

### TECHNICAL DETAILS (continued from page 3)

<b>Analog Audio Inputs/Outputs</b>	1 x Stereo input on XLR connectors Nominal Input level: $-4.0$ to $+13.0$ dBu (VU) or $-2$ dBu to $+20$ dBu (PPM) 2 x Stereo output, capable to driving two transmitters; independent level controls Output level: $-6$ dBu to $+24$ dBu peak
<b>Digital AES Audio Inputs/Outputs</b>	1 x Stereo input on XLR, 24 bit resolution Input Reference Level: Variable within the range of $-30$ dBFS to $-7$ dBFS (VU) or $-23$ dBFS to $0$ dBFS (PPM) 2 x Stereo outputs on XLR Output Level (100% peak modulation): $-20.0$ to $0.0$ dBFS software controlled
<b>Input/Output Sample Rate</b>	32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, and 96 kHz; automatically detected (input) and user-selected (output). Input/output sample rates can be different.
<b>Windows PC Software</b>	Included in delivery; requires Microsoft Windows® 7 OS or higher; PC connection via TCP/IP protocol via direct cable connect, modem or Ethernet interface (RJ45) or serial RS232 interface
<b>GPI Interface</b>	8 x user-programmable inputs, floating on DB-25 male connector
<b>Tally Outputs</b>	2 x NPN open-collector
<b>Voltage</b>	100–132 VAC or 200–264 VAC, switch-selected on the rear panel, 50–60 Hz, 40 VA
<b>Dimensions (W x H x D)</b>	19" x 3.5" (2U) x 14.25" / 48.3 cm x 8.9 cm (1U) x 36.2 cm

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The OPTIMOD 9400 was designed to achieve the highest possible quality in AM shortwave, medium wave and long wave broadcast sound. It delivers a high quality FM-like sound to the listener's ear by pre-processing for the limitations of the average car or table radio. The 9400 supports Xperi's HD AM® in-band on-channel digital radio system. The digital radio processing can also be used for simulcast satellite radio, netcast, DAB+, DRM or DRM+ digital broadcasts. Regardless of whether you have a major-market station or just want your station to sound like one, Optimod-AM 9400 is right for you.

### Key Features

**Quick Setup** provides a guided, systematic procedure for setting up the 9400. It should be adequate for most users without special or esoteric requirements.

Easy **LESS-MORE** adjustment of the dynamics processing lets anyone get excellent results, while processing experts can fine-tune to their exact preferences with Intermediate or Advanced Control (Advanced Control is available only from PC Remote software.).

**Factory Presets:** Each OPTIMOD comes with a variety of factory presets which you can use as basis to create your own signature sound. Orban is happy to help you find the perfect setup for your station.

**Rides Gain:** The 9400 rides gain over an adjustable range of up to 25dB, compressing dynamic range and compensating for operator gain-riding errors and for gain inconsistencies in automated systems.

**Increased Loudness and Density:** By the use of multiband limiting and multiband distortion-canceling clipping, the 9400 improves the consistency of the station's sound and increases loudness and definition without producing audible side effects.

**HD-AM® Support:** OPTIMOD 9400 supports the Xperi HD-AM® system. Except for common stereo enhancement and AGC, the HD-AM processor is an independent processing chain with its own set of user-adjustable parameters, maintaining 15 kHz audio bandwidth (per Xperi's

specifications) regardless of the bandwidth setting of the processing intended for the analog channel. To ensure source-to-source consistency, the HD-AM processing includes full five-band compression/limiting that is independent of the five-band compression/limiting in the analog processing chain. This output can also be used for netcasts and satellite radio.

**Peak Level Control:** Peak levels are precisely controlled to prevent overmodulation.

**Transmitter Bandwidth Control:** The OPTIMOD 9400 controls the transmitter bandwidth as necessary to meet government regulations, regardless of program material or equalization. OPTIMOD-AM's high-frequency bandwidth can be switched instantly in 500 Hz increments between 4.5 kHz and 9.5 kHz. The lower cutoff frequencies meet the output power spectral density requirements of ITU-R 328-5 without further low-pass filtering at the transmitter, while the 9.5 kHz filter meets the requirements of the NRSC-1 standard (North America). The 5.0 kHz filter makes the analog AM bandwidth compatible with HD-AM transmission. The lowpass filters have parametric cutoff shapes, allowing you to trade off filter ringing against frequency response flatness.

**High- and Low-frequency Compensation:** The 9400 compensates for the high- and low-frequency rolloffs of typical AM receivers with a fully adjustable program equalizer providing up to 20 dB of high-frequency boost (at 5 kHz) without producing the side effects encountered in conventional processors. This equalizer can thus produce extreme preemphasis that is appropriate for very narrow-band radios. The 9400's fully parametric low- and mid-frequency equalizers



allow you to tailor your air sound to your precise requirements and desires. The 9400 also fully supports the NRSC standard preemphasis curve.

**PreCode™ technology** : This feature allows the OPTIMOD to manipulate several aspects of the audio to minimize artifacts caused by low bitrate codecs, ensuring consistent loudness and texture from one source to the next. PreCode™ includes special audio band detection algorithms that are energy and spectrum aware. This can improve codec performance on some codecs by reducing audio processing induced codec artifacts, even with program material that has been preprocessed by other processing than OPTIMOD. There are several factory presets tuned specifically for low bitrate codecs.

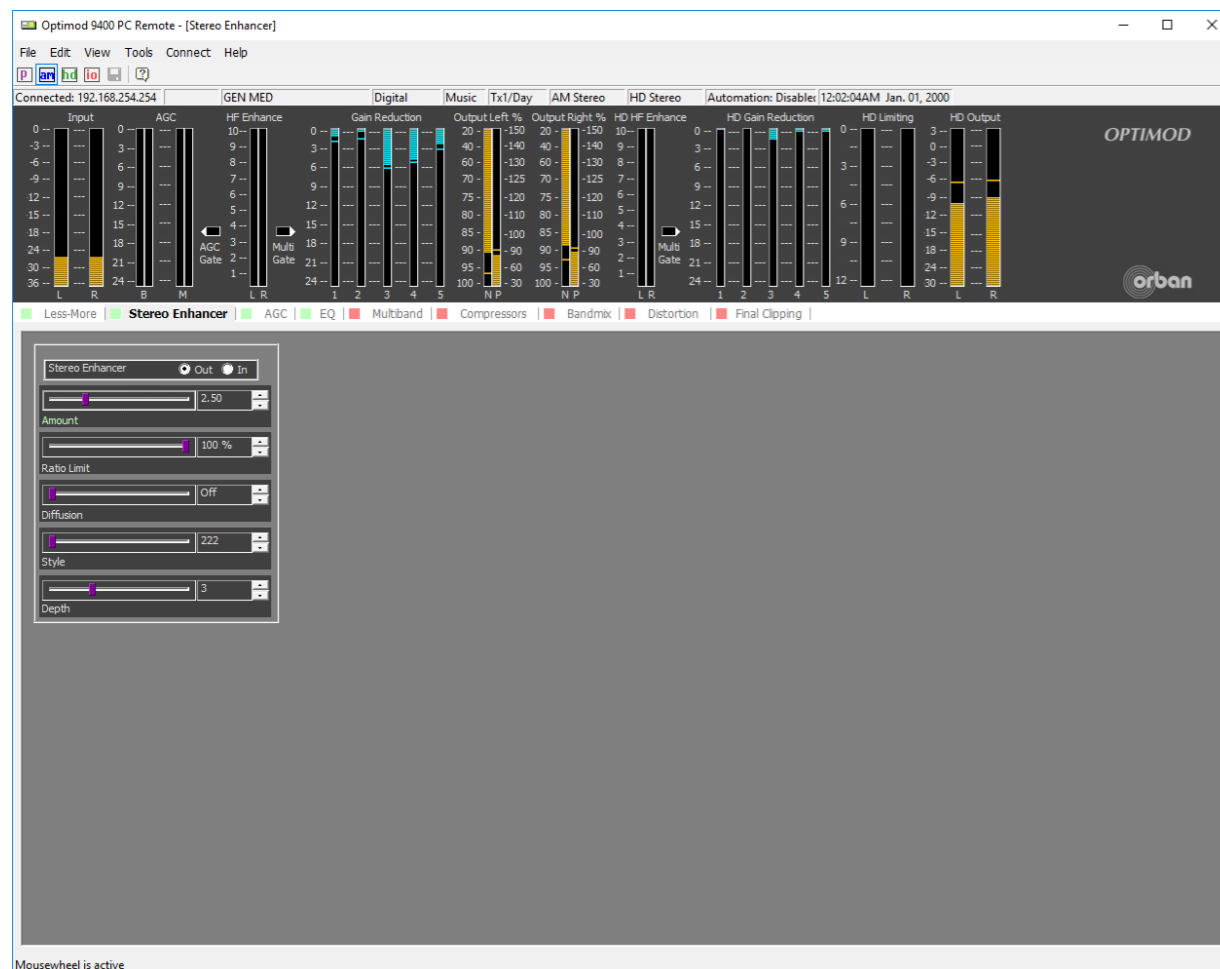
**Bypass Test Mode and Tone Generator:** A Bypass Test Mode can be invoked locally, by remote control or by automation to perform a broadcast system test or to compare easily original and processed sound. A built-in line-up tone

generator facilitates quick and accurate level setting.

**Failsafe switching** detects loss of audio on the primary input, which you can assign to be the analog or digital input. If audio is lost on the primary input, the 9400 can switch automatically to the secondary input.

**SNMP Support:** The SNMP (Simple Network Management Protocol) feature allows you to monitor your OPTIMOD's status and to send alarm notifications via your OPTIMOD's Ethernet connection to your network.

**Remote Control or front panel operation:** You can access all 9400 features comfortably via the supplied Windows PC Software using your local network or the Internet. Alternatively, all system setup adjustments (such as input reference level) and the most important processing controls are also available via the front panel with its display.



## TECHNICAL DETAILS

**Total System Distortion (de-emphasized, 100% modulation)**

<0.01% THD, 20 Hz–1 kHz, rising to <0.05% at 9.5 kHz. <0.02% SMPTE IM Distortion

**Frequency Response (analog processing chain)**

±0.2 dB, 50 Hz–9.5 kHz, or as determined by user settable high-pass filter in the active transmission preset

**Frequency Response (digital processing chain)**

±0.2 dB, 50 Hz–15 kHz, or as determined by user settable low-pass filter

**Internal Sample Rate**

32 kHz to 256 kHz, depending on processing being performed

**Total System Separation**

> 50 dB, 20 Hz - 9.5 kHz; 60 dB typical

**Processing Topology**

The stereo enhancer and two-band AGC are common to the analog and digital processing chains. The processing path splits after the AGC. The analog path receives equalization, five-band compression, distortion-controlled and -canceled clipping, overshoot compensation, and transmitter equalization. The digital path receives equalization, five-band compression, and look-ahead limiting. The parameters of the equalizers, five-band compressors, and peak limiters in the two paths are separately and independently adjustable.

**High-Pass Filter (processing for analog modulation)**

Constrained by user-settable fifth-order “quasi-elliptical” highpass filter to 50, 60, 70, 80, 90, or 100 Hz. All filters have equal-ripple (Chebychev-like) passbands, and 25 and 35 Hz notches for transmitter protection

**High-Pass Filter (processing for digital modulation)**

1 Hz, not user-adjustable

**Operation Mode**

The stereo/mono mode settings for the analog and digital radio processing chains are independent of each other. Like the analog processing chain, the digital radio processing chain can be operated in STEREO, MONO-L+R, MONO-L, or MONO-R modes.

**Minimum Processing Delay (analog processing chain)**

approximately 17 ms

**Minimum Processing Delay (digital processing chain)**

approximately 24 ms

Any output can be switched to emit a monitor signal with 5 ms delay. This signal contains the output of the five-band digital-channel compressor/limiter.

**Delay Difference between Analog AM and Digital Processing Chains**

Fixed at 5.778 ms, regardless of processor control settings