Omnia.11 FM and FM/HD

Flagship Class FM Processing for the Most Competitive Broadcasters on the Planet

OVERVIEW

Omnia.11 is available in FM+HD with separate processing paths for FM and HD/DRM or FM without HD/DRM. The FM-only model is upgradeable to FM/HD at a later date. Switchable Single Sideband Suppressed Carrier (SSBSC) technology for potential reduction of multipath is a standard feature. A front panel touch screen GUI, on a 10.5" diagonal screen, provides ease of use and enhanced metering and diagnostics. Remote access is available via any web browser. Livewire, AES/EBU digital and analog I/O are standard. Fanless cooling. Rugged 4 RU chassis.

Omnia.11s now ship with the G-Force™ Dynamics Engine standard. G-Force is also available as an optional Plug-In for Omnia.11 units already in the field. Designed by Frank Foti and Cornelius Gould, Omnia.11 with G-Force represents a significant update to Omnia.11's dynamics—so significant, in fact, that Omnia has updated the GUI to a vivid cobalt blue. It sounds even better than it looks thanks to a dynamics processing framework that enables the Omnia.11 to set the overall EQ for signature consistency, making it sound cleaner, clearer, louder, more consistent, more open, and more pleasing. You hear the music. You hear the voice. You don't hear the processor. Both FM+HD and FM-only models can be upgraded with the optional Perfect Declipper Plug-In, a revolutionary new algorithm that restores clipped areas in audio recordings. This algorithm not only restores dynamics, but removes distortion.

FEATURES

G-Force™ Dynamics Engine

The G-Force Plug-In (which ships standard on all new Omnia.11 units and can be added as an optional upgrade for existing units in the field) lets Omnia.11 handle rapidly changing, hyper-compressed source material better than ever with new, sophisticated improvements. The G-Force dynamics processing framework enables the Omnia.11 set the overall EQ for signature consistency, making it sound cleaner, clearer, louder, more consistent, more open, and more pleasing. You hear the music. You hear the voice. You don't hear the processor.

"Pepino" Clipper

The latest FM final clipper from Frank Foti, custom-engineered to take G-Force Dynamics to the next level. Includes "Pepino Clipper Mode 2," which preserves brightness at aggressive clipping levels.

Presets

Always updating, always evolving, Omnia engineers are constantly striving to provide new and powerful presets. From the best ears in the industry, find your custom sound easier than ever.

Transient Detail Enhancer

In the dynamics section - smarter more powerful RMS control in the AGCs, producing stable solid increase in loudness to match the performance of Pepino.

Solar Plexus

For deep, tight bass that you can feel!

Unified FM/HD Bass Clipper

Improves audio consistency between the FM and HD channels and overall bass quality.

1 Louder

To gain that extra db of loudness.

Intelligent Ultra-Multiband Limiter System

Self-adjusting attack/release functions guarantee crystal clear music and voice. The limiters are self-adapting and can tune themselves to the activity of the AGC section on the fly, providing more powerful and transparent limiter action than possible before. Makes adjustment of limiters a breeze!

Bass Management

Manages harmonics for a natural and undistorted bottom end.

Ultra LoIMD Distortion Controlled Clipper System

Dramatically reduces intermodulation distortion (IMD) for more loudness headroom.

MPX Composite Baseband Over AES (Omnia Direct)

Output of the Omnia.11's stereo generator can be coupled directly to the modulator of the transmitter's exciter. This enables the exciter to modulate with more precision and clarity.

Perfect Declipper Plug-In (Optional)

A revolutionary new algorithm to restore clipped segments and remove distortion in aggressively mastered audio recordings results in a clearer, more open texture that also gives more flexibly with processing choices. (Must be running v3.0 and G-Force.)

SSBSC Technology

Omnia.11 Single Sideband Suppressed Carrier (SSBSC) technology may reduce multipath distortion.

Extra Wide Touchscreen

10.5" diagonal screen clearly shows all controls.

Looks Cool and Stays Cool

Military-grade, fanless industrial design stays cool with heatsinks in rugged chassis.

IN DEPTH

New G-Force™ Dynamics Engine

G-Force (which ships standard on new units and is available as an optional Plug-In to upgrade existing field units) has a highly refined density detection scheme, which means rock-solid performance across a wide range of recordings. Program adaptive attack, release, and ratio values let you set the characteristic elements of your signature sound and make audio acceleration and deceleration smoother than ever. A Makeup Threshold allows for gain management and control without sudden, audible swings. Additionally, AGC sections synchronize with program material. Multiband Limiters now self-adapt to the Multiband AGC activity and also feature program-controlled attack and release, actively reducing limiter-induced inter-mod distortion. Limiters are more responsive and active, yet remarkably transparent, even under extreme activity. G-Force requires v3.0, outlined below.

Software Updates

The G-Force plug-in runs on Omnia.11 v3.0 or later. Included in this general system release are many improvements, including: Static RDS; the flexibility of analog, AES/EBU or Livewire patch points; patch point location for PPM® chains so you can integrate your Voltair/Encoder combo into your audio processing chain; patch point input and output meters for easy level references; upper subharmonic control of Solar Plexus over tonal balance; and compatibility with third party FM-HD time alignment systems.

Version 3.6 is also now available, which features many improvements over v3.0, including the New "Pepino" clipper now with two modes. G-Force processing improvements to take advantage of newly designed clipper. Improved high-frequency handling and more consistent bass response. "Transient Detail Enhancer" in the dynamics section with smarter more powerful RMS control in the AGCs, producing stable solid increase in loudness to match the performance of Pepino. Smoother switching between presets. Unified FM/HD Bass Clipper improves audio consistency between the FM & HD channels and overall bass quality. New Phat Bass update for richer stronger bass presence. Improved sound in the low-delay DJ section. Greatly improved HD look-ahead limiter in HD-enabled units. Warmer and cleaner live DJ voice.

The latest Omnia.11 software is available as a complimentary, downloadable field update at TelosAlliance.com/omnia/omnia11.

The Perfect Declipper Plug-In Option

Just when you thought nothing could sound any better, G-Force-enabled Omnia.11s can be upgraded with the Perfect Declipper Plug-In. Engineered by audio-processing legend Hans van Zutphen, the

Perfect Declipper uses a revolutionary new algorithm to replace clipped areas in audio recordings, restoring dynamics and removing distortion. You must be running v3.0 or later and G-Force to install the Perfect Declipper Plug-In.

Intelligent Ultra-Multiband Limiter System

Traditional limiting technology has often resulted in various forms of audio corruption. Omnia.11's new LoIMD technology coupled with smart gain reduction algorithms now have limiters that sound amazingly transparent. All AGC and limiting algorithms employ an auto acceleration / deceleration mechanism, which tunes out perceptible intermodulation distortion. The attack/release functions adjust themselves based upon content density. This breakthrough method literally analyzes the audio content in both the amplitude and frequency domain, then adapts the timing networks—on the fly—to transparently control the signal, without the control being heard. The result is revealed in added detail, clarity, and quality, yet maintaining the desired competitive loudness level. Special attention was paid to the behavior of live voice quality. The improved performance of the AGC and limiter functions generate live voice clarity and impact far beyond that which was previously possible.

Bass Management

The bass enhancement algorithm is a key feature of the Omnia.11. Low end is now broadcast with recording studio-like punch and impact, with no traditional side-effects whatsoever.

Omnia.11's exclusive bass-management method is a mixture of innovation, as well as a rearrangement of the system topology. Achieving great-sounding bass requires the most effort, partly due to the fact that the bass spectrum has the most number of harmonics, and all of these must be kept properly accounted for in the time domain. Also, any additional spectra created (enhancement) must have its harmonic content managed, or the bass region begins to sound distorted and unnatural. This process requires much more than just traditional EQ, bass clipping/filtering, or any ordinary attempt at bass enhancement. Even the location where the function is inserted matters, as well as how it maintains its frequency range along with the rest of the system. An entire dissertation could be done on the bass enhancement/management system alone. The classic Omnia dynamically flat & time aligned crossover system has been further refined to produce smooth, rich, and full tonality. The AGC and limiter sections cannot be fooled into false gain control due to spectral density (or lack thereof) from the crossover network.

G-Force takes this all to another level of greatness that allows broadcasters to adjust the Omnia.11's bass via a single knob. Advanced adjustment mode allows more precise bass sculpting, including Omnia's Solar Plexus bass enhancement feature. An intelligent active bass clipper system allows the full power of the new bass enhancement scheme to come through on the dial.

Ultra LoIMD Distortion Controlled Clipper System

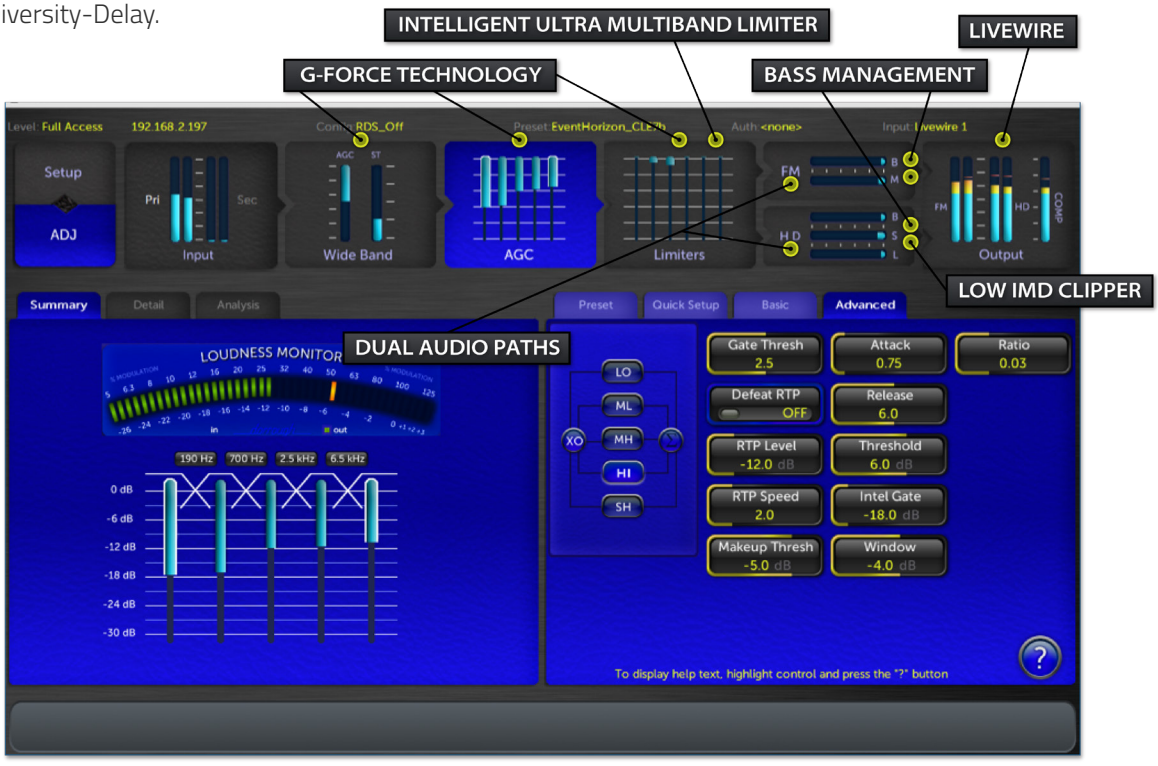
Audio processing for conventional broadcast (FM and AM) has, in some applications, reached extreme levels. Various methods are available today capable of creating LOUD competitive signals, but at the

expense of perceptible quality. Through critical listening, extensive research, and evaluation of processing methods, it has been determined the single most annoying quotient is due to intermodulation distortion (IMD) induced by aggressive functions within the processing system. The algorithms are pushed to the limits, and beyond. One of the most crucial, aggressively used algorithms in the FM processor is the pre-emphasized final limiter/clipper. Omnia Engineering has developed the new Ultra LoIMD Distortion controlled clipper system specifically to reduce IMD in this critical stage of the processing.

For those who feel the need to use it, there's also a composite clipper embedded in the stereo generator. However, to date, all of our testing has been done without any composite clipping. Pilot protection is on the order of magnitude close to 90 dB, which is considerably more protection than necessary for even the best FM receiver. Integrated laboratory-grade stereo generator with dual MPX outputs, 19 kHz reference output for external RDS/RBDS systems and pilot protection that provides >80dB pilot protection—with or without composite clipping. MPX spectral low-pass filter protects RDS/RBDS and SCA signals if composite clipping is employed. There are multiple ways to adjust the system to achieve the exact sound you're looking for.

Unprecedented Access

- A front panel touch screen GUI, on a 10.5" diagonal screen, provides ease of use and enhanced metering and diagnostics. Remote access is via any web browser.
- Livewire, AES/EBU digital and analog I/O is standard. Headphone soft "patch points" are available for listening through the processing chain.
- Diversity-Delay.



SPECIFICATIONS

General

- Non-linear Crosstalk: > -80 dB, main to sub or sub to main channel (referenced to 100% modulation).
- 38 kHz Suppression: > 70 dB (referenced to 100% modulation).
- 76 kHz Suppression: > 80 dB (referenced to 100% modulation).
- Pilot Protection: > -65 dB relative to 9% pilot injection, ± 1 kHz.
- 57 kHz (RDS/RBDS) Protection: better than -50 dB.
- Connectors: Two EMI suppressed female BNC, floating over chassis ground
- Maximum Load Capacitance: 5nF (at 10 ohms source impedance).
- Maximum cable length: 100 feet/30 meters RG-58A/U.

Analog Audio Input

- Left/Right Stereo. Electronically balanced.
- Input impedance 10k ohms resistive.
- Maximum Input Level: +22 dBu.
- Nominal Input Level: +4dBu, which nets a -18dBFS input meterreading on a steady-state signal when the Input Gain controlis set to 0.0dB. Program material with a nominal average level(VU reading) of +4dBu will typically produce peak readings on the input meter in the range of -12 dBFS to -6dBFS. This is the correct operating level.

A/D Conversion

- Crystal Semiconductor CS5361, 24 bit 128x over-sampled delta-sigma converter with linear-phase anti-aliasing filter. Pre-ADCanti-alias filter, with high-pass filter at <10 Hz.
- Connectors: Two, EMI-suppressed XLR-female. Pin 1 chassis ground, Pin 2 “Hot.”

Analog Audio Output

- Left/Right Stereo. Electronically balanced.
- Output Impedance 20 ohms.
- Minimum load Impedance: 600 ohms.
- Output Level adjustable from -2 dBu to +22dBu peak in 0.1dB steps.

D/A Conversion

- Crystal Semiconductor CS4391, 24 bit, 128x oversampled.
- Connectors: Two, EMI-suppressed XLR-male. Pin 1 chassis ground, Pin 2 "Hot."

Frequency Response

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

System Distortion

- Less than 0.01% THD, 20 Hz – 7.5 kHz. Second harmonic distortion above 7.5 kHz is not audible in the FM system.
- Signal-Noise Ratio: > -80 dB de-emphasized, 20 Hz – -15 kHz bandwidth, referenced to 100% modulation.
- The measured noise floor will depend upon the settings of the Input and Output Gain controls and is primarily governed by dynamic range of the Crystal Semiconductor CS5361 A/D Converter which is specified as >110 dB. The dynamic range of the internal digital signal processing chain is >144 dB.

Stereo Separation

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

Crosstalk

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

System Latency

- 36-50ms dependant on processing and clipper selection through "FM" channel, as measured from the analog inputs through the composite MPX output.

Composite Outputs

- Source Impedance: 5 ohms or 75 ohms, jumper-selectable. Single ended and floating over chassis ground. Output Level: 0V to 10V in 0.05V steps, software adjustable.

D/A Conversion

- Texas Instruments/Burr Brown PCM1798, 24-bit sigma-delta converter.

Configuration

- Two electrically independent outputs. Software based level adjustment.

Load Impedance

- 50 ohms or greater load is suggested.

Pilot Level

- Adjustable from 4.0% to 12.0% in 0.1% steps and OFF.

Pilot Stability

- 19 kHz, ± 0.5 Hz.

Signal-to-Noise Ratio

- -85 dB typical, 75 µs de-emphasized, 15 kHz bandwidth, referenced to 100% modulation).

Distortion

- < 0.02% THD 20 Hz – 15 kHz bandwidth, 75 µs de-emphasized, referenced to 100% modulation.
- Stereo Separation: > 65 dB, 30 Hz – 15 kHz.
- Linear Crosstalk: > -80 dB, main to sub or sub to main channel, referenced to 100% modulation.

Connector

- XLR-female, EMI-suppressed. Pin 1 chassis ground, Pin 2-3 transformer isolated, balanced, and floating. Standard AES3 specified balanced 110 ohm input impedance.

External Sync Range

- Automatically accepts sample rates between 32kHz and 96kHz. Connector: XLR-female, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating – AES3 standard 110 ohm impedance.

Remote Control

- Via Ethernet using built-in Java (TM) based remote control program integrated into web page interface. All software is served from the built-in web server to any standard web browser; there is nothing to install on the user's computer.

Connectors

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

GPI Interface

- Connector: EMI suppressed DB-15 female connector.

Power Requirements

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

Power Connector

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

Power Supply

- Internal. Overvoltage and short circuit protected.

Digital Audio Input

- Configuration: Stereo per AES/EBU standard, CS8420 Digital Audio Transceiver with 24 bit resolution, software selection of stereo, mono from left, mono from right or mono from sum.
- Automatically accepts and locks to input sample rates between 30 and 108 kHz.
- Connector: XLR-female, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating – AES3 standard 110 ohm impedance.

Digital Audio Output #1

- Stereo per AES3 standard. Output can be configured in software for flat or pre-emphasized response at 50 or 75 microseconds.
- Digital Sample Rates: Output sample rates software selectable for 48kHz, Sync to Input or Sync to External.
- Connector: XLR-male, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating. Standard AES3 specified 110 ohm source impedance.
- Digital Output Level: -22.0 to 0.0 dBFS software adjustable.

Digital Audio Output #2:

- Stereo per AES3 standard. Output can be configured in software for flat pre-emphasized response at 50 or 75 microseconds.
- Digital Sample Rates: Output sample rates software selectable for 48kHz, 44.1kHz or Sync to External.
- Connector: XLR-male, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating. Standard AES3 specified 110 ohm source impedance.
- Digital Output Level: -22.0 to 0.0 dBFS software adjustable.

External Sync Input:

- External Sync: Output sample rate can be synchronized to the signal present on the AES/EBU input, or to an AES3 signal applied to the Ext. Sync input connector. (Does not accept Word Clock Inputs)

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.