



# OPTIMOD 5500i

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## TECHNICAL DETAILS (continued from page 3)

<b>Baseband Spectral Protection</b>	pilot protection > 60 dB re 9% pilot injection, ±250 Hz; subcarrier protection > 70 dB; RDS protection > 50 dB re 4% RDS injection. All specs apply with up to 2 dB composite processing drive
<b>Non-Digitized SCA Inputs</b>	2 x non-digitized analog on BNC connectors; summed into the analog composite outputs SCA 2 input can be configured to supply a 19 kHz pilot reference
<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>	85–264 VAC, auto-selected, 50–60 Hz, 30 VA
<b>Dimensions (W x H x D)</b>	19" x 1.75" (1U) x 14.25" / 48.3 cm x 4.5 cm (1U) x 36.2 cm

OPTIMOD 5500i puts competitive five- and two-band OPTIMOD processing into a single rack unit and brings it to you at the most affordable price ever. Quality sound is what 5500i is all about - sound that attracts audiences by providing a polished, professional presentation regardless of format and source material. Exceptional versatility allows you to adjust the processor's audio texture to brand your audio, knowing that the resulting signature sound will remain consistent, cut-to-cut and source-to-source.

The 5500i can also be used as a superb stand-alone stereo encoder with latency as low as 2 ms and full overshoot limiting in both the left/right and composite baseband domains. When used in this mode, the 5500i must be driven (usually via an STL) by a fully-featured FM audio processor (like Orban's 8700i) that incorporates pre-emphasis-aware HF limiting and peak control.

### Key Features

**Quick Setup** provides a guided, systematic procedure for setting up the 5500i. It should be adequate for most users.

Easy **LESS-MORE** adjustment of the dynamics processing lets anyone get excellent results, while processing experts can fine-tune to their exact preferences with Advanced Control, available 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.

**Four Processing Structures:** The 5500i features four processing structures which are Stand-Alone Stereo Encoder, Optimum Five-Band (or "Multiband"; 15 ms delay) for a consistent, "processed" sound, free from undesirable side effects, Ultra-Low-Latency Five-Band (5 ms delay), and Two-Band for a transparent sound that preserves the frequency balance of the original program material. The Optimum Five-Band and the Two-Band structures can be switched via a mute-free cross-fade. Please note that switching to or from the Ultra-Low Latency Five-Band structure causes the audio to mute for about two seconds because the DSP code must be reloaded.

**Speech and Music Detection:** The OPTIMOD automatically detects if voice or music is being processed and allows you to set up the processing individually for both.

**ITU BS-412 Multiplex Power Control:** A defeatable, program-adaptive multiplex power limiter can unobtrusively control the multiplex power according to ITU-R BS412 standards.

**Composite Limiter/Clipper:** A patented "Half-Cosine Interpolation" composite limiter providing excellent spectral protection of the pilot tone and SCAs (including RDS). If you prefer the sound of conventional composite clipping, we also offer a defeatable composite clipper with spectral protection for the pilot tone and subcarriers. The composite clipper drives the composite limiter, which serves as an overshoot compensator for the composite clipper when it is active.

**SSB Stereo Encoder Operation:** Allows its stereo encoder's stereo subchannel modulator to operate in an experimental compatible single sideband/vestigial sideband mode. In SSB mode, the subchannel modulator acts as a pure SSB generator for L-R material in the frequency range of 150 Hz to 17 kHz and as a vestigial sideband generator below 150 Hz.

**Low-Delay DJ Monitor Output:** The 5500i offers a low-delay monitor output which takes the audio from multiband compressor output. This allows the talent/DJ to comfortably monitor the processed audio off-air with headphones.

**10 MHz Reference Input:** With the 10 MHz Reference Input it is possible to lock the internal DSP clock, the stereo pilot tone frequency and digital composite output sample rate to a 10 MHz reference signal. This feature facilitates the operation within single- and near-single-frequency-networks (N-SFN).

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**RDS:** Built-in full-featured RDS/RBDS generator that supports static and dynamic RDS values.

**Kantar Embedder:** The built-in Kantar Live Embedder inserts continuously the audience watermark into the final stage of the processed audio signal. Once installed and configured the Live Embedder does not require any external controls.

**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.

**Diversity Delay:** A maximum delay of 16 seconds can be used as the diversity delay in HD Radio/DAB+ installations, which allows the 5500i's stereo encoder (including composite limiter) to be used in an HD Radio/DAB+ installation.

**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 5500i can switch automatically to the secondary input.

**Stereo Encoder functionality**

The OPTIMOD 5500i allows changing between normal two-band and five-band audio processor modes and stand-alone stereo encoder modes via a smooth cross-fade. This facilitates switching between pre-processed network feeds (where only overshoot limiting is needed) and local origination (where full audio processing is required).

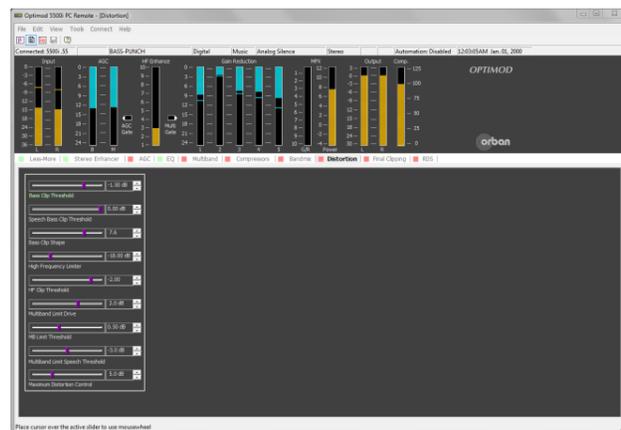
The sample rate is 64 kHz and multiples thereof, up to 512 kHz. The internal audio bandwidth is high enough to prevent overshoot caused by spectral truncation of the left/right input signals that are band-limited to 18 kHz or lower.

15, 16, or 17 kHz linear-phase lowpass filtering can be applied to the input signal. To minimize input/output delay, this filter can be bypassed, which is appropriate if the input signal is correctly band-limited by the audio processor driving the 5500i.

A left/right domain overshoot limiter is available. This combines look-ahead and band-limited clipping techniques to control STL-induced overshoots while minimizing artifacts. A dual-mode composite limiter is available. It can operate in either "Half-Cosine Interpolation" mode or conventional hard clipper mode. The "Half-Cosine" mode provides better separation and preservation of stereo imaging, while the "Hard" mode provides

**SNMP Support:** Via SNMP you can monitor your OPTIMOD's status and to send alarm notifications to your network.

**Remote Control or front panel operation:** You can operate and configure the 5500i comfortably via the supplied Windows PC Software using your local network or the Internet. Alternatively all functionalities are also available via the front panel with its display.



brighter sound because it creates waveforms that are closer to square waves. Both modes provide excellent spectral protection of the pilot tone and subcarrier regions. To ensure accurate peak control, the limiter operates at 512 kHz sample rate.

A high-accuracy BS-412 multiplex power controller is available, with user control over the multiplex power threshold. This allows you to compensate for overshoots in the signal path upstream from the 5500i, preventing excessive reduction of the multiplex power.

The input signal can be flat or pre-emphasized to 50 µs or 75 µs. The 5500i can apply J.17 de-emphasis to the input signal.

All normal 5500i inputs and outputs are available, including analog and digital inputs, two composite outputs with independent level controls, and two subcarrier inputs (one of which can be repurposed to emit a 19 kHz pilot reference output for RDS/RBDS generators).

**TECHNICAL DETAILS**

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

<0.01% THD, 20 Hz–1 kHz, rising to <0.05% at 15 kHz. <0.02% SMPTE IM Distortion

**Frequency Response**

Follows standard 50µs or 75µs pre-emphasis curve ±0.10 dB, 20 Hz–15 kHz. Analog left/right output and digital output can be user-configured for flat or pre-emphasized output

**Sample Rate**

32 kHz to 512 kHz, depending on processing being performed (Stereo Encoder from 64 kHz)

**Total System Separation**

> 50 dB, 20 Hz - 15 kHz; 60 dB typical

**Defeatable Analog FM Diversity delay**

Up to 16 seconds

**Minimum Processing Delay**

5 ms to 15 ms, processing structure dependent

**Low-Latency Monitor Output Delay**

4 ms

**Analog Audio Inputs/Outputs**

Stereo on XLR connectors  
Nominal Input level: -4.0 to +13.0 dBu (VU) or -2 dBu to +20 dBu (PPM)  
Output level = -6 dBu to +24 dBu peak

**Digital AES Audio Inputs/Outputs**

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 0dBFS (PPM)  
1 x Stereo output on XLR  
Output Level (100% peak modulation): -20.0 to 0.0dBFS software controlled

**Sampling Rate**

32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, and 96 kHz

**Wordclock Sync Input on BNC Connector**

1x word clock or 10 MHz clock, automatically selected  
DSP master clock can be phase-locked to these signals, which in turn phase-locks the 19 kHz pilot tone frequency, facilitating single-frequency network operation. The digital output sample frequency can also be locked to these signals.

**Composite Baseband Outputs**

2 x analog on female BNC connectors providing -12 dBu (0.55 Vp-p) to +16.0 dBu (13.82Vp-p) levels for 0.1 dB adjustment resolution

**Stereo Separation**

At 100% modulation = 3.5Vp-p, > 60 dB, 30 Hz - 15 kHz.  
At 100% modulation = 1.0 - 8.0 Vp-p, > 55 dB, 30 Hz - 15 kHz