

# Omnia.7AM

## AM Never Sounded This Good



## OVERVIEW

Do you want your AM broadcasts to sound CLEANER, CLEARER, and LOUDER? Then you need a processor designed and built for today's AM radio.

Meet Omnia.7AM, a feature-rich, competitively priced AM audio processor engineered to do just that, and the first processor dedicated to AM to appear on the scene in many years.

While competitors are using old and outdated technology in their processors, the Omnia.7AM uses the best of current technology to meet current challenges faced by AM broadcasters. Omnia.7 AM delivers the powerful, clear, and precise Omnia signature sound that's the first choice of top stations worldwide.

The Omnia.7AM employs most of the features of the 7FM. All aspects of the processing infrastructure, bandwidth, and their output signals, however, have been specially engineered for maximum efficiency and performance within the AM spectrum.

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## FEATURES

- “Undo,” exclusive Omnia technology that removes distortion and mathematically re-creates the peaks sliced from today’s poorly mastered contemporary music. Undo restores life, brilliance, and dynamic range to any type of music.
- An exclusive Psychoacoustic Controlled Distortion Masking Clipper analyzes and masks distortion perceptible to the human ear, leaving only clean, clear audio.
- A complete toolbox of sophisticated Omnia sound-shaping technology gives you the power to analyze and refine your signature sound using a variety of sonic tools ranging from Real-Time Analyzers to Oscilloscopes, FFTs, and more.
- Remote client software allows full remote control of processor and all metering tools from any Windows-based PC or tablet on the local network—including touch-screen devices.
- Dry Voice Detector detects speech and applies appropriate processing for clearest possible voice quality.
- Built-in Speaker Calibration tool.
- Multiband downward expansion (source noise reduction).
- Three-stage wideband AGC with adjustable sidechain equalization.
- Program-dependent two- to five-band multiband AGCs and limiters.
- 4.3” / 10.9 cm. front panel screen.
- Full remote control with audio monitoring.
- Dual, independent power supplies.
- Composite pass-through (relay bypass) for backup processor.
- Asymmetrical output with 150% maximum positive peak modulation, 100% maximum negative peak modulation, and peak inversion controls for the input and output audio.
- Available with optional HD and/or streaming.

## IN DEPTH

### “Undo”

A processor, by its very nature, compresses dynamic range and employs some form of clipping to deliver a “signature sound” and a competitively loud signal. Clean, well-recorded audio has always been able to withstand greater degrees of processing; this was true decades ago and it’s more relevant than ever today.

Unfortunately, recordings made in the past two decades have declined in terms of quality, as mastering engineers wage their very own “loudness wars.” (Rip a track from the modern CD of your choice and look at the waveform in your favorite editor if you need proof!)

The result is source material that is hyper-compressed from the studio, with only a dB or two of dynamic range at most. As if that weren’t bad enough, the music is run through unsophisticated, brute-force clippers to make them louder still. Before it even gets touched by the compressors, limiters, and clippers in the processor itself, it has been damaged.

By repairing the damaged audio before processing, “Undo” gives Omnia.7AM cleaner and more dynamic audio to work with. The first step of Undo is the declipper, which examines and mathematically re-creates audio peaks that were flattened during mastering. The second step, a multi-band expander, increases dynamic range. The result: clean, dynamic, enjoyable sound.

### Psychoacoustically Controlled Distortion-Masking Clipper

Clipping is typically the final stage of a processing chain. The final clipper is also where the classic (and oft dreaded) “loud versus clean” tradeoff is made. When more clipping is used to gain loudness on the dial, clipper distortion becomes more and more pronounced. The clipped peaks fall back into the audio and manifest themselves as audible distortion.

How to solve this problem? You could back down the clipper drive to clean up the sound — but you lose loudness. You could dial up the compressors and limiters that precede the clipper — but that results in busy, dense sound that leads to listener fatigue.

To put it plainly: Omnia.7AM sounds significantly cleaner than other processors at a given loudness level — and substantially louder at any given level of quality. It comes closer to eliminating the “loud / clean” compromise than any other processor on the market today. Voices sound clean, while music and production sounds surprisingly vibrant on AM transmission.

This is especially important for AM because unlike FM where loudness is desired for dial-dominating sound, loudness on AM directly translates to increased signal coverage, especially on the fringes of the signal. So it’s even more important to have the ability to be loud AND clean on AM since more and better coverage means more potential listeners, ultimately resulting in potentially more revenue.

## Omnia Toolbox

While audio processing is largely a “hearing” process, there is still much to be learned by seeing what your adjustments are doing to your sound. Some stations still have an oscilloscope on the test bench or a spectrum analyzer at the transmitter, but it’s not always convenient (or possible) to hook up a processor to them while on the air.

With Omnia.7AM, there’s no extra test equipment to buy (‘scopes and analyzers aren’t cheap) and no cables to hook up. You also have the built-in capability to visually monitor the signal at the input, the output, and dozens of in-between points throughout the processing path so you can tell what’s happening to your audio every step of the way.

## Speaker Calibration

If you make decisions about your processing on uncalibrated monitors, your choices are colored by the audio characteristics of the speaker itself — not to mention those of your listening room.

The pink noise generator and RTA built into Omnia.7AM, used with an inexpensive calibrated microphone, makes it possible to calibrate any speaker system to deliver as flat a response as the speakers will allow. (Small speakers still won’t reproduce low frequencies well; the laws of physics still apply!) With speaker and room influences removed from the equation, you are free to adjust your audio based only upon “the facts.”

“But,” you say, “listeners aren’t hearing my station on calibrated speakers! They’re listening in their cars, at their computer, and through cheap ear buds, so I should too.” It’s true — that’s exactly how your listeners hear your station, and why listening on a variety of radios, in many different environments, is a good idea. But adjusting your processing this way invariably results in frustration and lousy audio.

Here’s why: You listen first in a compact car with a typical factory stereo. You don’t hear much bass, so you adjust your processing to deliver more low end. Then, you move to a luxury car with 10 speakers and a subwoofer, and the bass is muddy, boomy, and overwhelming. Why? Because you adjusted the processing to make up for its perceived deficiencies, when the real deficiency was in your speakers!

Having at least one pair of high-quality, calibrated speakers as your reference will dramatically improve your on-air sound, save you valuable time—and help preserve your sanity, too!

## Dry Voice Detector

The human voice can often present a real challenge. Even Omnia.7AM's psychoacoustically controlled distortion-masking clipper, which dramatically minimizes the dreaded "clean / loud" tradeoff, can reveal some distortion on voices when overall loudness is the goal.

To ensure clean voice quality in these situations, the Dry Voice Detector listens for speech, then automatically and inaudibly adjusts the compressor and limiter sections, reducing the amount of overall clipping needed to maintain the same level of loudness.

## Remote Client

Remote control is a must — especially when your processor is miles (and often mountains) away from the studio. Omnia.7AM takes remote control to a new high, with a high-performance Web interface that eliminates interface lag. And, if you have multiple Omnia.7AM processors, its single connection window enables you to manage multiple remotes simultaneously.

Provided your network has sufficient bandwidth, you can even stream audio from various patch points within the processing chain back to your computer, so you can hear the effect of your adjustments in the quiet of your office — not inside a noisy transmitter building.

## SPECIFICATIONS

### Frequency Response

- 20Hz to 10.0kHz, +/-0.5dB.
- Adjustable NRSC pre-emphasis curve implementation. You may instead choose pre-emphasis at 50us or 75us, or even a flat output if desired. Low pass filter can be set between 3.0kHz and 10.0kHz in 0.5kHz increments. This allows maximum high-frequency transmission while allowing for station-specific bandwidth restriction scenarios such as HD Radio, 9 kHz channel spacing, or even more narrow-band shortwave transmission.
- +/- 0.5dB 20Hz to 15kHz; 16.5kHz in extended mode.

### Signal-to-Noise Ratio

- Greater than -80 dB, de-emphasized, 20Hz to 15kHz

### System Distortion

- Less than 0.01% THD+N below pre-emphasis, inaudible above

### Stereo Separation

- 65dB minimum, 20Hz to 15kHz; 70dB typical

### Stereo Baseband Output

- Adjustable from -24.0dBFS to 0.0dBFS in 0.1 dB increments

### Digital Output Level

- Adjustable from -24.0dBFS to 0.0dBFS in 0.1dB increments

### A/D Conversion

- Crystal Semiconductor CS5361, 24 bit 128x over-sampled delta sigma converter with linear-phase anti-aliasing filter
- Pre-ADC anti-alias filter, with high-pass filter at <10 Hz
- Delta sigma converter with linear-phase and anti-aliasing filter
- MPX Inputs have high pass filter <0.1Hz

## D/A Conversion

- Crystal Semiconductor CS4391, 24-bit, 128x oversampled
- External sync input
- Per AES11 Digital Audio Reference Signal (DARS), reference for digital output sample rate
- MPX Outputs are DC coupled

## Analog I/O

- Two balanced, EMI filtered XLR connectors

## AES Digital I/O

- AES/EBU In; Out via XLR connectors
- Input accepts 32000 – 96000 Hz. Output is 44100 or 48000 depending on the rate selected in software. AES Reference Input via BNC connector. Accepts 44100 or 48000 Hz only, and the correct rate must first be selected in the software.

## External Sync Range

- 44.1kHz or 48kHz

## Inputs/Outputs

- Balanced, EMI-filtered, L/R analog input and output on XLR connectors
- AES input and output on XLR connectors, including recognition of external sync signal
- Ethernet RJ-45 port supporting 100 and 1000 BASE-T Ethernet. at 44.1 or 48kHz

## Power Requirements

- 100-264 VAC, 47-63Hz autosensing, 100W maximum

## Power Connector

- IEC male, detachable 3-wire power cords supplied

## Power Supply

- Internal dual redundant

## Environmental

- Operating: 0 to 50 degrees C
- Non-operating: -20 to 70 degrees C

## Physical Specifications

- Unit weight: 11 pounds
- Total shipping weight: 15 pounds
- Dimensions: 2RU at 3.5" H x 19" W x 12.5" D

## Regulatory

**North America:** FCC and CE tested and compliant, power supply is UL approved.

**Europe:** Complies with the European Union Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), as amended by Commission Decisions 2005/618/EC, 2005/717/EC, 2005/747/EC (RoHS Directive), and WEEE.