



# OPTIMOD 8600Si



## TECHNICAL DETAILS (continued from page 3)

<b>Baseband Spectral Protection</b>	pilot protection > 60 dB re 9% pilot injection, $\pm 250$ 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

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# OPTIMOD 8600Si



With the OPTIMOD 8600 we have introduced the MX peak limiter technology which decreases distortion while increasing transient punch and high frequency power handling capacity. The 8600Si includes simultaneous processing for analog FM and for digital transmissions like netcasts, DAB+ and HD Radio in a compact, single rack unit.

## Key Features

**Quick Setup** provides a guided, systematic procedure for setting up the 8600Si. 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 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.

**Six Processing Structures:** You can select between six processing structures that are Five-Band (or "Multiband") for a consistent, "processed" sound with 17 ms delay (typical), free from undesirable side effects, Low-Latency Five-Band (12 ms delay), Ultra-Low-Latency Five-Band (3.7 ms delay), and Two-Band (17 or 22 ms delay) for a transparent sound that preserves the frequency balance of the original program material. Additionally, the 8600Si has two "MX" processing structures - one Five-Band and one Two-Band - which include the exclusive, advanced MX peak limiting technology to decrease distortion while achieving substantial improvements in transient punch and high frequency clarity.

**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.

The **Sophisticated Bass Pre-Limiter** has a new algorithm that generates carefully time-aligned, bandwidth- controlled harmonics that minimize the peak level of the bass so that very low frequencies can actually exceed 100% modulation. The main benefit is the ability to use more bass clipping without generating objectionable distortion in the upper mid-bass

frequency range and can facilitate tuning a preset for more bass punch.

**"True Peak" Control** for the digital radio processing with an accuracy of better than 0.5 dB. For typical program material, accuracy is 0.2 dB.

**ITU BS-412 Multiplex Power Control:** An improved BS-412 Multiplex Power Controller provides a new user-adjustable, program-adaptive algorithm to make operation smoother and more subtle.

**ITU-R BS.1770-4 Loudness Control** for both analog and digital radio processing chains facilitates compliance with modern target loudness recommendations like EBU R128 and allows users to obey any related government regulations.

**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 8600Si offers a low-delay monitor output which takes the audio from multiband compressor output and has an approximate delay of 4 ms. This allows the talent/DJ to comfortably monitor the processed audio off-air with headphones.





**10 MHz Reference Input:** A 10 MHz reference input allows the internal DSP clock, the stereo pilot tone frequency and digital composite output sample rate to be locked to a 10 MHz reference signal (like GPS), facilitating single-frequency-network (SFN) and near-single-frequency-network (N-SFN) operation.

**Ratings Encoder Loop-Through:** A ratings encoder loop-through is available. You can place it between the AGC and the FM-HD/digital radio split (allowing one ratings encoder to be used for both FM and HD/digital radio), or between the FM analog limiter output and the stereo encoder (to maximize the drive level to the ratings encoder and to avoid passing the watermark through FM peak limiting).

**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.

**Defeatable Analog FM Processing Delay:** A configurable delay can be added to the FM path to allow the delays of the

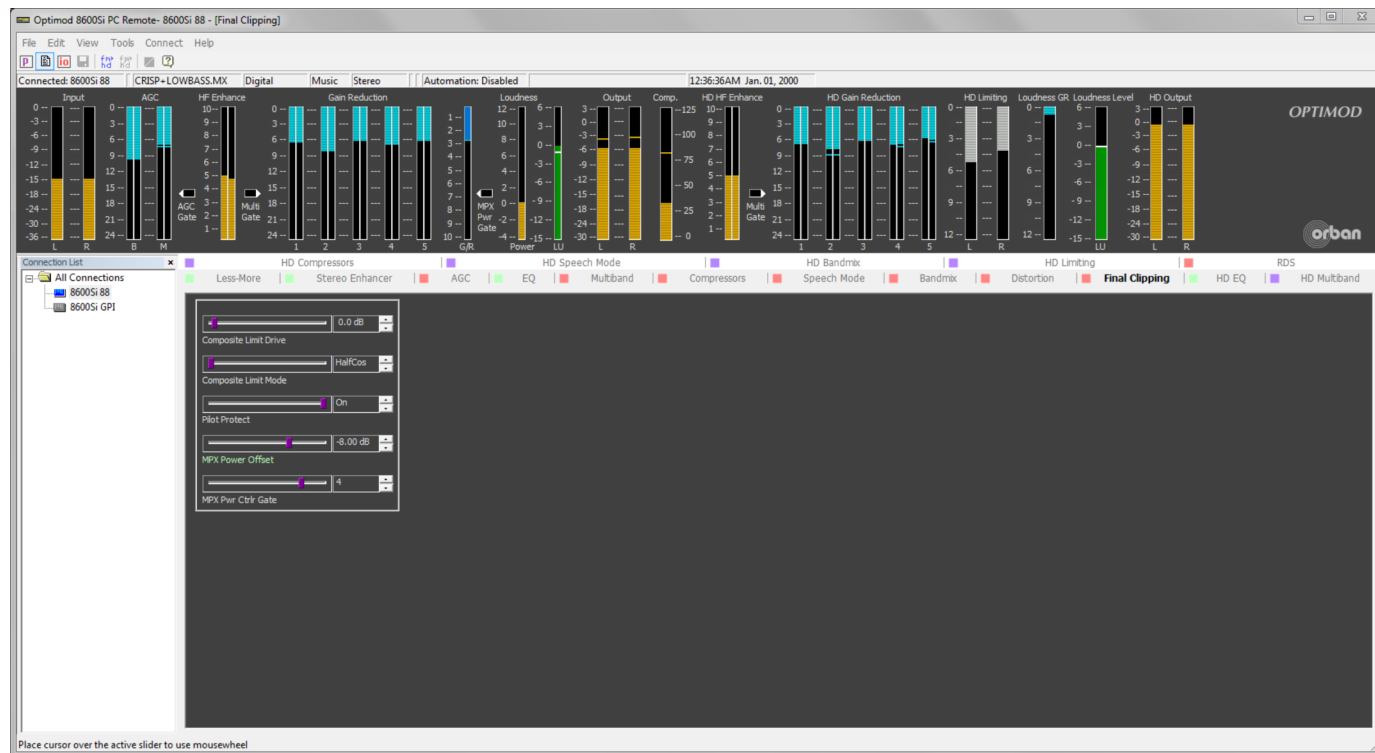
analog and digital paths in the HD Radio/DAB+ system to be matched at the receiver output. This is e.g. important in car radios with automatic switch-over.

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

**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 8600Si 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 operate and configure the 8600Si 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.



## 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**

64 kHz to 512 kHz, depending on processing being performed

**Total System Separation**

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

**Peak Overshoot at HD Output**

0.4 dB True Peak maximum; 0.2 dBTP typical

**Defeatable Analog FM Processing Delay**

0.27 to 16.384 seconds

**Minimum Processing Delay**

3.7 ms to 270 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)  
2 x Stereo outputs on XLR, can be individually set to emit the analog FM processed signal, the digital radio processed signal, or the monitor signal  
Output Level (100% peak modulation): -20.0 to 0.0 dBFS 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