that a PC of moderate MIPS be employed. The suggestion here is at least a CPU that operates at 800MHz or more.

## File Based Storage

In a production workstation, Omnia 8x provides the ability to process audio files for storage. This is extremely useful when archiving material, or performing normalization to file based content.

## Mastering/Post Production

This is somewhat related to the above section, as more mastering is now done in the workstation domain. The difference being that the end result usually ends up in compact disc (CD), or recorded form somewhere. Restoration of old audio masters benefit extremely well as they can be transferred into a workstation where Omnia 8x is installed.

## Recording/Production/Broadcast

Probably the most common application, where the need is to have access to a processor for a host of operations. Omnia 8x is extremely versatile in its capabilities.



## FAQ / Diagnostics / Maintenance

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This section contains answers to some frequently asked Omnia 8x setup questions, and some troubleshooting procedures intended to determine if factory service is needed. These procedures are not intended to take the place of a conversation with Axia support personnel; should you need to contact us for support, please use the contact information listed on Page-35 of this manual.

### Q: The Omnia 8x web interface asks me for a password, but I haven't set one.

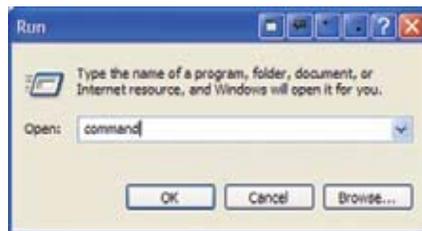
A: Omnia 8x web interface is password protected by default to discourage tampering. . The default factory login is **user**; leave the password field empty. Click **<OK>**.

The front panel of the Omnia 8x unit can also be passcode protected to secure the IP settings. This is done from the **System** screen in the web interface.

### Q: I get a “Page Not Found” error when I try to connect to Omnia 8x using my Web browser. What’s wrong?

A: It’s possible that your computer’s network configuration needs adjustment. Livewire™ networks do not assign IP addresses dynamically (DHCP), so double-check to see if your computer is actually a part of the network — that its network adapter has a valid IP address and the proper subnet mask value is assigned. Assuming your computer is running Windows, you can view these settings using a utility called IPCONFIG.EXE. Here’s what to do:

1. Double-check Omnia 8x’s IP address — Click the front panel knob to enter the menu and then click on the first menu choice: “IP settings”. The IP address and subnet mask values are displayed on the first two lines. Write these down for reference.
2. On your Windows computer, click on the **Start** button and choose **Run...** from the menu. In the box that appears, type “command” (or “cmd”) to start a DOS command box, then click the **OK** button.



3. A black box with white type will appear. Type **ipconfig** in the box, and press the “Enter” key. You’ll be rewarded with a screen that looks like this:

```
C:\WINDOWS\System32\cmd.exe
C:\>ipconfig

windows IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 
    IP Address. . . . .               : 192.168.1.101
    Subnet Mask . . . . .             : 255.255.255.0
    Default Gateway . . . . .         : 192.168.1.1
C:\>
```

4. The screen displays your computer’s IP address, Subnet Mask and Gateway settings. Write these down and compare them to those previously obtained from your Omnia 8x.

Explanation: The IP address is usually expressed as four decimal numbers, each representing eight bits, separated by periods. This is known more technically as “dotted quad notation. An IP address has two parts: the identifier of a particular network and an identifier of the particular device (which can be a server or a workstation) within that network.

Since networks vary in size, there are four different address formats or classes you can use to construct them. We recommend that Livewire networks be constructed as Class B networks to allow enough unique device addresses for expansion.

To learn more about IP addressing and network construction, we recommend reading Cormac Long’s excellent 4-part IP Network Design, available at <http://tinyurl.com/64bb5>.

Write down the values displayed and type “exit” to close the DOS command box. Compare the two IP addresses to be certain that your computer is on the same network as your Omnia 8x; in a Class B network, this means that the first six digits of the IP addresses *must match*. If they do not, change the IP address of your computer’s Network Interface Card. Consult your Operating System’s documentation for specific instructions on how this is done. Also compare the Subnet Mask values; these must be exactly the same on both your Omnia 8x and your computer.

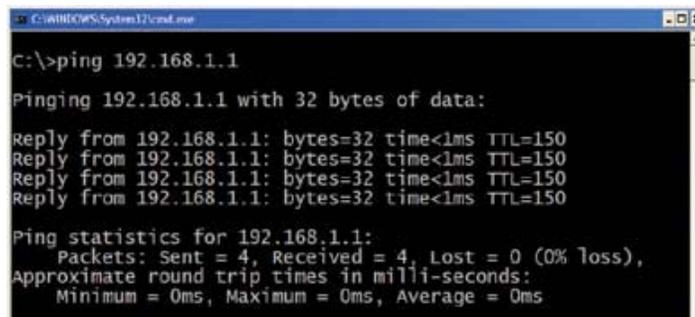
Note that changing a computer’s IP settings and/or Subnet Mask settings often requires a reboot before those settings take effect. This may depend on the operating system being used.

Once your computer is using the same IP network address and subnet as your Omnia 8x, you should be able to access your Omnia 8x’s web page.

If you’ve confirmed network settings and still cannot access your Omnia 8x, “Ping” the unit to determine whether it is responding to your requests. Here’s how:

1. Use the **Run...** command previously described to open a DOS command window.
2. At the command prompt, type **ping xxx.xxx.xxx.xxx** (where *x* represents Omnia 8x’s IP address).

If your Omnia 8x is responding to commands, the **ping** command will produce a screen resembling the figure



```
C:\WINDOWS\System32\cmd.exe
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

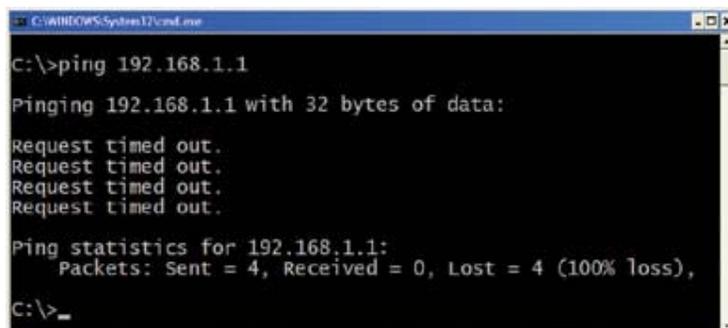
Reply from 192.168.1.1: bytes=32 time<1ms TTL=150

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

below:

Results like these, showing packets sent and returned, indicate that your Omnia 8x is active and responding to requests.

However, if the **ping** command produces results like those below, your Omnia 8x is not responding and must be restarted. Disconnect the Omnia 8x power supply from the mains, wait 1 minute, restore power and try again.



```
C:\WINDOWS\System32\cmd.exe
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>_
```

# If You Need Help!

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## Obtaining Service

- Omnia Customer Support personnel are available in Cleveland, Ohio, USA, Monday through Friday between 9:00 A.M. and 6:00 P.M., Eastern Time. If outside the U.S.A., please contact the dealer you purchased your Omnia from.
- Before contacting Omnia Customer Support, please have the serial number of the unit (located on a barcode sticker on the rear panel in this format: 0206WXXXX) 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 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.omniaaudio.com/>

## Via E-Mail

The customer service e-mail address for Omnia is: [support@omniaaudio.com](mailto:support@omniaaudio.com).

## Via Phone & Mail (USA and non-European Countries)

Customer service is available by telephone, Monday – Friday between 9:00 A.M. and 6:00 P.M., USA Eastern time zone.

Phone: +1.216.241.7225      Fax: +1.216. 241.4103

Shipping Information: \* Telos / Omnia

2101 Superior Avenue

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

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This Warranty covers "the Products," which are defined as the various audio equipment, parts, software and accessories manufactured, sold and/or distributed by TLS Corp., d/b/a Omnia (hereinafter "Omnia").

With the exception of software-only items, the Products are warranted to be free from defects in material and workmanship for a period of two years from the date of receipt by the end-user.

Software-only items are warranted to be free from defects in material and workmanship for a period of 90 days from the date of receipt by the end-user.

This warranty is void if the Products are subject to Acts of God, including (without limitation) lightning; improper installation or misuse, including (without limitation) the failure to use telephone and power line surge protection devices; accident; neglect or other damage.

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

In no event will Omnia, its employees, agents or authorized dealers be liable for incidental or consequential damages, or for loss, damage, or expense directly or indirectly arising from the use of any of the Products or the inability of the end-user to use any of the Products either separately or in combination with other equipment or materials, or from any other cause.

In order to invoke this Warranty, Omnia must receive notice of a warranty claim within the above-stated warranty period and Omnia must authorize warranty coverage. If Omnia authorizes the performance of warranty service, the defective Product must be delivered, shipping prepaid, to: Omnia, 2101 Superior Avenue, Cleveland, Ohio 44114.

Omnia, at its option will either repair or replace the Products and such action shall be the full extent of Omnia's obligation under this Warranty. After the Products are repaired or replaced Omnia will return them to the party that sent the Products, and Omnia will pay for the cost of shipping.

Omnia's authorized dealers are not authorized to assume for Omnia any additional obligations or liabilities in connection with the dealers' sale of the Products.

Omnia products are to be used with registered protective interface devices that satisfy regulatory requirements in their country of use.