multipurpose

orban crl

audio processing



DTV DAB NET DTV DAB

OPTIMOD DIGITAL 6300

Need to slash processing cost,

complexity,

and clutter?

Here’s the perfect weapon —



one for three
and three for all.

OPTIMOD 6300 – Three Processors in One:



The Orban 6300 is a high-quality, multipurpose stereo audio processor for digital radio, digital television, netcasts, STL protection, satellite uplink protection, and digital mastering. With 20 kHz audio bandwidth, the 6300 succeeds Orban's popular OPTIMOD-DAB 6200 audio processor but offers improved processing algorithms and more flexibility. Any of its three outputs can emit any of the following signals:

- Stereo enhancement, equalization, and AGC without look-ahead peak limiting
- Stereo enhancement, equalization, and AGC with peak limiting
- Stereo enhancement, equalization, and multiband processing (2-band or 5-band, including AGC) without peak limiting
- Stereo enhancement, equalization, and multiband processing (2-band or 5-band, including AGC) with peak limiting.

A talent headphone processor

Use the stereo enhancement, equalization, and multiband processing without peak limiting to drive talent headphones. Delay is less than 5 milliseconds from input to output. This is particularly useful in HD Radio™ facilities, where off-air headphone monitoring is impossible due to delay.

A no-compromise processing chain for digital transmission and media

Use the stereo enhancement, equalization, and multiband processing chain with peak limiting for any digital transmission channel, like HD Radio™, DAB, DRM, digital television, and netcasts. Moreover, newly designed compression ratio and knee controls make the 6300 perfect for subtle compression in mastering and production. Mastering-quality look-ahead limiters and a pristine signal path provide superb audio quality.

details



Next and Previous buttons scroll display horizontally to access hidden menu items.

Bright, legible LCD display allows you to recall, edit, and save presets, and to set up system technical parameters like input and output levels.

Input level meters. Full featured, full-time LED metering makes it easy to set up the 6300.

AGC gain reduction meter.

Left and right meters can indicate the gain reduction of the AGC or multiband compressor look-ahead limiters.

LCD contrast adjustment optimizes the display to your preferred viewing angle.

Four context-sensitive soft keys repurpose themselves for the task at hand.

Dedicated keys for Escape, Recall Preset, Edit Preset, and System Setup.

Gain reduction meters for AGC and multiband compression.

Knob lets you easily customize presets and tweak system setup parameters.

A studio AGC (with peak limiting for STL protection)

Use the 6300's AGC with peak limiting to substitute for the AGC in an OPTIMOD at the transmitter and to provide protection limiting for the STL. The AGC is turned off in the transmitter-side OPTIMOD. The 6300's two independent stereo look-ahead limiters can be switched to operate either "flat" or on a 50 µs or 75 µs pre-emphasis curve to protect a pre-emphasized path like a typical analog microwave STL.

The 6300's AGC uses the same dual-band, window-gated, matrix technology as the AGCs in Orban's 2300, 5300, 8300, 8382, 8400, 8500, 9300, and 9400 OPTIMODs. It can accurately substitute for the AGCs in these devices and can help maintain an all-digital signal path throughout the facility. Because the 6300's AGC is more advanced than the AGCs in Orban's 2200, 8200, and 9200 OPTIMODs, the 6300 can upgrade the performance of these older products when substituted their AGCs. Moreover, because the 6300 supports presets that can be recalled by remote control, it can be automatically synchronized to the presets on-air at a transmitter-side OPTIMOD when presets are dayparted.

The 6300's multiband processing is based on the technology used in OPTIMOD-FM 8500's digital radio processing path and will sound similar. To help you match the sound of an 8400 or 8500, the 6300 provides presets with the same names as those in OPTIMOD 8400 and 8500. If you are using a factory preset at a transmitter-side 8400 or 8500, you can recall a preset with the same name in the 6300 to ensure that the sound stays the same as it would if you were using an 8400 or 8500 with its internal AGC.

advanced
2-band AGC
perfectly complements
any OPTIMOD installed
at the
transmitter

Automatic Loudness Control for Digital Television and Netcasts

The 6300 offers two-band and five-band presets carefully tuned to the demands of sound-for-picture applications. These ride gain subtly and unobtrusively so that the sound is always comfortably listenable.

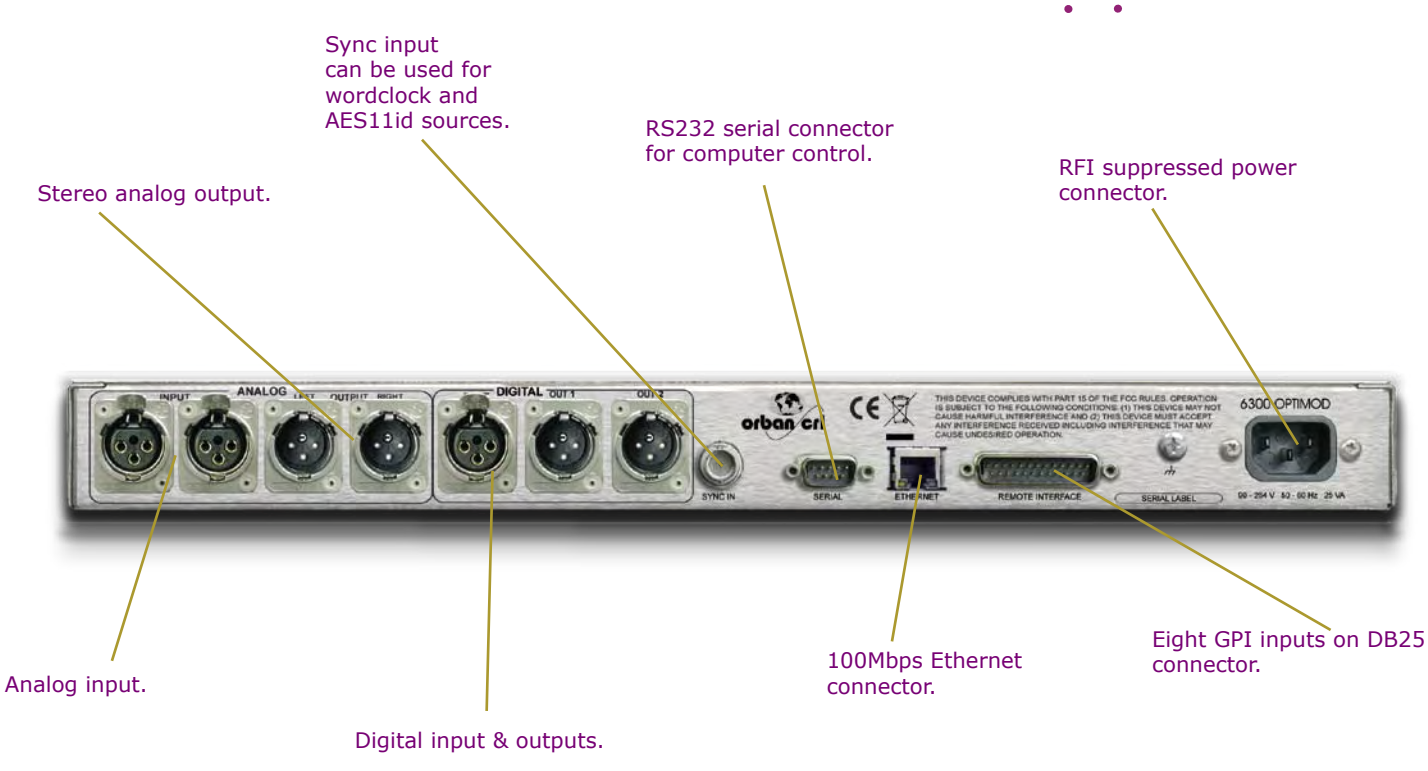
The 6300's built-in CBS Loudness Controller™ tames source-to-source loudness variations, ensuring consistency and maximizing audience satisfaction.

PreCode™ Conditions Audio for Low Bitrate Codecs

Orban's PreCode™ technology manipulates several aspects of the audio to minimize artifacts caused by low bitrate codecs. PreCode offers an optimum balance between liveliness and artifact reduction, minimizing "phasey" and "underwater" artifacts without sucking the life out of the audio.

minimizes codec artifacts
without killing the music

details



features & benefits

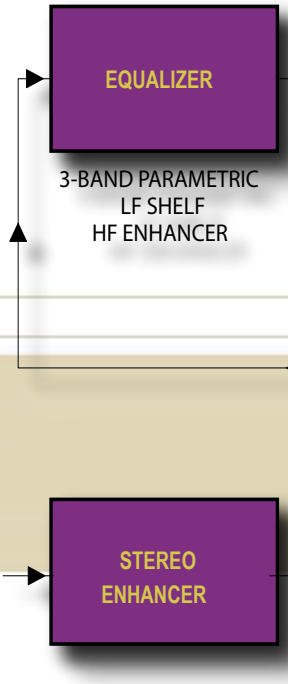
USER-FRIENDLY INTERFACE	
LCD and **full-time LED meters**	These meters make setup, adjustment and programming of OPTIMOD 6300 easy — you can always see the metering while you're adjusting the processor. Navigation is by dedicated buttons, soft buttons (whose function is context-sensitive), and a large rotary knob. The LEDs show all metering functions of the processing structure (Two-Band or Five-Band) in use.
Dedicated Keys	Push one of the dedicated buttons to "Recall" a preset, to "Modify" processing, or to access the system's Setup controls.
ABSOLUTE CONTROL OF OUTPUT LEVEL	
Mastering-quality look-ahead limiters	THE 6300 **precisely controls peak levels** to prevent clipping or overmodulation in transmission media. The maximum level of the digital samples is controlled to better than 2%.
Pre-emphasis limiting for the two standard pre-emphasis curves of 50 µs & 75 µs	While **primarily oriented toward "flat" media**, the 6300 can also provide **pre-emphasis limiting** for the two standard preemphasis curves of 50 µs and 75 µs. This allows it to protect pre-emphasized satellite uplinks and similar channels where protection limiting or light processing is required.
FLEXIBLE CONFIGURATION	
Analog & AES3 digital inputs & outputs	The 6300 includes **analog** and **dual AES3** digital inputs and outputs. The digital input and digital outputs have sample rate converters and can operate at 32 kHz, 44.1 kHz, 48, 88.2 and 96 kHz sample rates. The pre-emphasis status and output levels are separately adjustable for the analog and digital outputs. *Note that the 6300 cannot provide simultaneous, independent audio processing for flat and pre-emphasized channels. Even though one output may be pre-emphasized while other is flat, the only difference between the outputs is that the "flat" output has de-emphasis applied to it after the processing while the pre-emphasized output does not.*
Independently configured outputs	OPTIMOD 6300's outputs can be independently configured to emit the output of the **AGC** or the output of the **multiband compressor/limiter**, all configurable to use or bypass look-ahead limiting.
Dual-mono mode	The 6300's **dual-mono mode allows entirely separate mono programs** to be processed, facilitating dual-language operation. *In this mode, both processing channels operate using the same processing parameters (like release time); you cannot adjust the two channels to provide different processing textures.*
Versatile lowpass filtering	The 6300 **controls the audio bandwidth** as necessary to accommodate the transmitted sample frequency. OPTIMOD's high frequency bandwidth can be switched instantly (typically in 1 kHz increments) between 10 kHz and 20 kHz. 20 kHz is used for highest-quality systems. 15 kHz meets the requirements of any system that uses 32 kHz sample frequency, while 10 kHz is appropriate for 24 kHz sample frequency.

features & benefits

ADAPTABILITY THROUGH MULTIPLE AUDIO PROCESSING STRUCTURES	
DSP processing allows the 6300 to be reconfigured instantly	A **processing structure** is a program that operates as a complete audio processing system. Only one processing structure can be on-air at a time. The 6300 realizes its processing structures as a series of high-speed mathematical computations made by Digital Signal Processing (DSP) chips.
Two processing structures	The 6300 features two processing structures: **Five-Band** for a spectrally consistent sound with good loudness control, and **Two-Band** for a transparent sound that preserves the frequency balance of the original program material while also effectively controlling subjective loudness.
Exclusive PreCode technology minimizes artifacts in low bitrate codecs	In the Five-Band structure, Orban's **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. 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.
No-compromise "Protect" function	A special Two-Band preset creates a no-compromise "Protect" function that is functionally similar to the "**Protect**" structures in earlier Orban digital processors. The Five-Band and the Two-Band structures can be switched via a mute-free crossfade.
CBS Loudness Controller™	The 6300's Two-Band structure includes a **CBS Loudness Controller™** for DTV applications. This system measures subjective loudness (as perceived by an average listener) and then closes a feedback loop to limit loudness to a preset level. *It effectively controls loud commercials, which are the primary irritant in video applications.*
Dual-band AGC smoothly rides gain	The 6300's AGC **rides gain** over an adjustable range of up to 25 dB, compressing dynamic range and compensating for both operator gain-riding errors and gain inconsistencies in automated systems. The AGC output is available to drive STLs, so the 6300 can be used as a studio AGC.
Phase-linear processing structures	The 6300's processing structures can be configured as phase-linear to maximize audible transparency.
Mastering Applications	All compressors in the Two-Band and Five-Band structures have **compression ratio** and **knee shape** controls for each band's compressor, making the 6300 perfect for applying subtle compression in mastering applications. The 6300's look-ahead limiters are sonically competitive with the best dedicated mastering limiters. The crossovers and equalizers use double-precision (48-bit) filters to ensure sonic purity.
Speech Mode	The 6300's **automatic speech/music discriminator and separate "speech mode" tuning controls** allow you to optimize the processing separately for music and speech material.

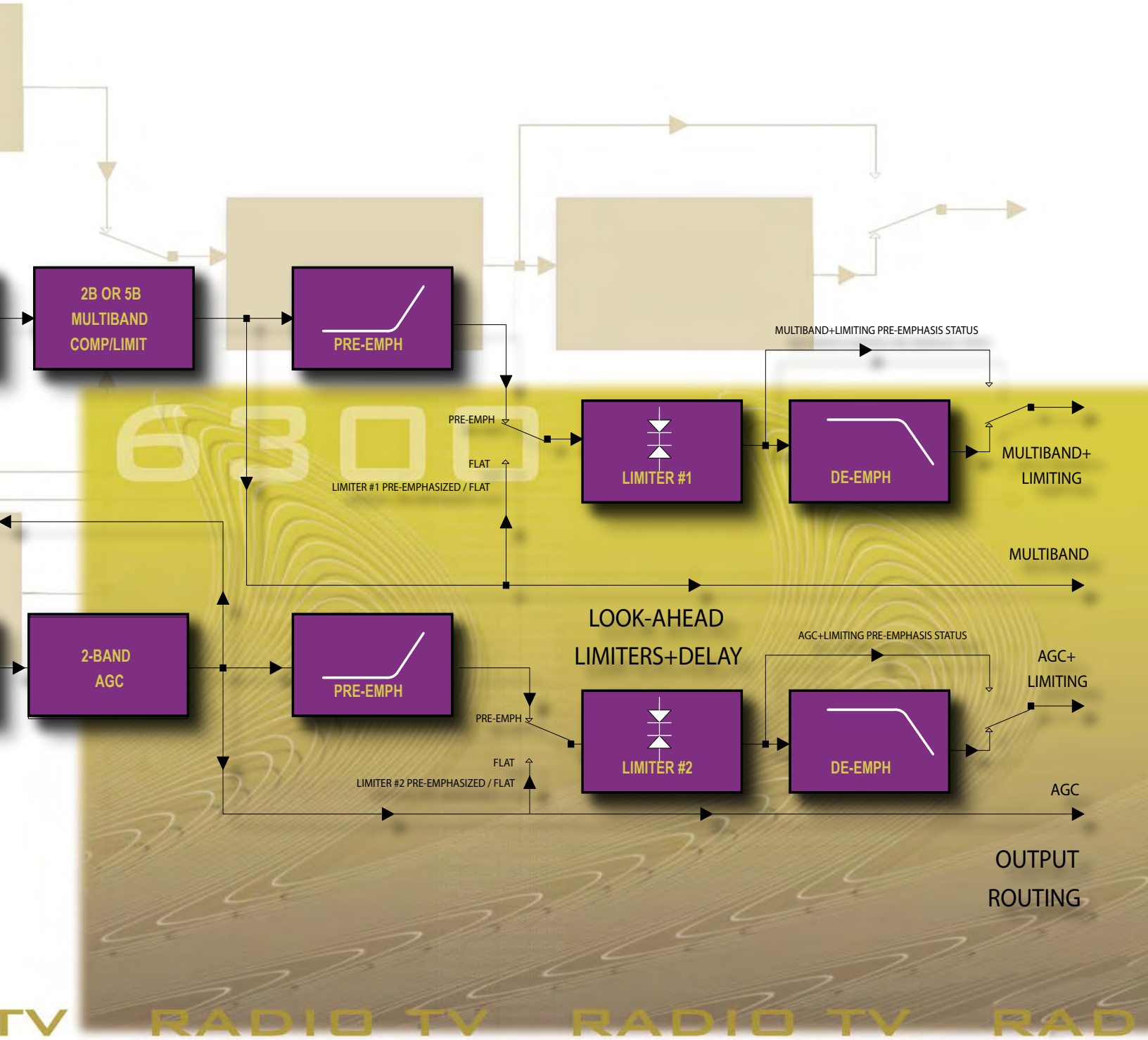
features & benefits

CONTROLLABLE	
Eight programmable, optically isolated "general-purpose interface" (GPI) ports	The 6300 **can be remote-controlled** by 5-12V pulses applied to eight programmable, optically isolated "general-purpose interface" (GPI) ports.
6300 PC Remote software	**6300 PC Remote software** is a graphical application that runs under Windows 2000 and XP. It communicates with a given 6300 **via TCP/IP** over **modem**, **direct serial** and **Ethernet connections**. You can configure PC Remote to switch between many 6300s via a convenient organizer that supports giving any 6300 an alias and supports grouping multiple 6300s into folders. Clicking a 6300's icon causes PC Remote to connect to that 6300 through an Ethernet network or initiates a Windows Dial-Up or Direct Cable Connection if appropriate. The PC Remote software allows the user to access all 6300 features (including advanced controls not available from the 6300's front panel) and allows the user to archive and restore presets, automation lists, and system setups (containing I/O levels, digital word lengths, GPI functional assignments, etc.).
Versatile **real-time clock**	The 6300 contains a versatile **real-time clock**, which allows automation of various events (including recalling presets) at pre-programmed times. To ensure accuracy, the clock can be synchronized to an Internet timeserver.
Bypass Test Mode	A **Bypass Test Mode** can be invoked locally, by remote control (from either the 6300's GPI port or the 6300 PC Remote application), or by automation to permit broadcast system test and alignment or "proof of performance" tests.
Built-in line-up tone generator	The 6300 contains a built-in **line-up tone generator**, facilitating quick and accurate level setting in any system.
Updating 6300's software	The 6300's software can be upgraded by running Orban-supplied downloadable upgrade software on a PC. The upgrade can occur remotely through the 6300's Ethernet port or serial port (connected to an external modem), or locally (by connecting a Windows® computer to the 6300's serial port through the supplied null modem cable).
Easy Setup	A Quick Setup wizard guides you through system setup, step by step. Dozens of excellent-sounding factory presets help you find the sound you want. Once you have found a suitable preset, you can fine-tune it with one-knob LESS-MORE control. If you want to go further, Full Control and Advanced Control let you modify processing settings at progressively deeper levels.



RADIO TV RADIO TV RADIO

about the 6300's audio processing



specifications

It is impossible to characterize the listening quality of even the simplest limiter or compressor based on specifications, because such specifications cannot adequately describe the crucial dynamic processes that occur under program conditions. Therefore, the only way to evaluate the sound of an audio processor meaningfully is by subjective listening tests.

Certain specifications are presented here to assure the engineer that they are reasonable, to help plan the installation, and make certain comparisons with other processing equipment.

PERFORMANCE	*Specifications apply for measurements from analog left/right input to analog left/right output.*	
	Frequency Response (Bypass Mode)	Depending on settings, is flat or follows standard 50 µs or 75 µs preemphasis curve ±0.10 dB, 20 Hz – 20 kHz. (At 32 kHz input sample rate, the passband is reduced to approximately 14.7 kHz.) Analog left/right output and digital output can be user-configured for flat or pre-emphasized output.
	Noise	Output noise floor will depend upon how much gain the processor is set for (Limit Drive, AGC Drive, Two-Band Drive, and/or Multiband Drive), gating level, equalization, noise reduction, etc. The dynamic range of the A/D Converter, which has a specified overload-to–noise ratio of 110 dB, primarily governs it. The dynamic range of the digital signal processing is 144 dB.
	Total System L/R Channel Separation	>70 dB, 20 Hz – 20 kHz; 90 dB typical (analog I/O). Digital I/O separation is essentially infinite.
	Polarity	(Bypass Mode; Operate Mode when processing chain is configured for linear phase): Absolute polarity maintained. Positive-going signal on input will result in positive-going signal on output.
	Internal Processing Sample rate	48 kHz. We believe this provides maximum audible transparency by minimizing numerical "noise" in the equalizers and filters while still preserving a pure, transparent sound. The double-precision equalizers and crossover filters used throughout the 6300 produce at least 6 dB lower noise and nonlinear distortion than they would at 96 kHz.
	Processing Resolution	Internal processing has 24 bit (fixed point) or higher resolution; uses Motorola DSP56367 chips.
	Delay	The minimum available input/output delay is approximately 20 ms, as determined by the advanced "look-ahead" processing algorithms employed. This can be padded to exactly one frame of 24, 25, 29.97 or 30 frames/second video up to a maximum delay of 50 ms.
	Operating Mode	Stereo or dual-mono. In dual-mono mode, both processing channels have the same subjective adjustments (as determined by the active preset) but are otherwise independent, making this mode appropriate for dual-language transmissions. Operating mode can be set via GPI, Ethernet and serial connections, internal clock-based automation, and AES3 Status Bits.
INSTALLATION	***Analog Audio Input***	
	Configuration	Stereo / Dual-Mono.
	Impedance	>10 kΩ load impedance, electronically balanced.
	Nominal Input Level	Software adjustable from –4.0 to +13.0 dBu (VU).
	Maximum Input Level	+27 dBu.
	Connectors	Two XLR-type, female, EMI-suppressed. Pin 1 chassis ground, Pins 2 (+) and 3 electronically balanced, floating and symmetrical.
	A/D Conversion	24 bit 128x oversampled delta sigma converter with linear-phase anti-aliasing filter.
	Filtering	RFI filtered, with high-pass filter at 0.15 Hz (–3 dB).
	Analog Audio Output	
	Configuration	Stereo. Flat or pre-emphasized (at 50 µs or 75 µs), software-selectable.
	Source Impedance	50 Ω, electronically balanced and floating.
	Load Impedance	600 Ω or greater, balanced or unbalanced. Termination not required or recommended.
	Output Level (100% peak modulation)	Adjustable from –6 dBu to +24 dBu peak, into 600 Ω or greater load, software-adjustable.
	Signal-to-Noise	≥100 dB unweighted (Bypass mode, 20 Hz – 20 kHz bandwidth, referenced to 100% modulation).
	Distortion	≤0.01% THD (Bypass mode, de-emphasized) 20 Hz – 20 kHz bandwidth.
	Connectors	Two XLR-type, male, EMI-suppressed. Pin 1 chassis ground, Pins 2 (+) and 3 electronically balanced, floating and symmetrical.
	D/A Conversion	24 bit 128x oversampled.
	Filtering	RFI filtered.
	Digital Audio Input	
	Configuration	Stereo or Two-Channel (dual-mono) per AES3 standard, 24 bit resolution, software selection of stereo or dual-mono. Unit can detect Stereo or Two-Channel status bits and switch modes appropriately.
	User Bits	Unit can pass AES3 User Bits from its AES input to AES Output #1.
	Sample Rate	32, 44.1, 48, 88.2 or 96 kHz, automatically selected.
	Connector	XLR-type, female, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer balanced and floating, 110 Ω impedance.
	Input Reference Level	Variable within the range of –30 dBfs to –10 dBfs.
	J.17 De-emphasis	Software-selectable.
	Filtering	RFI filtered.

Digital Audio Outputs	
Configuration	Stereo or Two-Channel per AES3 standard. Output configured in software as flat or pre-emphasized to the chosen processing preemphasis (50 µs or 75 µs), with or without J.17 preemphasis.
Sample rate	Internal free running at 32, 44.1, 48, 88.1 or 96 kHz, selected in software. Can also be synced to the AES3 digital, AES11id, or Wordclock input at 32, 44.1, 48, 88.1 or 96 kHz, as configured in software. (Passband is limited to approximately 14.7 kHz when using 32 kHz output sample rate.)
Word Length	Software selected for 24, 20, 18, 16 or 14-bit resolution. First-order highpass noise-shaped dither can be optionally added, Dither level automatically adjusted appropriately for the word length.
Connector	XLR-type, male, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer balanced and floating, 110 Ω impedance.
Output Level (100% peak modulation)	–20.0 to 0.0 dBfs software controlled.
Filtering	RFI filtered.
Sync Input	
Configuration	Can accept wordclock or AES11id (75 Ω) sync, selectable in software.
Connector	Female BNC.
Termination	Unterminated. For wordclock, use an external 75 Ω terminator if the 6300 is the last item in the chain. For AES11id, always use a 75 Ω terminator.
Remote Computer Interface	
Configuration	TCP/IP protocol via direct cable connect, modem, or Ethernet interface. Modem is not supplied.
Serial Port	115 kbps RS–232 port DB–9 male, EMI-suppressed.
Ethernet Port	100 Mbit/s on RJ45 female connector.
Remote Control (GPI) Interface	
Configuration	Eight (8) inputs, opto-isolated and floating.
Voltage	6 – 15 VAC or DC, momentary or continuous. 12 VDC provided to facilitate use with contact closure.
Connector	DB–25 male, EMI-suppressed.
Control	User-programmable for any eight of user presets, factory presets, bypass, test tone, stereo or mono modes, analog input, digital input.
Filtering	RFI filtered.
Tally Outputs	
Circuit Configuration	Two NPN open-collector outputs.
Voltage	+15 Volts maximum. Do not apply negative voltage. When driving a relay or other inductive load, connect a diode in reverse polarity across the relay coil to protect the driver transistors from reverse voltage caused by inductive kickback.
Current	30 mA maximum.
Indications	Tally outputs can be programmed to indicate a number of different operational and fault conditions, including Input: Analog, Input: Digital, Analog Input Silent, AES Input Silent and AES Input Error.
Power	
Voltage	85 – 264 VAC, 50 – 60 Hz, 15 VA.
Connector	IEC, EMI-suppressed. Detachable 3-wire power cord supplied.
Grounding	Circuit ground is independent of chassis ground and can be isolated or connected with a rear panel switch.
Safety Standards	ETL listed to UL standards, CE marked.
Environmental	
Operating Temperature	32 to 122 °F / 0 to 50 °C for all operating voltage ranges.
Humidity	0 – 95% RH, non-condensing.
Dimensions (W x H x D)	19" x 1.75" x 14.25" / 48.3 cm x 4.5 cm x 36.2 cm. One rack unit high.
RFI / EMI	Tested according to Cenelec procedures. FCC Part 15 Class A device.
Shipping Weight	10 lbs / 4.6 kg.
Warranty	
Two Years, Parts & Service	Subject to the limitations set forth in Orban's Standard Warranty Agreement.
Operating Manual	
	The 6300 Operating Manual is available for download from ftp.orban.com/6300/Documentation. This contains both setup and servicing instructions.

Because engineering improvements are ongoing, specifications are subject to change without notice.



www.orban.com

r08-2007_RO/Lo

ORBAN/CRL Corporate Office
7970 S. Kyrene Rd. | Tempe AZ 85284 USA
[p] +1 480.403.8300 | [f] +1 480.403.8301 | www.orban.com

Northern California Design Center Group
14798 Wicks Blvd. | San Leandro CA 94577 USA
[p] +1 480.403.8300 | [f] +1 480.403.8301 | [e] info@orban.com

ORBAN Europe GmbH
Businesspark Monreposstr. 55 | 71634 Ludwigsburg Germany
[p] +49 7141 22 66 0 | [f] +49 7141 22 66 7 | www.orban-europe.eu

ORBAN/CRL Netherlands B. V.
Signaal 74 | 1446 XA Purmerend, Netherlands
[p] +31 299 40 25 77 | [f] +31 299 40 29 04