



PREVIEW

OPTIMOD Trio

AM/FM/Digital Media
Audio Processor

With OPTIMOD Trio you get three audio processors in one box and you decide which one to use. Following OPTIMOD 5950 and OPTIMOD 5750, the OPTIMOD Trio is the third in line of Orban's new generation of audio processors. Compact in its design but big in functionality: OPTIMOD Trio can be configured as AM Audio Processor, as FM Audio Processor or alternatively as HD Radio/DAB+/Streaming Audio Processor. In the HD Mode, Trio is even suitable for TV audio processing. No matter if you need to have a flexible backup unit, your requirements for an audio processor might change or if you simply want your audio to sound the best it can, OPTIMOD Trio does the job.



Key Features

AM Operating Mode: With OPTIMOD Trio you can achieve excellent quality in AM shortwave, medium wave and long wave broadcast sound. It increases the density and loudness of the program material by Orban's proprietary multiband limiting and multiband distortion-canceling clipping, improving the consistency of the station's sound and increasing loudness and definition without producing audible side effects. OPTIMOD Trio compensates for the high frequency rolloffs of typical AM receivers with a fully adjustable program equalizer providing up to 20dB of high-frequency boost (at 5 kHz) without producing the side effects encountered in conventional processors.

FM Operating Mode: OPTIMOD Trio provides four FM processing structures: Five-Band, Low-Latency Five-Band, Ultra-Low-Latency Five-Band and Two-Band. Additionally, it can be also used as stand-alone stereo encoder with latency as low as 2 msec and full overshoot limiting in both the left/right and composite baseband domains. The defeatable ITU BS.412 Multiplex Power Controller constrains MPX power smoothly and reliably, ensuring compliance in countries that require it. An onboard RDS/RBDS generator

supports dynamic PS scrolling and IP access. The optional μ MPX Interface allows you to transmit DMPX over bandwidth reduced IP.

Digital Media Operating Mode: You can choose between the Five-Band processing structure for a spectrally consistent sound and the Two-Band processing structure for a transparent sound that preserves the frequency balance of the original program material. Either processing structure delivers artifact-free loudness control. Orban's proprietary PreCode™ technology minimizes artifacts caused by low bitrate codecs often used in HD Radio™, DAB+, and streaming.

Factory Presets: Like all OPTIMODs, Trio also comes with a variety of factory presets; Orban's exclusive "Less-More" control simplifies creating your own signature sound.

AES67/SMPTE ST-2110: Trio provides an Ethernet network interface for Audio-over-IP connections supporting AES67 and SMPTE ST-2110.

Remote Control/Monitoring: OPTIMOD Trio can be configured and controlled via any HTML5 web browser. It also supports the SNMP v2 protocol and in a future release Ember+ will be added.



PREVIEW

OPTIMOD Trio

FM/AM/Digital Media
Audio Processor



ITU-R BS.1770-4 Loudness Control facilitates compliance with modern target loudness recommendations like EBU R128.

Silence Detection: A programmable silence detector is available for the analog, digital and AoIP inputs. It can generate alarms and allows automatic switching to a backup input/input audio storage.

Streaming Monitor Output: The processed signal can be optionally monitored remotely via IP, allowing processor adjustment in locations where a clean off-air signal is unavailable.

Internal Storage for Audio Backup: An optional 2 GB Flash Memory provides two hours linear or twelve hours AAC, MP3 or OPUS encoded audio.

Internet Stream Decoder: This optional feature can be used as a backup audio source received via Audio-over-IP.

Audience Measurement: An internal Watermarking Encoder can optionally be added (Kantar, Nielsen or IPSOS).

Dual Power Supplies: OPTIMOD Trio is equipped with monitored dual-redundant power supplies.

Audio Input Channels: 1 x stereo analog
2 x stereo digital AES3
2 x stereo AoIP

Audio Output Channels: 1 x stereo analog
2 x analog MPX/composite
2 x stereo digital AES3 or 1 x stereo digital AES3 and 1 x DMPX (configurable)
2 x stereo AoIP
1 x headphone output (for monitoring)
Optional 1 x μ MPX (DMPX over IP)

SCA Inputs: 2 x

Synchronisation: 10 MHz clock input
AES11 sync input
19 kHz pilot tone reference output

GPIOs: 8 x inputs, 2 x outputs

Latency: 4 - 22 msec (depending on the processing structure)
Low-latency AES Output: 3 - 8 msec

IP Network: 1 x RJ45 Ethernet Management
1 x RJ45 for AoIP

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OPTIMOD 5750

FM & DAB+/HD Radio Audio Processor

OPTIMOD 5750 is the second of Orban's new generation of audio processors and comes with all the features needed in a high-quality audio processor for FM and digital radio. It has a compact 1RU design, is equipped with a new high-resolution touch display, and controllable via any HTML5 web browser.



Key Features

OPTIMOD 5750 replaces its predecessor OPTIMOD 5700i and provides processing for FM analog and for DAB+, HD Radio and streaming. The FM and HD settings can be coupled to make the blend between analog and HD1 as smooth as possible in HD Radio. Alternatively, the FM and the digital processing can be adjusted independently. This is valuable when the digital processing drives a channel that does not require blending, such as an Internet stream.

Four Processing Structures: Five-Band, Low-Latency Five-Band, Ultra-Low-Latency Five-Band and Two-Band.

Window-Gated AGC: Intelligent two-band window-gated AGC controls levels subtly and unobtrusively.

RDS/RBDS: Onboard generator supports dynamic PS scrolling and IP access.

Factory Presets: OPTIMOD 5750 has numerous factory presets included in delivery; Orban's exclusive "Less-More" control simplifies creating your own signature sound.

AES67/SMPTE ST-2110: Two redundant network interfaces are available for Audio-over-IP connections supporting AES67 and SMPTE ST-2110.

Remote Control/Monitoring: OPTIMOD 5750 can be configured and controlled via any HTML5 web browser. SNMP v2 is also supported. Ember+ will be added in a future release.

"True Peak" Limiter: The "True Peak" limiter in the digital processing path anticipates and controls peak levels following D/A conversion, a feature now required by many broadcasters.

ITU BS.412 Multiplex Power Control: The defeatable ITU BS.412 Multiplex Power Controller constrains MPX power smoothly and reliably, ensuring compliance in countries that regulate it.

ITU-R BS.1770-4 Loudness Control facilitates compliance with modern target loudness recommendations like EBU R128.

Diversity Delay: An adjustable delay can be inserted in the FM and/or digital path to ensure time-alignment of the FM and HD Radio/DAB+ signals at the receiver.

Silence Detection: A programmable silence detector is available for the analog, digital and AoIP inputs. It can generate alarms and allows automatic switching to a backup input/input audio storage.

Audience Measurement: Two internal watermarking encoders that support Nielsen Audio, Kantar, or IPSOS are optionally available, allowing the FM and the DAB+/HD Radio signals to be watermarked independently.



OPTIMOD 5750

FM & DAB+/HD Radio Audio Processor



Streaming Monitor Output: Optionally, the processed FM or DAB+/HD Radio signals can be monitored remotely via IP, allowing processor adjustment in locations where a clean off-air signal is unavailable.

µMPX interface: The optional µMPX Interface allows you to transmit bandwidth-limited DMPX over IP.

APTmpX Interface: The optional APTmpX Interface allows you to transmit full bandwidth DMPX over IP.

Internal Storage for Audio Backup: An optional 2 GB Flash Memory provides two hours linear or twelve hours AAC, MP3 or OPUS encoded audio.

Internet Stream Decoder: This optional feature can be used as a backup audio source received via Audio-over-IP.

Dual Power Supplies: OPTIMOD 5750 is equipped with monitored dual-redundant power supplies to ensure 24/7 operation.

Safety Bypass Relays: The analog, digital AES3 and the composite audio inputs and outputs have defeatable safety bypass relays that operate in case of hardware or power failures.

Audio Input Channels: 1 x stereo analog
2 x stereo digital AES3
2 x stereo AoIP

Audio Output Channels: 1 x stereo analog
2 x analog MPX/composite
2 x stereo digital AES3 or 1 x stereo digital AES3 and 1 x DMPX (configurable)
4 x stereo AoIP
1 x headphone output (for monitoring)
Optional 1 x µMPX (DMPX over IP)

SCA Inputs: 2 x

Synchronisation: 10 MHz clock input
AES11 sync input
19 kHz pilot tone reference output

GPIOs: 8 x inputs, 2 x outputs

Latency: 4 - 22 msec (depending on the processing structure)
Low-latency AES Output: 3 - 8 msec

IP Network: 1 x RJ45 Ethernet Management
2 x RJ45 Dual-redundant AoIP (AES67, SMPTE ST-2110, DANTE or RAVENNA)

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OPTIMOD 5750 HD

FM & DAB+/HD-1/HD-2 Radio Audio Processor

OPTIMOD 5750 HD is the second of Orban's new generation of audio processors and comes with all the features needed in a high-quality audio processor for FM and digital radio. It has a compact 1RU design, is equipped with a new high-resolution touch display, and controllable via any HTML5 web browser.



Key Features

The OPTIMOD 5750 HD replaces its predecessor OPTIMOD 5700i and provides processing for FM analog and for DAB+, HD Radio and streaming. The FM and HD settings can be coupled to make the blend between analog and HD1 as smooth as possible in HD Radio. Alternatively, the FM and the digital processing can be adjusted independently. This is valuable when the digital processing drives a channel that does not require blending, such as an Internet stream.

OPTIMOD 5750 HD is equipped with analog, AES3, composite and digital MPX as well as AES67/SMPTE-ST2110 inputs and outputs includes advance audio routing and Diversity Delay and can easily be integrated in any studio and transmitter environment. Additionally, optional μ MPX allows a cost-effective transmission of digital MPX signals over IP.

- **Four Processing Structures:** Five-Band, Low-Latency Five-Band, Ultra-Low-Latency Five-Band and Two-Band.
- **Window-Gated AGC:** Intelligent two-band window-gated AGC controls levels subtly and unobtrusively.
- **RDS/RBDS:** An onboard RDS/RBDS generator supports dynamic PS scrolling and IP access.
- **Factory Presets:** Numerous factory presets included in delivery.
- **Audio-Over-IP:** Two redundant network interfaces are available for Audio-over-IP connections supporting AES67, SMPTE ST-2110 and RAVENNA or DANTE.
- **Remote Control/Monitoring:** OPTIMOD 5750 can be configured and controlled via any HTML5 web browser. SNMP v2 is also supported. Ember+ will be added in a future release.
- **"True Peak" Limiter:** The "True Peak" limiter in the digital processing path anticipates and controls peak levels following D/A conversion, a feature now required by many broadcasters.
- **ITU BS.412 Multiplex Power Control:** The defeatable ITU BS.412 Multiplex Power Controller constrains MPX power smoothly and reliably, ensuring compliance in countries that regulate it.
- **ITU-R BS.1770-4 Loudness Control:** Facilitates compliance with modern target loudness recommendations like EBU R128.
- **Diversity Delay:** An adjustable delay can be inserted in the FM and/or digital path to ensure time-alignment of the FM and HD Radio/DAB+ signals at the receiver.





OPTIMOD 5750 HD

FM & DAB+/HD-1/HD-2 Radio Audio Processor



The OPTIMOD 5750 HD Broadcast Audio Processor, back panel.

- **Silence Detection:** A programmable silence detector is available for the analog, digital and AoIP inputs. It can generate alarms and allows automatic switching to a backup input/input audio storage.
- **Audience Measurement:** Two internal watermarking encoders that support Nielsen Audio, Kantar, or IPSOS are optionally available, allowing the FM and the DAB+/HD Radio signals to be watermarked independently.
- **Streaming Monitor Output:** Optionally, the processed FM or DAB+/HD Radio signals can be monitored remotely via IP, allowing processor adjustment in locations where a clean off-air signal is unavailable.
- **µMPX Interface:** The optional µMPX Interface allows you to transmit bandwidth-limited DMPX over IP.
- **APTmpX Interface:** The optional APTmpX Interface allows you to transmit full bandwidth DMPX over IP.
- **Internal Storage for Audio Backup:** An optional 2 GB Flash Memory provides two hours linear or twelve hours AAC, MP3 or OPUS encoded audio.
- **Internet Stream Decoder:** This optional feature can be used as a backup audio source received via Audio-over-IP.
- **Dual Power Supplies:** OPTIMOD 5750 is equipped with monitored dual-redundant power supplies to ensure 24/7 operation.
- **Safety Bypass Relays:** The analog, digital AES3 and the composite audio inputs and outputs have defeatable safety bypass relays that operate in case of hardware or power failures.

Audio Input Channels:	1 x stereo analog 2 x stereo digital AES3 2 x stereo AoIP
Audio Output Channels:	1 x stereo analog 2 x analog MPX/composite 2 x stereo digital AES3, or 1 x stereo digital AES3 and 1 x DMPX (config) 4 x stereo AoIP 1 x headphone output (for monitoring) Optional 1 x µMPX (DMPX over IP)
SCA Inputs:	2 x
Synchronization:	10 MHz clock input AES11 sync input 19 kHz pilot tone reference output
GPIOs:	8 x inputs, 2 x outputs
Latency:	4 – 22 msec (depending on the processing structure) Low-latency processing AES Output: 3 – 8 msec
IP Network:	1 x RJ45 Ethernet Management 2 x RJ45 Dual-redundant AoIP (AES67, SMPTE ST-2110, Dante or RAVENNA)

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OPTIMOD 5950

FM & DAB+/HD Radio Audio Processor

The OPTIMOD 5950 is the first of Orban's new generation of audio processors. Only 1RU high, it offers a powerful suite of features including Orban's breakthrough MX peak limiter technology. Equipped with a new high-resolution touch display and controllable via any HTML5 web browser, the 5950 combines user-friendly operation with highest quality OPTIMOD audio processing for FM and DAB+/HD Radio broadcasts.



Key Features

OPTIMOD 5950 is the culmination of 50 years of Orban processing experience. Incorporating the best features of the OPTIMOD 8700i and expanding upon them with additional capabilities, OPTIMOD 5950 fits any broadcast requirement. The MX peak limiter decreases distortion, increases transient impact, and provides more high frequency energy. The multipath mitigator/phase corrector prevents high frequency loss during mono listening, including weak-signal blending in car radios. The subharmonic synthesizer creates appropriate low frequency content from source material that is lacking it. OPTIMOD 5950 simultaneously processes one stereo program for FM and DAB+/HD Radio/Streaming. The settings can be coupled to make the blend between analog and HD1 as smooth as possible in HD Radio. Alternatively, the FM and the digital processing can be adjusted independently. This is valuable when the digital processing drives a channel that does not require blending, such as an Internet stream.

Six Processing Structures: Five-Band, Low-Latency Five-Band, Ultra-Low-Latency Five-Band, Two-Band, Five-Band MX and Two-Band MX.

Window-Gated AGC: Intelligent two-band window-gated AGC controls levels subtly and unobtrusively.

RDS/RBDS: Onboard generator supports dynamic PS scrolling and IP access.

Factory Presets: Like all OPTIMODs, the 5950 also comes with a variety of factory presets; Orban's exclusive "Less-More" control simplifies creating your own signature sound.

AES67/SMPTE ST-2110: Two redundant network interfaces are available for AES67/SMPTE ST-2110 Audio-over-IP connections.

Remote Control/Monitoring: OPTIMOD 5950 can be configured and controlled via any HTML5 web browser. It also supports the SNMP v2 protocol. Ember+ will be added in a future release.

"True Peak" Limiter: The "True Peak" limiter in the digital processing path anticipates and controls peak levels following D/A conversion, a feature now required by many broadcasters.

ITU BS.412 Multiplex Power Control: The defeatable Multiplex Power Controller constrains MPX power smoothly and reliably, ensuring compliance in countries that regulate it.

ITU-R BS.1770-4 Loudness Control facilitates compliance with modern target loudness recommendations like EBU R128.

Diversity Delay: An adjustable delay can be inserted in the FM and/or digital path to ensure time-alignment of the FM and HD Radio/DAB+ signals at the receiver.



OPTIMOD 5950

FM & DAB+/HD Radio Audio Processor



Silence Detection: A programmable silence detector is available for the analog, digital and AoIP inputs. It can generate alarms and allows automatic switching to a backup input/input audio storage.

Audience Measurement: Two internal Nielsen, Kantar or IPSOS Encoders are optionally available, allowing the FM and the DAB+/HD Radio signals to be watermarked independently.

Streaming Monitor Output: Optionally, the processed signal can be monitored remotely via IP, allowing processor adjustment in locations where a clean off-air signal is unavailable.

µMPX interface: The optional µMPX Interface allows you to transmit bandwidth-limited DMPX over IP.

APTmpX Interface: The optional APTmpX Interface allows you to transmit full bandwidth DMPX over IP.

Internal Storage for Audio Backup: An optional 2 GB Flash Memory provides two hours linear or twelve hours AAC, MP3 or OPUS encoded audio.

Internet Stream Decoder: This optional feature can be used as a backup audio source received via Audio-over-IP.

Dual Power Supplies: Monitored dual-redundant power supplies ensure a trouble-free 24/7 operation.

Safety Bypass Relays: The analog, digital AES3 and the composite audio inputs and outputs have defeatable safety bypass relays that operate in case of hardware or power failures.

Audio Input Channels: 1 x stereo analog
2 x stereo digital AES3
2 x stereo AoIP

Audio Output Channels: 1 x stereo analog
2 x analog MPX/composite
2 x stereo digital AES3 or 1 x stereo digital AES3 and 1 x DMPX (configurable)
4 x stereo AoIP
1 x headphone output (for monitoring)
Optional 1 x µMPX (DMPX over IP)

SCA Inputs: 2 x

Synchronisation: 10 MHz clock input
AES11 sync input
19 kHz pilot tone reference output

GPIOs: 8 x inputs, 2 x outputs

Latency: 4 - 260 msec (depending on the processing structure)
Low-latency AES Output: 3 - 8 msec

IP Network: 1 x RJ45 Ethernet Management
2 x RJ45 Dual-redundant AoIP (AES67, SMPTE ST-2110, DANTE or RAVENNA)

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OPTIMOD 5950 HD

FM & DAB+/HD-1/HD-2 Radio Audio Processor

The OPTIMOD 5950 HD is the latest in a long line of award winning OPTIMOD processors.

- Audio processing for FM and DAB+/HD-1/HD-2 Radio broadcasts
- MX peak limiter technology
- High-resolution touch display
- Controllable via any HTML5 web browser
- 1 RU high

NABSHOW
of the
**PRODUCT
YEAR 2025
WINNER**



Key Features

OPTIMOD 5950 HD is the culmination of 50 years of Orban processing experience. Incorporating the best features of the OPTIMOD 8700i and expanding upon them with additional capabilities, OPTIMOD 5950 HD fits any broadcast requirement. The MX peak limiter decreases distortion, increases transient impact, and provides more high frequency energy. The multipath mitigator/phase corrector prevents high frequency loss during mono listening, including weak-signal blending in car radios. The subharmonic synthesizer creates appropriate low frequency content from source material that is lacking it. OPTIMOD 5950 HD simultaneously processes one stereo program for FM and DAB+/HD-1/HD-2 Radio/Streaming. The settings can be coupled to make the blend between analog and HD1 as smooth as possible in HD Radio. Alternatively, the FM and the digital processing can be adjusted independently. This is valuable when the digital processing drives a channel that does not require blending, such as an Internet stream.

- **Six Processing Structures:** Five-Band, Low-Latency Five-Band, Ultra-Low Latency Five-Band, Two-Band, Five-Band MX and Two-Band MX.
- **Window-Gated AGC:** Intelligent two-band window-gated AGC controls levels subtly and unobtrusively.
- **RDS/RBDS:** Onboard generator supports dynamic PS scrolling and IP access, includes UECP.
- **Factory Presets:** Like all OPTIMODs, the 5950 HD also comes with a variety of factory presets; Orban's exclusive "Less-More" control simplifies creating your own signature sound.
- **AES67/SMPTE ST-2110:** Dual redundant network interfaces are available for AES67/SMPTE ST-2110 Audio-over-IP connections (Dante or RAVENNA).
- **Remote Control/Monitoring:** OPTIMOD 5950 HD can be configured and controlled via any HTML5 web browser. It also supports the SNMP v2 protocol, Ember+ and SSH.
- **"True Peak" Limiter:** The oversampled "True Peak" limiter in the digital processing path anticipates and controls peak levels following D/A conversion, a feature now required by many broadcasters.
- **ITU BS.412 Multiplex Power Control:** The defeatable "dual speed" Multiplex Power Controller constrains MPX power smoothly and reliably, ensuring compliance in countries that regulate it.
- **ITU-R BS.1770-4 Loudness Control:** This facilitates compliance with modern target loudness recommendations for FM and Digital Media.
- **Diversity Delay:** A multifunctional adjustable delay can be inserted in the FM and/or digital path to ensure time-alignment of the FM and HD Radio/DAB+ signals at the receiver.





OPTIMOD 5950 HD

FM & DAB+/HD-1/HD-2 Radio Audio Processor



The OPTIMOD 5950 HD Broadcast Audio Processor, back panel.

- **Silence Detection:** A programmable silence detector is available for all physical inputs. It can generate alarms and allows automatic switching to a backup input/input audio storage.
- **Audience Measurement:** Internal Nielsen, Kantar or IPSOS Encoders are optionally available, allowing the FM and the DAB+/HD Radio signals to be watermarked independently.
- **Streaming Monitor Output:** Optionally, the processed signal can be monitored remotely via IP, allowing processor adjustment in locations where a clean off-air signal is unavailable.
- **µMPX interface:** The optional µMPX Interface allows you to transmit bandwidth-limited DMPX over IP.
- **APTmpX Interface:** The optional APTmpX Interface allows you to transmit full bandwidth DMPX over IP.
- **Internal Storage for Audio Backup:** An optional 2 GB Flash Memory provides two hours linear or twelve hours AAC, MP3 or OPUS encoded audio.
- **Internet Stream Decoder:** This optional feature can be used as a backup audio source received via Audio-over-IP.
- **SuperHiFi HLS+ Decoder:** Option provides metadata recovery that can be sent to dual IP destinations. Quu is supported and it has up to 3 minutes of playback buffering with time synced playout.
- **Dual Power Supplies:** Monitored dual-redundant power supplies ensure a trouble-free 24/7 operation.
- **Safety Bypass Relays:** The analog, digital AES3 and the composite audio inputs and outputs have defeatable safety bypass relays that operate in case of hardware or power failures.

Audio Input Channels:	1 x stereo analog 2 x stereo digital AES3 2 x stereo AoIP
Audio Output Channels:	1 x stereo analog 2 x stereo digital AES3, both independent configurable for DMPX 4 x stereo AoIP 2 x analog MPX/composite 1 x µMPX / APTmpX (DMPX over IP STL) 1 x headphone output (for monitoring)
SCA Inputs:	2 x (BNC)
Synchronization:	10 MHz clock input (BNC) AES11 sync input 19 kHz pilot tone reference output
GPIOs:	8 x inputs, 2 x outputs
Latency:	4 - 260 msec (depending on the processing structure) Low-latency processing Output: 3-8 msec
IP Network:	1 x RJ45 Ethernet Management/Control 1 x RJ45 Ethernet Streaming encoding/decoding/µMPX/APTtmpX functionalities 2 x RJ45 Dual-redundant AoIP (AES67, SMPTE ST-2110, Dante or RAVENNA)

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OPTIMOD XPN-Enterprise

FM & DAB+/HD Radio Audio Processing System

The OPTIMOD XPN-Enterprise offers a completely new approach to processing compared to the existing Orban hardware product range. It is an easy-to-use, Linux-based, customizable processing platform for multiple broadcast stations or streaming services with centralized control. OPTIMOD XPN-Enterprise supports AES67/SMPTE ST-2110/2027 as well as Livewire+™ and allows you to set up a state-of-the-art AoIP audio processing system. By using the appropriate XPN-E Node, other common methods of transport such as AES3 are supported as well and necessary outputs (FM Composite, DMPX, μ MPX, and DAB+/HD Radio) for the distribution to the transmitter sites can be provided.



Key Features

OPTIMOD XPN-Enterprise server provides Orban's proprietary OPTICLOUD™ processing for up to **8 FM and 8 DAB+/HD Radio channels plus 8 processed streaming outputs** for a total of 24 output channels using either the FM/HD Node or the FM Node. The outputs of the streaming processors can be added by using the optional AES Node with 8 AES Audio inputs and 8 AES Audio outputs. Alternatively, you could also use the Streaming Encoder Node which provides 4 Streaming Encoders in a 1RU hardware box with AoIP connection. Of course, it is possible to connect two Streaming Encoder Nodes to have 8 processed and encoded audio streams.

Each XPN-E Node is connected via AoIP Ethernet interface to the XPN-Enterprise server. We offer **XPN-E Nodes** to set up or expand your system according to your requirements.

The following XPN-Enterprise nodes are available to extend the system and provide virtually unlimited flexibility for your radio broadcast ecosystem:

- **FM/HD Node:** 1RU hardware box with dual redundant AoIP input with FM and HD/DAB outputs as follows: 1 digital MPX, 1 FM composite (analog MPX), 1 Orban μ MPX, 1 AES3 and 1 analog audio output; the node also provides RDS encoding and dual FM/HD Watermarking Encoders (Kantar or Nielsen)
- **FM Node:** 1RU hardware box with dual redundant AoIP input with FM output as follows: 1 FM composite (analog MPX), 1 Orban μ MPX and 1 AES3 audio output; the node also provides RDS encoding and an FM Watermarking Encoder (Kantar or Nielsen)
- **Streaming Node:** 1RU hardware box with 4 Streaming Encoders (FLAC, AAC, OPUS) and 4 Watermarking Encoders (Kantar or Nielsen)
- **AES Node:** 1/3 1RU hardware box with 8 AES3 inputs and 8 AES3 outputs
- **Kantar Node:** 1RU hardware box providing 4 Kantar Watermarking Encoders
- **Nielsen Node:** 1RU hardware box providing 4 Nielsen Watermarking Encoders





OPTIMOD XPN-Enterprise

FM & DAB+/HD Radio Audio Processing System

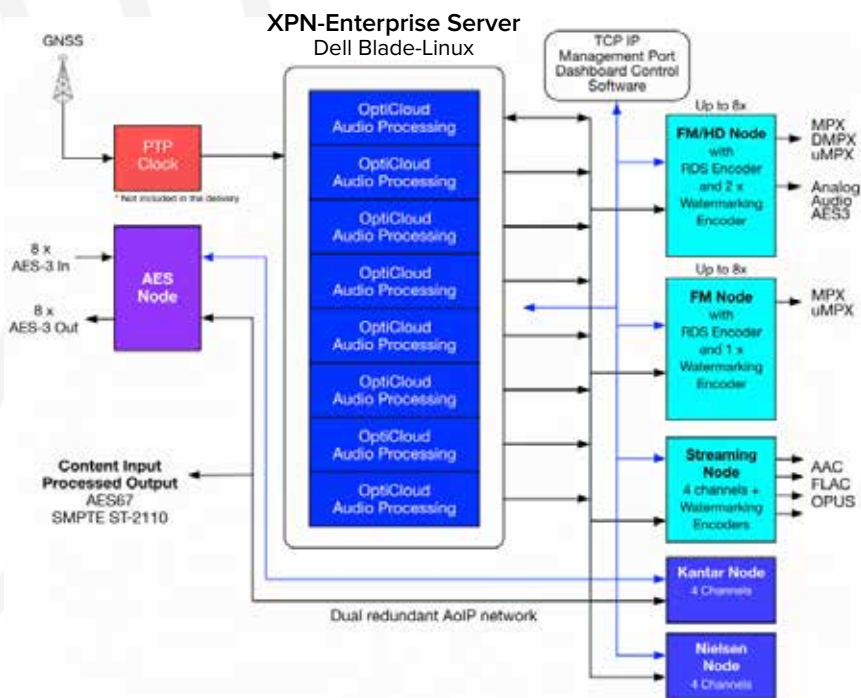


The OPTIMOD XPN-Enterprise has an easy-to-use, Linux-based, customizable processing platform for multiple broadcast stations or streaming services with centralized control.

- **Audio Processing at Its Best:** XPN-Enterprise's OPTICLOUD™ processing provides automatic level control of audio sources, sophisticated multi-band dynamic equalization with both subharmonic and harmonic synthesis, phase-skew correction, and a highly effective oversampled true-peak limiter that prevents distortion and optimizes codec performance without clipping or primitive pumping.
- **Factory Presets:** As with all our OPTIMODs, the XPN-Enterprise also comes with a variety of factory presets; Orban's exclusive "Less-More" control simplifies creating your own signature sound.
- **Centralized Control:** The Dashboard app can be installed on Windows, Mac OS X or Linux operating systems and allows you to configure and monitor the complete system.

System Block Diagram

The block diagram on the right shows you an example of the OPTIMOD XPN Enterprise system. Depending on your requirements, you can use AES67 or the AES3 Node for your audio inputs and outputs. On the output side, the FM/HD Node allows you to select any of the available interfaces as your output for the processed FM and HD/DAB+ broadcasts. If you do not need an HD output for DAB+ or HD Radio, you can simply use the FM Node instead. Both the FM/HD and the FM Nodes provide an integrated RDS Encoder as well as Watermarking (Nielsen or Kantar). In total, you can connect up to 8 FM/HD and/or FM Nodes. With each Streaming Node, you will be able to encode up to four processed streams using AAC, FLAC or OPUS algorithms, each with its own dedicated Watermarking. Multiple Streaming Nodes can be used to stream content to end users or back to the studio to monitor and adjust the processing.



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Technical specifications are subject to change; Version: October 2025





OPTIMOD XPN-AM

AM and HD Radio Broadcast Audio Processor

The OPTIMOD XPN-AM is the result of more than five years of research by processing pioneer Bob Orban. It exploits a psychoacoustic model to maximize the reach and intelligibility of AM/MW/SW transmissions while lowering distortion and reducing listening fatigue. The XPN-AM is based upon an AM-optimized version of Orban's MX limiter technology that was first introduced in the Optimod-FM 8600. This revolutionary limiter technology provides an unprecedented combination of loudness, cleanliness, crispness, speech intelligibility, and coverage. Additionally, XPN-AM's design incorporates everything Orban has learned in 42 years of AM processing experience, starting with the original Optimod-AM 9000 back in 1977.



The OPTIMOD XPN-AM, an AM and HD Broadcast Audio Processor.



Designed by Orban in USA/Germany

www.orban.com





OPTIMOD XPN-AM

AM and HD Radio Broadcast Audio Processor



The OPTIMOD XPN-AM Broadcast Audio Processor, back panel.

Key Features

- **MX Limiter** – Orban's exclusive MX Limiter increases average modulation while reducing distortion and improving speech intelligibility, and increasing HF power handling capability.
- **20% Power Savings** – Compared to other AM processors, provides up to 20% power savings when using MDCL AMC 3 dB dynamic carrier power control.
- **Processing for Multiple Broadcast Types** – Suitable for long wave, medium wave, and shortwave (HF) AM broadcasts.
- **Maximum Coverage** – Cuts through today's high RF noise environments, maximizing coverage.
- **Diversity Delay** – Mono/stereo analog AM processing and HD Radio/netcast processing with built-in diversity delay and delay ramping.
- **Dense Positive Peaks** – Can create dense positive peaks to 125% modulation.
- **Equalizer** – Versatile transmitter equalizer can tune out tilt and ringing in transmission systems.
- **Variable Bandwidth** – Variable bandwidth from 2.5 KHz to 9.5 KHz (NRSC), with parametric input filter shapes to trade off brightness against ringing.
- **Complements the High Frequency Roll-Off** – Receiver equalizer shapes pre-emphasis can complement the high frequency roll-off of an "average" AM radio as determined by NRSC tests in 2006.

System Specifications

Input/Output Delay – Typically 450 to 1000 ms. Varies according to the number of processing features that are activated.

Input/Output Resolution – 16-bit or 24-bit fixed point. If the output is configured for 16 bits, First-order noise-shaped dither can be applied prior to truncation to 16 or 24 bits from 32-bit float.

Input/Output Sample Rate – 44.1, 48, 96, or 192 kHz. 48 KHz is native. 44.1, 96, and 192 kHz use high-quality synchronous sample rate converters built into OPTIMOD XPN-AM.

Internal Resolution – 32-bit or 64-bit floating point, as appropriate for the processing being performed.

Internal Sample Rate – 48-256 kHz as needed.

Stereo Enhancer – Orban-developed L-R dynamic expansion triggered by L+R transients. To avoid artifacts and over-enhancement, it only expands L-R energy above 200 Hz.

Multiband Compressors – 25dB gain reduction range, Five-Band.

Frequency Response – ± 0.1 dB, 2-20,000Hz
(Bypass software running)

HD MB Crossover Frequencies – 6.2 KHz, 1.6 KHz, 420 Hz, and 200/150/100 Hz (selectable)

AM MB Crossover Frequencies – 3.8 kHz, 1.6 kHz, 420 Hz, and 100/150/200 Hz (selectable)

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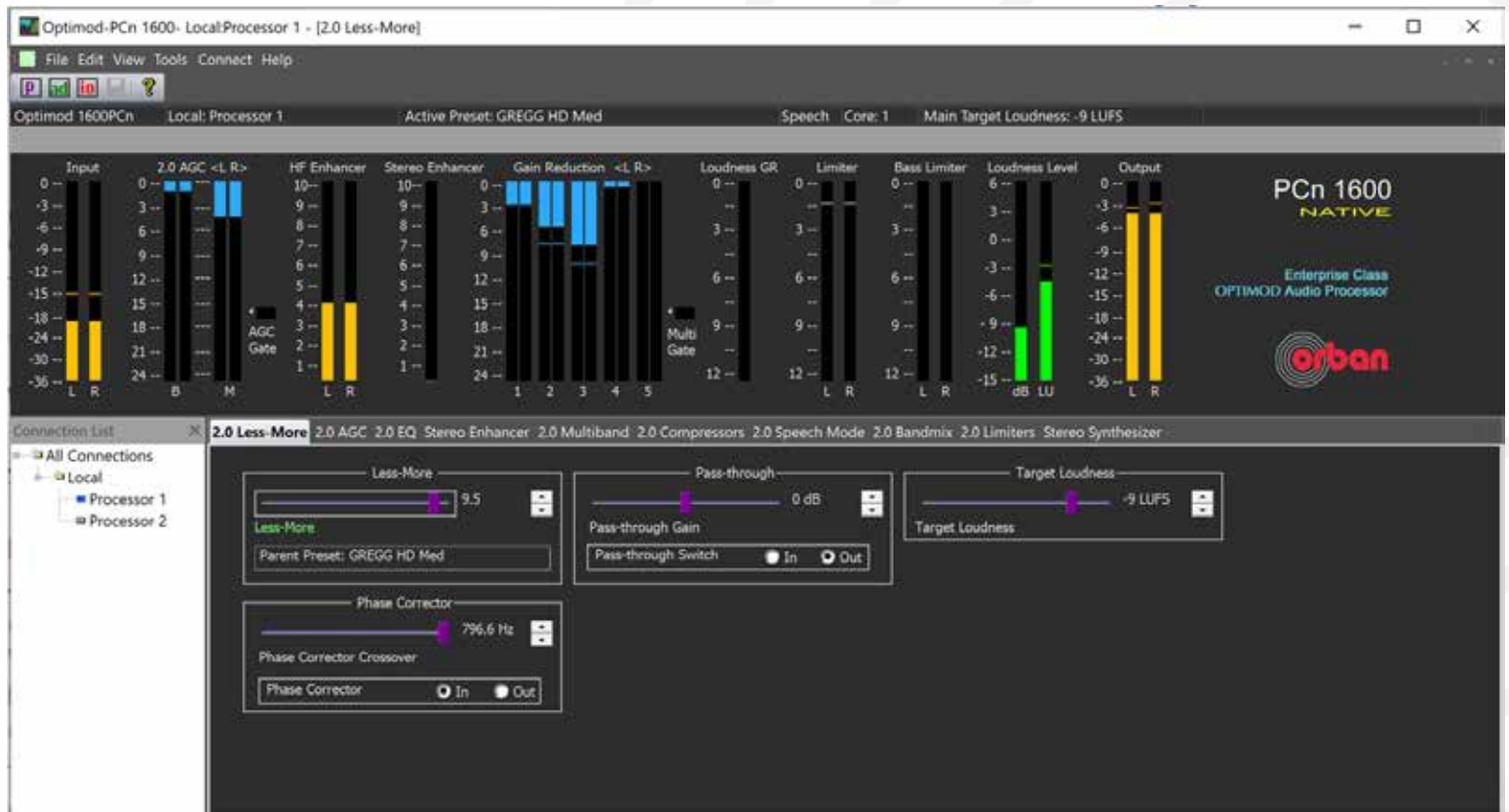




OPTIMOD-PCn 1600

Audio Processing Software for DAB+, Streaming & Podcast

The OPTIMOD-PCn 1600 Audio Processing Software is the perfect choice for customers who need a flexible and scalable audio processing solution. Whether it is audio processing for live streaming, DAB/DAB+, HD radio or TV broadcasts, OPTIMOD-PCn 1600 will do the job. With its integrated batch processor OPTIMOD-PCn 1600 is also the ideal solution for Podcasters who want to give their work the sound it deserves. OPTIMOD-PCn 1600 runs as a Windows Service on its host computer, can be configured to start automatically with Windows and runs reliably in the background.



The OPTIMOD-PCn 1600 configuration is done easily using the supplied Windows PC user control application. Via the user interface you can control all your audio processing streams in your connection list.





OPTIMOD-PCn 1600

Audio Processing Software for DAB+, Streaming & Podcast

Key Features

Flexible Number of Audio Processors: You will need to purchase one OPTIMOD-PCn 1600 license for each instance of audio processing required. The main factors determining how much CPU a given instance will use are the number of channels of processing (dual-mono or stereo), whether the MX Peak Limiter is activated, and whether the Loudness Controllers are enabled.

Audio Processing Tailored to Your Needs: OPTIMOD-PCn 1600 comes with Orban's exclusive MX peak limiter which decreases distortion, increases transient impact, and provides more high frequency energy. The multipath mitigator/phase corrector prevents high frequency loss during mono listening, including weak-signal blending in car radios. The subharmonic synthesizer generates punchy bass. Each OPTIMOD-PCn 1600 audio processor consists of the following adjustable processing elements: Input > DC-blocking High-Pass Filter > Stereo Synthesizer > Mono Bass > Left/Right Phase Skew Corrector > Stereo Enhancer > Two-Band AGC with Window Gating > High-Pass Filter (20-200Hz) > Lowpass Filter (10.. 20 kHz) > Subharmonic Synthesizer > Equalizer/HF Enhancer > Five-Band Downward Expander > Five-Band Compressor/Limiter > CBS and BS.1770 Automatic Loudness Controller > Bass-Clip / Pre-Limiter > True Peak Limiter > Output.

Factory Presets: A variety of factory presets are available; Orban's exclusive "Less-More" control simplifies creating your own signature sound.

Loudness Control: OPTIMOD-PCn 1600 provides modern "target loudness" concepts including those specified in EBU R128 and ATSC A/85 using the ITU-R BS.1770 loudness model. It allows you to easily set and verify the target loudness of the output. You can also use the proprietary Orban-CBS Labs Loudness Meter and Loudness Controller that provides BS.1770 compliance better than a BS.1770-based loudness control and it does so without audible gain pumping or other annoying artifacts common in BS.1770-based loudness controls.

True Peak Control: The MX True Peak Limiter creates a favourable tradeoff between loudness, transient punch, and distortion artifacts.

PreCode™ Technology: Orban's exclusive PreCode™ technology manipulates 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.

Batch Processor for Podcast Applications: OPTIMOD-PCn 1600 can also process .wav files for e.g. podcasting. The processing speed is usually faster than real time and depends on the CPU speed and architecture. Single files or directories can be processed, using local or external storage. Any metadata present in the source file is preserved and passed to the destination file.

Audio Interfaces: The software is compatible with all Windows-sound devices with stable Windows WASAPI Drivers. Real, virtual, and network audio devices are supported for maximum flexibility, scalability, and inter-app audio connections without real hardware.

Audio-Over-IP: By use of third party Windows Audio drivers, PCn 1600 is compatible with various network audio input/output (such as AES67, Ravenna, Dante or Livewire).

Control Software: The 1600PC Windows Control Software can run on the same computer as the OPTIMOD-PCn Service or on any computer connected to the same network. You can install as many copies of 1600PC on as many computers as you wish. Only one instance of 1600PC can be connected to a given audio processor at a time.

Network Management: The SNMP features allow you to monitor the PCn 1600 status and to send alarm notifications to your network via the ethernet connection. IP API and serial API features provides complete remote administration over TCP/IP and serial port communication.

Hardware Requirements: OPTIMOD-PCn requires a genuine Intel Core 2 (3 GHz or faster using Intel's 45 nm manufacturing process), i3, i5, or i7, CPU of any generation. PCn uses Intel vector floating point instructions to achieve the required computational efficiency. The baseline PCn code requires the SSE4.1 vector instruction set. Core 2 and all i-series processors support SSE4.1. You may also use an Intel Xeon processor if it supports SSE4.1. We recommend sixth-generation i7 CPUs or higher.

Operating System: Windows 10, Professional edition or higher.

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